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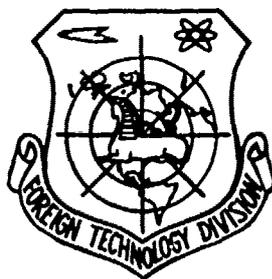
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# FOREIGN TECHNOLOGY DIVISION



EXPERIENCE OF SOVIET MEDICINE IN GREAT  
PATRIOTIC WAR. 1941-1945

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# UNEDITED MACHINE TRANSLATION

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U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	<i>А а</i>	A, a	Р р	<i>Р р</i>	R, r
Б б	<i>Б б</i>	B, b	С с	<i>С с</i>	S, s
В в	<i>В в</i>	V, v	Т т	<i>Т т</i>	T, t
Г г	<i>Г г</i>	G, g	У у	<i>У у</i>	U, u
Д д	<i>Д д</i>	D, d	Ф ф	<i>Ф ф</i>	F, f
Е е	<i>Е е</i>	Ye, ye; E, e*	Х х	<i>Х х</i>	Kh, kh
Ж ж	<i>Ж ж</i>	Zh, zh	Ц ц	<i>Ц ц</i>	Ts, ts
З з	<i>З з</i>	Z, z	Ч ч	<i>Ч ч</i>	Ch, ch
И и	<i>И и</i>	I, i	Ш ш	<i>Ш ш</i>	Sh, sh
Й й	<i>Й й</i>	Y, y	Щ щ	<i>Щ щ</i>	Shch, snch
К к	<i>К к</i>	K, k	Ъ ъ	<i>Ъ ъ</i>	"
Л л	<i>Л л</i>	L, l	Ы ы	<i>Ы ы</i>	Y, y
М м	<i>М м</i>	M, m	Ь ь	<i>Ь ь</i>	i
Н н	<i>Н н</i>	N, n	Э э	<i>Э э</i>	E, e
О о	<i>О о</i>	O, o	Ю ю	<i>Ю ю</i>	Yu, yu
П п	<i>П п</i>	P, p	Я я	<i>Я я</i>	Ya, ya

\*ye initially, after vowels, and after ъ, ь; e elsewhere.  
When written as ě in Russian, transliterate as yě or ě.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	sinh <sup>-1</sup>
cos	cos	ch	cosh	arc ch	cosh <sup>-1</sup>
tg	tan	th	tanh	arc th	tanh <sup>-1</sup>
ctg	cot	cth	coth	arc cth	coth <sup>-1</sup>
sec	sec	sch	sech	arc sch	sech <sup>-1</sup>
cosec	csc	csch	csch	arc csch	csch <sup>-1</sup>

Russian English

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lg log

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PAGE 1

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V. N. Shamov, T. Ya. Ar'yev (secretary).

Page 7.

Second Section.

COURSE AND EXITS OF THE BULLET WOUNDS OF SKULL DEPENDING ON THE  
VARIED CONDITIONS OF THE COMBAT OPERATIONS OF THE TROOPS

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Page 8.

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Page 13.

In preceding/previous, the fourth, volume of the present "Work" were brought to light questions of classification, pathological anatomy, clinic, complications and dependences of the series/row of the pathological processes in internal organs/controls on the damages of the cerebral cortex, and also treatment and direct issues of the bullet wounds of skull and brain. In this case all statistical evidence, just as direct results of treatment, were given on the basis of the data of the deepened development of the histories of disease/sickness/illness/malady, including all stages of evacuation.

However, for deeper characteristics of those varied conditions under which it was necessary to render medical aid by wounded during

the Great Patriotic War, main editorial staff recommended the studying of different combat process/operations, which were being characterized by the particular conditions of climate, locality, combat and medical-tactical circumstances, in different periods of last of the war.

Therefore in the fifth volume, dedicated to course and issues of the bullet wounds of skull depending on the varied conditions of the combat operations of the troops/forces, is given more detailed characteristics of rendering to the medical aid by that wounded into skull during seven large-scale combat process/operations of the Great Patriotic War, are given the conditions of rendering aid by that wounded to skull in different stages of evacuation and is given comparative characteristics of issues with the wounds of skull under varied conditions. Furthermore, from the moment of the termination of war passed sufficiently prolonged period, which made it possible to study and to illuminate in present volume the distant results of treatment and the ability to work of those wounded the histories of disease/sickness/illness/malady of whom were statistically developed for the preceding/previous volume. This was especially necessarily for determining the plastic role of the cerebral cortex in the restoration/reduction of the disrupted functions of the victim of organism, since the widespread opinion about the hopelessness of prognosis with such heavy wounds as the wounds of the skull and of

brain, based on the experiment/experience of past wars, was refuted the results of the treatment of these wounded during the Great Patriotic War.

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On the same reason in "Conclusion" are presented basic questions of military field neurosurgery on the foundation of the experiment/experience of the Great Patriotic War, which include the special features/peculiarities of the pathology of the cerebral cortex, subcortical ganglia/nodes and *truncated section* of brain after bullet wounds of skull, and also effect of wounds, primary surgical processing and subsequent treatment on the nearest and distant issues. Moreover, is illuminated the effect, which exerts to issues the character/nature of combat process/operations, condition of climate and locality, also, in particular the organization of the system of the specialized aid by that wounded the skull. In the latter/last unit of "Conclusion" are outlined further prospects for therapeutic aid with the wounds of skull.

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Chapter V.

MEDICAL AID TO WOUNDED IN SKULL UNDER VARIED CONDITIONS OF THE COMBAT OPERATIONS OF TROOPS

The main editorial staff of "Work" provided not only the deepened development of primary documents against wounded (histories of disease/sickness/illness/malady), but also study of reports about the combat process/operations of the Great Patriotic War 1941-1945 in order to thoroughly describe rendering to the medical aid by wounded under varied conditions of the combat operations of the troops/forces and in different year wars.

For a present section howled studied the materials on the treatment of those wounded the skull and the head brain during 7 large-scale combat process/operations of the Great Patriotic War:

1. Destruction of the Germans in the environs of Moscow - offensive operation from 5 December, 1941, through 28 January, 1942.

2. Battle in the environs of Stalingrad - period of defense and

offensive from 23 July, 1942, through 3 February, 1943.

3. Blockade break-through of Leningrad - offensive operation from 12 January, 1943, through 18 February, 1943.

4. Orel- Kursk battle - period of defense with march/passage into counteroffensive and beginning of pursuit of routed hostile troops from 5 July, 1943, through 20 July, 1943.

5. Liberation of Belorussia - offensive and pursuit of routed enemy from 23 June, 1944, through 18 July, 1944.

6. Visla - Oder - offensive from bridgehead/beachhead on western shore of Visla, pursuit of hostile troops and exercise of bridge-head strengthening on western shore of Oder from 14 January, 1945, through 10 February, 1945.

7. Berlin process/operation - offensive and combat in Berlin area from 16 April, 1945, through 5 May, 1945.

It should be noted that the analysis of materials is produced total on all armies, which participated in combat process/operation, but based on example of one of the armies, which was being located on the direction of main attack. This is caused by the fact that the

army area is most characteristic for military field neurosurgery and, furthermore, the study of materials on rendering to therapeutic aid by that wounded the skull in all armies, which participated in combat process/operation, smooths the specific special features/peculiarities of the combat process/operation which so are distinctly expressed in army, which was being located on the direction of main attack.

It is logical that in this army the conditions of rendering to the medical aid by that wounded the skull were most difficult from the point of view both combat and medical-tactical circumstances and quantity of the wounded, who entered therapeutic installations.

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However, if one considers that any army could be set for the accomplishment of combat objective in the direction of main attack, one should recognize that great marking acquires the study of work experience precisely in that army where stored/added up the severe conditions.

For the composition of this volume were studied and developed the reports and the explanatory recordings of the commanders, leading surgeons and doctor-specialists of all therapeutic installations and

medical departments of army, which was being located on the direction of the main attack of one or the other combat process/operation, and are also developed the reports of therapeutic installations and medical controls of the front line area, in order to come to light/detect/expose the direction of evacuation according to designation/purpose and further treatment of those wounded the skull.

As a result of developing these materials were the findings, characterizing the special features/peculiarities of the operational-tactical circumstances of the mentioned combat process/operations, was established/installed general/common/total characteristics of some questions of the organization of the medical aid by that wounded into skull in army area, and also specialized neuro-surgical aid in army and front line therapeutic installations.

The obtained statistical data make it possible to produce their comparative evaluation depending on the varied conditions of the combat operations of the troops/forces, and to also explain the basic laws, which affect the course and the issues of the bullet wounds of skull, upon consideration of the special features/peculiarities of medical-tactical circumstances and organization of the specialized aid.

Furthermore, the comparison of the results of treatment into

different combat process/operations made possible to consecutively/serially trace changes and achieved successes of the medical aid by that wounded into skull within the time of the Great Patriotic War, beginning with its first half-year and to final combat, which were finished by the taking of Berlin.

Rendering to the medical aid by that wounded the skull during combat process/operation the "Cut of the Germans in the environs of Moscow".

The Moscow process/operation, which was completed by Fascist-German troops/forces' cut on routes of approach to the capital of our native land, occupies one of the leading places among the combat process/operations of the Great Patriotic War.

I. V. Stalin gives the following characteristics to the combat operations of the Red Army, which routed Germans in the environs of Moscow: "shortly the Red Army applied to the Fascist-German troops/forces one after another the strikes/shocks in the environs of Rostov-na Don and Tikhvin, in Crimea and in the environs of Moscow. In furious fighting in the environs of Moscow it broke the Fascist-German troops/forces, which threatened with enclosing the Soviet capital" 1.

FOOTNOTE 1. Order of the people commissar of the defense on 23 February, 1942. No.55, Moscow. ENDFOOTNOTE.

"The Red Army, the repelling the attack of the Germans on Moscow, took initiative in their hands, it passed into offensive, chased the German troops/forces and in the course of the 4th months it passed by places more than 400 kilometers" 2.

FOOTNOTE 2. The 25th anniversary of great October socialist revolution. Report of the chairman of the state committee of defense at the solemn conference of the Moscow advice/council of the deputies of those laboring with the party and community organizations of Moscow on 6 November, 1942. ENDFOOTNOTE.

"The Red Army, threw back the enemy from Moscow and it continues to harvest it to the West. From German aggressors are completely freed Moscow and Tula regions, tens of cities and hundreds of villages of other areas, temporarily seized by enemy".

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It would be however by unpardonable myopia be calmed on the successes achieved and think that with the German troops/forces it is already finished. This would be empty bragging and conceit, unworthy

of Soviet people. One ought not to forget that ahead there are still many difficulties. Bragas suffers damage/defeat, but it is not yet broken and thereby, finished. Bragas is still powerful" 1.

FOOTNOTE 1. Order of the people commissar of the defense on 23 February, 1942, No 55, Moscow. ENDFOOTNOTE.

In this difficult time of the Great Patriotic War of the Red Army was required the considerable strain of forces, in order to deliver strikes/shocks on enemy, to provide the delivery of ammunition, combat technology, skillfully to cooperate along front and to organize timely medical aid to the heroic defenders of our native land, our capital.

Render aid to the medical aid by that wounded the skull and the head brain during this combat process/operation has a series/row of specific special features/peculiarities.

Bitter resistance of hostile troops, who created the developed net/system of fire/light and defensive zones with engineering facilities, bad weather conditions (blizzard, snowfalls and great frost), and also considerable advance of our troops/forces forward caused great difficulties in the provision of a medical aid by wounded.

It should be noted that in this initial period of war the medical service of army yet did not have sufficient work experience under military field conditions. At this time was carried out great work on deployment and equipment of the wide net/system of the specialized agencies for those wounded the skull at the immense front of the Great Patriotic War. It was required, furthermore, the known time, so that in the therapeutic installations of army, army and front line area uniform Soviet military medical doctrine would become the property of all medical workers and it was in practice realized in military field surgery.

In accordance with the combat circumstances and the enumerated conditions, and also in connection with the nearness of Moscow of area of combat, specialized aid by that wounded into skull was rendered mainly on the hospital basis of front, where were attached the necessary forces and substances. For this in a number of cases from armies withdrew the specialized groups of CEMU [OPMY - separate medical reinforcement company] and gave to their front line hospitals.

Combat on the route of the Germans in the environs of Moscow were deployed at front in 500 km and encompassed area to 100000 km<sup>2</sup>. On 5

December, 1941, army, which was being located on the direction of main attack, passed into offensive and with combat began to advance forward. Initiative in combat solidly passed into Soviet troops/forces hands. Next day was freed one of the temporarily occupied Soviet cities, and after two more days the advance units of this army moved out to large/coarse highway main pipeline. On 11 December army jointly with adjacent surrounded large/coarse defensive point/post. On 12 December army conducted persistent combat for overcoming the defense zones of the enemy where it met the developed net/system of engineering facilities in the form of minefields, the reinforced-concrete pillboxes, dug in into ground tanks, escarpments, etc., 15 December were freed some more large cities, and army, pursuing enemy, with combat advanced to the West. Enemy, exerting persistent resistance, attempted to organize defense on the lines of rivers. On 20 December army moved out to the defensive lines, built by Fascist-German aggressors along river.

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On 22 December in area of the suburban populated areas the Fascist-German troops/forces, attempting by any substances to stop the advance of our troops/forces, used the mines, charged/loaded by the tearing toxic substances.

The troops/forces of army, having surmounted the bitter counterattacks, forced open the defensive line of enemy on water obstacles and, rapidly advancing forward, with combat they moved out to the station of railroad main pipeline. This task was carried out during January 1942. By this time army routed 6 Fascist divisions.

In further combat was freed the large/coarse station of another railroad main pipeline and the significant part of the temporarily occupied territory.

Thus, for the troops/forces of the front in composition of which performed the army, it was possible as a result of rapid offensive to throw back the enemy from Moscow far to the west.

For the elongation/extent of this combat process/operation the aid by that wounded the skull on the field of battle was reduced in essence to the application of dressing and their cautious delivery/procurement on EMP. Aid to wounded rendered aidmen, and also soldiers by way of mutual assistance. Considerable difficulties appeared with the research of wounded on the field of battle. The fact is that the territory in which were deployed combat, represented the covered with deep snow cover plain, which was gently rising in northeastern direction. Almost third of combat area were covered with forests/scaffolding. In territory there were many rivers, including

some quite large. During combat process/operation all rivers were covered with the thick layer of ice.

The research of wounded on the field of battle in a number of cases was impeded not only by the need for the survey of great snow plains and forests/scaffolding, but also by the fact that the wounded were in the camouflage suits.

In the beginning of combat process/operation stood the thaws, whereas from second half December of 1941 and during January 1942 kept the first low temperature, reaching to - 36°. In connection with frost by snow-bollards and by snowstorms increased the danger of deterioration of the condition of wounded on the field of battle in view of the threat of freezings. Were accepted all measures for that, so that the medical aid by wounded would prove to be possibly better and it is more rapid, for which were additionally isolated the specially equipped teams of the stretcher bearers. As a result of the measures indicated the majority of those wounded the skull received first aid soon from the moment of wound, but nevertheless the given above negative conditions of locality and season could not but be repelled in the condition of those wounded the skull, especially those of them which were located without consciousness.

The carrying out of wounded from the field of combat was

realized by all possible methods (Fig. 1); predominantly they used drags, sleighs and stretchers. However, from the first days of combat process/operation was turned particular attention to the need for the fastest delivery/procurement of those wounded the skull on BMP and PMP. The majority of those wounded the skull was delivered on PMP by horse transport, on sleighs. This form/species of transport under winter conditions was for those wounded the skull most convenient, since provided calm, without agitation locomotion.

Page 18a.



Fig. 1. Carrying out of wounded skull from field combat. From the picture of the military medical museum of VM USSR.  
(Artist K.A. Finogenov)

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The medical measures, which were being undertaken on PMF in the relation to wounded the skull, consisted of the cessation of external hemorrhage, corrections of bandage, introductions in readings of the

substances, stimulating cardiovascular activity and respiratory/breathing center, bandaging of head and provision of careful delivery/procurement of wounded on DMF.

Many PMP successfully managed their task and, after rendering necessary therapeutic assistance, they rapidly delivered those wounded the skull on DMF. However, on individual PMP work passed to the very stressed circumstances, in essence as a result of the difficulties, connected with the evacuation of wounded.

Known value had also unfavorable conditions for deployment of PMP. The retreating enemy destroyed buildings and construction, burning and blowing them up. PMP were arranged/located not far off from front line in the half-wrecked quarters/premises or in tents. In the individual periods of combat process/operation on PMP always it was not possible to in proper time deliver drugs in connection with the difficulties of their delivery along the broken by artillery, tanks and aircraft bombs roads, under conditions of frost and snowfalls, or operating the aviation of enemy.

As a result of difficulties with evacuation on individual PMP was saved/accumulated a considerable quantity of wounded. In the unit of those wounded into skull, that were being located in unconscious condition, were noted the freezings.

After taking of the measures of the over-all strengthening character/nature of those wounded in skull they evacuated to DMP first of all. The unconscious condition of wounded was the reading to their most rapid possible and cautious evacuation with PMP in view of the need for urgent surgical intervention apropos of intracranial hemorrhage. Those heavily wounded<sup>in</sup> the skull usually evacuated by truck transport DMP, which obtained light wounds skulls they delivered to DMP, frequently on reverse empty car and by incidental transport.

To the division points/posts of medical aid the majority of those wounded into skull entered within comparatively early periods. Unit of them was found in unconscious condition. The severity of the wounds of skull during combat process/operation somewhat oscillated. So, in December of 1941 on DMP among all those wounded the skull heaviest group (with the damage of bones) composed 23.30/o, and the group of easily wounded (without the damage of the bones of skull) - 76.70/o. During January 1942 the percentage of wounded the skull with damage bones increased to 44.5, and the group of those wounded to soft tissues respectively decreased to 55.50/o.

The relationship/ratio of these two groups of wounded for entire

combat process/operation was such: with the damage of the bones of skull - 31.40/o and without the damage of bones - 68.60/o.

The oscillations of the character/nature of the wounds of skull are explained, first of all, by the increased severity of wounds in January of 1942 during overcoming of the zones of engineering facilities and furious fighting with the breaking of defensive lines on the water obstacles where the enemy used extensively artillery fire. Known effect on the relationship/ratio of these two groups of those wounded <sup>in</sup> the skull showed/rendered also the improved during January carrying out from the field of combat of heavily wounded, those rapidly delivering on DMP.

In the work of individual DMP, especially during December 1941, was a series/row of shortages. A certain unit of DMP was not completely expanded/scanned. In connection with this were observed the cases of comparatively late rendering to the qualified medical aid ~~to the~~ wounded <sup>in</sup> the skull, and their evacuation to GBA sometimes was held up.

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Especially great difficulties in work were noted on individual newly formed DMP: the absence of sufficient work experience under severe

winter conditions complicated their work. The flow of wounded within some DMP always was not sufficiently clearly sorted out: easily wounded and heavily wounded went sometimes in one group.

All these shortages in the course of combat process/operation were amended because of the great aid, shown/rendered DMP by sanitary section of army, to the acquisition of work experience under military field conditions, and also because of selfless work of medical personnel.

The workers of the therapeutic installations of army area learned to rapidly and completely deploy DMP, it is correct to sort out the flow of wounded, to increase the volume of surgical work.

Those wounded the skull received at DMP the qualified medical aid. Great value was given to the warming of wounded, to the granting by them of rest, to the over-all strengthening and dehydrating substances, the use/application of sulfanilamide preparations with purpose of prophylaxis of infection, and also to the examination/inspection of the wound of skull.

Basic part of those wounded skull (80.40/o) was evacuated in KhPPG. Separately, in relation to the group of those wounded the soft tissues of skull, the percentage of evacuation into the therapeutic

installations of army area composed 95.0. As far as group is concerned of wounded with injury of the bones of skull, then their evacuation in KhPPG composed altogether only 49.00/c. So insignificant an evacuation of wounded<sup>in</sup> the skull with damage bones from army therapeutic installations into army ones composes one of the specific special features/peculiarities of the medical service of those wounded<sup>in</sup> the skull this combat process/operation and requires in more detailed analysis.

In spite of the available instructions of GVSU, which forbade to operate those wounded the skull on DMP, with exception of the vitally risky cases of increasing in the intracranial pressure and hemorrhage, in this army it was subjected to surgical interventions on DMP 30.00/o of wounded in<sup>the</sup> skull with damage bones. Is explained this, first of all, by the fact that in the series/row of the surgeons of DMP were still fresh in memory the installations of war with the White Finns when the surgical processing of the wounds of skull and brain sufficiently widely was conducted in army therapeutic installations. The unit of the called into army doctors, who did not have the sufficient work experience under military field conditions, considered the first 24 hours after the wound of skull by only period during which was to prevent the development of infection in shells and substance of brain via surgical intervention. Therefore in series/row of DMP a considerable number of those wounded the skull

and the head brain underwent primary processing.

Insufficient work experience under military field conditions contributed so that doctors' unit, without skillful in classification and evacuation of wounded, in a number of cases was not decided to assign for evacuation in KhPPG of those heavily wounded the skull, considering that due to the severity of their condition they will not achieve army therapeutic installations and it preferred at first of work more widely to hospitalize them on DMP.

The noted individual cases of the delay of the evacuation of those wounded the skull with PMP to DMP contributed so that some wounded entered on DMP into comparatively late periods after wound, with the expressed phenomena of infectious complications from the side of brain and its shells. This group of wounded was nontransportable and also it was hospitalized on DMP.

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Severe frosts in combination with shock condition contributed to a descent in the protective forces of organism and caused a known number of inflammatory complications from the side of the lungs, especially in those wounded into skull, that were being located in the unconscious condition; therefore also this group of wounded, in

view of their intransportability, is left for treatment on DMP to approach KhPPG.

Thus, as a result of the need for the post-operation hospitalization on the spot of the sufficiently great group of the operated wounded into skull, and also presences of a considerable number nontransportable wounded with infectious complications involving shells and substance of brain and with pneumonia, more than half <sup>of</sup> all wounded <sup>in</sup> the skull with damage bones was delayed for treatment on DMP to approach KhPPG. It is logical that the comprehensive examination/inspection of these wounded under conditions of DMP was difficult, since on DMP there was not X-ray apparatuses and it was not the corresponding specialists of the neurosurgeons and neuropathologists.

The conditions of hospitalization were difficult and because DMP frequently was necessary to deploy in the half-wrecked quarters/premises, tents and dugouts, testing/experiencing in a number of cases deficiency in bed resources. Especially great difficulties tested one of DMP, which during December 1941 received almost 32.00/o of these wounded <sup>in</sup> the skull, that passed through all division points/posts of the medical aid of army, in view of the fact that they here guided wounded of other divisions during the penetration of defensive zone.

Part of those wounded in skull with the extensive damage of brain entered on DMP in extremely heavy nonoperable condition. In the relation to this group of wounded were applied only conservative therapeutic measures.

Wounded<sup>in</sup> the skull with the heavy forms of pneumonia they treated in essence conservatively. After the recovery of their pneumonia they are subjected to primary processing.

The majority of those wounded<sup>in</sup> the skull with the damage of bones, the hospitalized on DMP, was subjected to primary processing. Primary processing technique, manufactured even to the Great Patriotic War, consisted in the carving of territories the welt of the soft tissues of the trepanation of the large defect of skull before the appearance of the unchanged solid cerebral shell, the emptying of the contained wound canal in the substance of brain, the washing of wound with weak antiseptic solutions and the application of dressing. Attention was paid to the thoroughness of the cessation of hemorrhage and the sparing methods emptying of contents of the wound of brain. For this purpose sometimes began to be applied an artificial increase in the intracranial pressure - tussiculation and stretching of wounded, and in their unconscious condition -

short-term compression of jugular veins. The surgeons of DMP attempted to remove all bone fragments, via the washing of wound to remove cerebral detrite and blood clots, and to also extract all available metallic foreign bodies.

Under military field conditions was rejected the osteoplastic method of operation, which was being propagandized by French neurosurgeons Martel and Vensan, since it was traumatic, it required special *equipment* for the flap autopsy of bone and total carving of the walls of wound canal in the substance of brain, and also was not considered the considerable infection of the bullet wounds of skull and brain.

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During Germans' rout under Moscow treatment of the wounds of skull after surgical processing in essence was reduced to the use/application of different form/species of bandages. The so-called open method of conducting the wound made it possible to control the wound of skull and brain and created conditions for the outflow of the contained wound canal.

However, surgeons' unit, in spite of instructions of GVSU, which forbid to lay primary sutures, nevertheless in a number of cases

after the primary processing of the wound of skull were laid anechoic sutures on soft tissues, what was erroneous tactics if the combings of the conditions in which worked the surgeons of DMP during this combat process/operation. The absence of the possibility on IMP to conduct sufficiently prolonged observation of the course of the sealed tightly wound, uncertainty in a number of cases in the full/total/complete removal of bone and metallic fragments from the substance of the brain (wounded could not be in detail inspected before the process/operation due to absence on DMP of X-ray apparatuses) forced the medical department of army to conduct the series/row of urgent explanatory and organizational measures among the surgeons of DMP for the steady execution of instructions of GVSU about the prohibition of anechoic suture. Only in the cases of ventricular liquorrhea anechoic suture continued to remain vitally shown.

From the defects the primary of processing technique of the wounds of skull, which occurred during this combat process/operation, should be noted some cases of the extensive carving of the wounds of the soft tissues of skull with the exposure of undamaged/uninjured bone. In the unit of the cases this was explained by the heavy condition of the wounded; predicted the penetrating wound of skull, and therefore the wound of soft tissues they cut all over during process/operation immediately to bone, which, however, proved to be

undamaged/uninjured. Was realized hemostasis, and wound was occluded by bandage.

Thus, wounded into the soft tissues of skull, not yet left the unconscious condition, were considered as obtained the penetrating wound of skull and it underwent the process/operation, during which was bared undamaged/uninjured bone. Although this did not give fatal consequences, however, retarded the healing of wounds and subsequently sometimes it led to the development of osteomyelitis.

In certain cases as a result of the insufficient experience of the individual doctors of MSB was conducted surplus carving of the territories of wound with the extensive exposure of bone by the previously known wound only of soft tissues, and also carving only of the surface strata of wound, with failure of the trepanation of bone defect and processing of the wounds of brain when the penetrating wound of skull is present,

All these defects of the operational technique of the primary processing of the wounds of skull, and also occurred individual cases of traumatic process/operations on the substance of brain with insufficient hemostasis, were in the course of further combat operations of army to a considerable degree corrected because of the

corresponding explanatory work of army surgeon and sanitary department of army, the acquisition of experiment/experience by young doctors, but the main thing, because of the transference of the center of gravity of processing of the wounds of skull with DMP into specialized army KhPPG. However, in this combat process/operation at DMP it was subjected to primary processings by 13.5c/o all of those wounded the skull. The operability at DMP of wounded the skull with damage bones composed, as has already been indicated, 30.00/c, and the groups of those wounded the soft tissues - 6.30/c.

The fatal results among operated those wounded the soft tissues of skull it was not; however, in the group of those wounded<sup>in</sup> the skull with the damage of bones, especially during the development of complications from the side of shells and of brain, lethality it proved to be comparatively high.

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Lethality among those operated caused the following factors: 1) the very heavy condition of those wounded<sup>A</sup> the skull, hospitalized on DMP, and 2) the insufficient acquaintance of some doctors of DMP with the specific special features/peculiarities of post-operation course with the wounds of skull and brain under conditions of line-of-communication treatment in military field circumstances.

It should be noted that during January 1942 the lethality among operated in group all those wounded the skull was lowered in comparison with December of 1941 almost 2 times.

During the short dismantled period of combat process/operation the "k<sup>o</sup>ut of the Germans in the environs of Moscow" on DMF recovered 1.40/o all of those wounded<sup>in</sup> the skull. These were mainly most easily wounded the soft tissues skulls, hospitalized according to one or the other reasons on DMF. However, noted several cases when on DMF recognized recovered of wounded<sup>in</sup> the skull with damage bones. Their sufficiently prolonged hospitalization on DMF, during which the wound healed and disappeared general cerebral symptoms, did still not give the law/right to count those these wounded the skull by those recovered, since necessary was roentgenological supervision and examination/inspection their neuropathologist or neurosurgeon. Therefore was given instruction, in order to all wounded into skull with the damage of bones before recognizing as their recovered, subjecting to careful examination/inspection under conditions of KhPPG for the purpose of warning/prevention of the subsequent complications.

The analysis of the reasons for death of those wounded<sup>in</sup> the skull

confirms the general laws, characteristic for an army area. Basic reasons were the changes, connected with the direct activity of the injury of skull and brain, intra-cerebral hemorrhage, and in certain cases infectious complications from the side of shells and substance of brain. In a number of cases is noted the anaerobic infection of brain.

The evacuation of the wounded substances skull with DMP in KhPPG was realized by motor transport, moreover motor vehicles were coldproof. Wounded escorted/tracked the nurses or aidmen, who controlled the general condition of those wounded<sup>in</sup> the skull, after bandages and immobilization of head. The easily wounded the soft tissues skulls in a number of cases were evacuated in KhPPG by incidental motor vehicles, also, on reverse empty car.

Individual DMP tested/experienced the series/row of difficulties during the evacuation of those wounded the skull, since some motor vehicles, directed on FMP, were held up in route/path, especially during snowfalls and snowstorms. Decreasing for this reason turnover of motor transport was reflected in known degree and in the evacuation of wounded with DMP in KhPPG. Especially great difficulties with the export of wounded with DMP arose during January 1942 as a result of increasing brokenness<sup>of</sup> the evacuation routes and snowdrifts on risins. However, the advance of army therapeutic

installations following by the attacking troops/forces contributed so that some DMP (or one of the echelons) were unloaded by approached KhPPG, which accepted wounded on the spot and was created the possibility to army therapeutic installations to advance further forward. This was applied predominantly with respect to the group nontransportable of those wounded into skull.

The need for redislocation of DMP in a number of cases forward caused the evacuation post-operation of those wounded the skull after 5-7 days after intervention or to their transfer on the spot for approached KhPPG of the first line.

Those wounded<sup>in</sup> the skull they guided into all KhPPG of army. Up to the moment of the offensive of army was given a series/row of newly formed KhPPG.

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In these hospitals there were new cadres, in which still was absent practical work experience under military field conditions. Complicated combat and medical-tactical situation, and also severe meteorological conditions and almost full/total/complete absence of housing fund caused the series/row of difficulties in the course of the combat process/operation which for medical workers it was

necessary to overcome with the deployment of hospitals and the provision of wounded with therapeutic aid.

KhPPG of first line in the relation to wounded in<sup>the</sup> skull fulfilled in essence sorting function, taking urgent therapeutic measures and guiding these wounded into the arranged/located not far off by KhPPG hospital bases armies. The unit of KhPPG of the first line in the course of stressed combat with enemy during individual days tested/experienced interruptions in supply as a result of the difficulty of delivery/procurement on the snow-covered and broken lines of communication.

Series/row of KhPPG was intensified by the groups of ORMU, but among them in this army yet it was not in that period of the war of special neuro-surgical groups.

1. Should be noted work of one of KhPPG of first line, which accepted considerable number of tace wounded skull. This hospital during the combat process/operation of 4 times was relocated, moreover constantly deployed sorting separation/section, surgical dressing to 5 tables, operating room, wards for wounded, who were being found in heavy condition, complicated by anaerobic infection and who were being found in shock, and furthermore, evacuation separation/section. On initial position the hospital was expanded in

rural school and in cottages. Subsequently, in proportion to advance forward, the conditions for deployment of KhPPG were impeded. It was necessary to adapt under hospital the half-wrecked buildings and to be oriented to tent resources. Those wounded into skull entered in essence from sanitary and medical battalions, with the appropriate documentation, since this hospital it advanced after one of DMP.

In this KhPPG in different time of combat operation it worked from 4 to 6 surgeons and, furthermore, the chief/leading surgeon, who had the considerable experiences of work under military field conditions, acquired during war with White Finns and since the beginning of the Great Patriotic War.

Hospital conducted great work on processing of the wounds of extremities, abdominal area, breast, etc. From a number of those wounded in <sup>the</sup> skull surgical interventions were produced only by the nontransportable; whereas the majority of those wounded into skull and brain was evacuated on GEA.

2. If we take for comparison of condition for deployment and work one additional KhPPG of first line, then it should be noted that this hospital was located at considerably greater distance from DMF. Wounded into skull it entered into this KhPPG comparatively less both in the absolute expression and in percent ratio to an entire group of

wounded. Those wounded into skull entered later periods, moreover in their unit had the signs/criteria of infectious complications from the side of shells and brain.

In hospital worked 3 surgeons, which more widely operated entered those wounded into skull. In particular, underwent surgical intervention by 22.00/o of all number of those wounded in<sup>the</sup> skull and 56.00/o of wounded with the damage of the bones of skull. The majority of the post-operation wounded was left for treatment on the spot.

This hospital worked under the best in comparison with the first hospital conditions in the sense of the promptness of the delivery of drugs and medical equipment, since supply routes to it were better.

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3. It is necessary in somewhat more detail to be stopped at work one, KhPPG of hospital base of army, that accepted to itself great number of those wounded skull, namely 60.00/o of all number of those wounded skull, entered into all KhPPG armies. The specific gravity/weight of those wounded<sup>in</sup> the skull among all wounded, who passed through this hospital, proved to be most high.

Thus, for this hospital it was necessary to conduct very great work according to rendering to the medical aid by all entered wounded, including sufficiently considerable number of those wounded <sup>in</sup> the skull and the brain.

The conditions of deploying the hospital were difficult, since in the places for its deployment was especially sharply felt deficiency in habitable resources, badly destroyed by enemy with retreat.

Within the time of the combat operation the hospital was relocated 7 times, moreover in proportion to the acquisition of experiment/experience in work was shortened the time of deployment and its quality was improved. In this hospital among doctors it was not neurosurgeons; however, there was 3 sufficiently experienced surgeon, mastered technology cavitary process/operations. During December entered wounded <sup>in</sup> the skull were in essence processed on DMP and in KhPPG of the first line. During January entered *untreated* wounded <sup>in</sup> the skull, certain unit entering directly with PMP in extremely heavy condition.

For entire combat process/operation into hospital entered 19.00/o of wounded with the damage of the bones of skull even 81.00/o wounded the soft tissues of skull. Surgical interventions were

undertaken in 2.10/o all of those wounded in<sup>the</sup> skull and 13.00/o of wounded<sup>in</sup> the skull with damage bones. So low a percentage of operability is explained by the fact that a considerable number of those wounded<sup>in</sup> the skull was already processed in foremost therapeutic installations. If one considers that this KhPPG frequently was redislocated, advancing after the attacking troops/forces, and also the fact that not far off from it was located the evacuation point, which evacuated wounded on GBF, then becomes clear the volume of the work of this hospital in the relation to wounded<sup>in</sup> the skull. Subjecting to surgical intervention only of the nontransportable wounded, the given KhPPG after the necessary conservative measures evacuated 94.00/o all of those wounded<sup>in</sup> the skull, moreover wounded the soft tissues it is evacuated by 96.00/o, and wounded<sup>in</sup> the skull with damage bones - 81.00/o. In the individual periods of combat process/operation the hospital tested difficulties in work in view of the late delivery/procurement of some objects/subjects of medical equipment.

4. In another KhPPG GBA entered about 10.00/o of those wounded skull, passed through all hospitals armies. The specific gravity/weight of those wounded<sup>in</sup> the skull among all those entered composed 1.40/o. Half these wounded entered with DMF and their KhPPG of the first line, another unit with PMP. First PMP entered wounded to 2-3 and days from the onset of wound, but sometimes and even later.

In essence entered wounded the skull were not processed. Focuses attention comparatively high percentage (44.0) of wounded with the damage of the bones of skull even 56.0 wounded the soft tissues.

- Among doctors of hospital were two surgeons.

Within the time of combat operation the given KhPPG was relocated 5 times. In the individual periods of combat process/operation were great difficulties during the deployment of hospital in view of the full/total/complete absence of housing fund in the ruined by enemy populated areas.

Within the time of this combat operation in hospital were produced surgical interventions by 17.50/o all of those wounded in the skull and, in particular, 31.00/o of wounded<sup>in</sup> the skull with damage bones.

Page 26. Bulk of those wounded soft tissues (90.00/o) was evacuated to GBF. The percentage of the evacuation of heavily wounded skull with damage bones was equal to 53.0; remaining unit (mainly post-operation wounded) was left for treatment on the spot.

5. In following KhPPG entered 13.50/o of wounded with respect to that wounded skull, passes through all hospitals of army. Wounded entered mainly with DMF and only 3.00/o entered with PMP.

Among all those locating undergoing medical treatment in this KhPPG those wounded into skull composed 2.8c/c. The distribution of those wounded the skull shows that into 17.5c/c were heavy wounds of skull with the damage of bones and into 82.5c/c - wound of soft tissues.

The conditions of deploying this KhPPG were very difficult. The chief/leading surgeon of hospital wrote in his report: "Freed by our troops/forces the rural populated areas points/posts were almost completely destroyed by enemy..." Being deployed before, was necessary to restore buildings in order to adapt them for a

hospital".

In spite of such unfavorable conditions, the given hospital with three-time redislocation each time was possible to deploy the equipped operating room, surgical dressing for easily and for heavily wounded, shock fee/pay/board, separations/sections for nontransportable and post-operation wounded evacuation separation/section, etc. In one of the periods of combat process/operation in this KhPPG was felt the deficiency in doctor-surgeons which was rapidly made up.

In the relation to wounded the skull in essence were carried out conservative measures, directed toward a decrease in intracranial pressure, the excitation of cardiovascular and respiratory/breathing activity in heavily wounded, warning/prevention of infectious complications from the side of brain and its shells, and also complications from the side of the lungs.

All wounded the skull were inspected in medical dressing room. Hair around wounds shaved off, wounds powdered by streptocide.

In 10.00/o all of those wounded the skull were produced operational intervention. In the group of wounded the skull with damage bones it underwent surgical interventions 12.00/o.

The majority of those wounded skull (97.00/o) was evacuated. In the group of those wounded the soft tissues of skull it is evacuated by 100.00/o, and among those wounded the skull with injury of bones - 84.00/o. Thus, in this KhPPG were hospitalized mainly nontransportable and post-operation wounded.

In one of the periods of combat process/operation, because of the need for urgent advance forward, from hospital were evacuated several those wounded the skull and the brain on the 7-12th day after surgical intervention. Evacuation route from this hospital to evacuation point was during this period short.

There is no necessity to enumerate consecutively/serially the work of all KhPPG GBA, since the conditions for their deployment and work are similar to those described above.

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One should only note that in two KhPPG, intended for the care of easily wounded, occurred the individual cases of the entry of wounded with the small blast-fragmentation penetrating wounds of skull and brain. After x-ray examination this diagnosis was refined, and

wounded into skull and brain urgently they evacuated to GBF. Surgical interventions on skull in these hospitals they did not produce. In one of them was widely applied physiotherapy. With the wounds of skull was applied mainly ultraviolet lighting of the wounds of soft tissues. In one of the hospitals for this combat process/operation recovered 24.30/c wounded the soft tissues of skull. It is evacuated to GBF 32.00/o of those wounded the soft tissues of skull, the others were left to recovery. The group of wounded the skull with damage bones was from this hospital completely evacuated. Hospitals for easily wounded tested/experienced into the individual periods of combat process/operation deficiency in surgical cadres and difficulties during deployment. In the course of combat process/operation these difficulties were eliminated.

Thus, during Germans' rout under Moscow environs for all KhPPG of army were the sufficiently difficult conditions for deployment and work.

Those wounded the skull they guided in KhPPG in essence with DMP; however, in the individual sections of the front where KhPPG of the first line were considerably advanced forward, wounded they sometimes acted directly with PMF.

In army was isolated one of KhPPG, which received to itself

60.00/o all of those wounded the skull. In remaining KhPPG entered different number of wounded (from 13.5-10 to 2.5-1.80/o) with respect to a total quantity of those wounded the skull, passed through all KhPPG armies.

The percentage wounded the skull among of all entered in KhPPG wounded oscillated from 1.0-1.8 to 3.0-4.5. Only in KhPPG, which accepted to itself 60.00/o wounded the skull the specific gravity/weight of the latter with respect to all that entered into this hospital wounded was above.

In this should be perceived the known specialization of aid by that wounded the skull in army area, although this aid during the dismantled combat process/operation rendered the general/common/total surgeons. One should, however, note that in the majority of those wounded into skull, that entered into this hospital, had the wounds only of the soft integuments of skull.

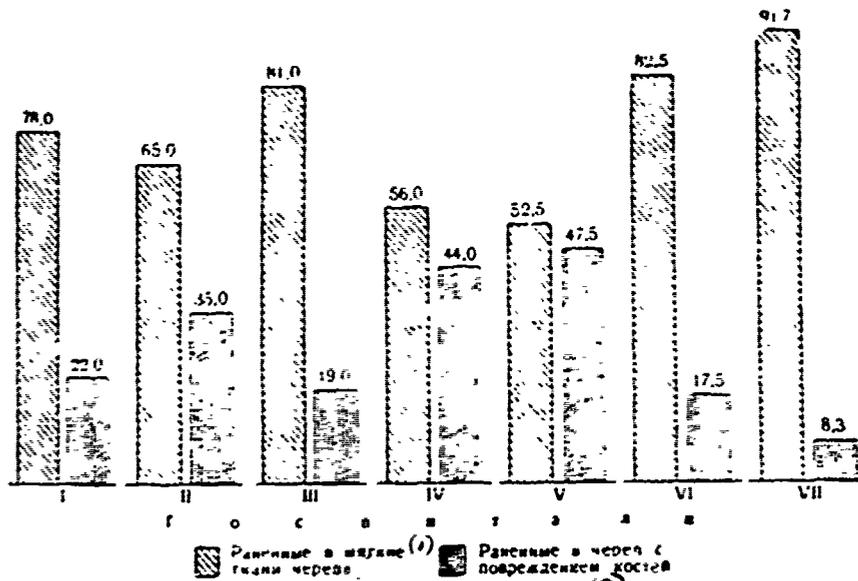


Fig. 2. Distribution of those wounded the skull according to the character/nature of wound in the individual hospitals of army during the rout of Germans in the environs of Moscow (in percentages).

Key: (1). Wounded into the soft tissues of skull. (2). Wounded into skull with damage of bones.

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The distribution of those wounded the skull according to the severity of wound is represented based on the example of several hospitals of army on diagram (Fig. 2). From Fig. 2 it is evident that only in two KhPPG was noted a comparatively high percentage of those

heavily wounded the skull; however, an absolute number of wounded the skull with damage bones was in them small. In the others, undertaken as an example, hospitals predominated wounded the soft tissues of skull.

Operational activity of KhPPG in relation to wounded the skull during rout Germans under Moscow is represented in Fig. 3. On the basis of this diagram it is possible to draw the conclusion that the frequency of surgical interventions in some KhPPG of army with the wounds of skull was different, without exceeding 17.5-22.00/c. Process/operations were conducted mainly by the wounds of skull with the damage of bones. Surgical intervention underwent nontransportable wounded, and also late entered. The abscesses of brain, which required surgical intervention, were encountered in army area in the single cases.

In those KhPPG, where entered the unfinished wounded directly from PMP, surgical interventions with the wounds of skull with the damage of bones were from 31.0 to 56.00/c.

The operability of those lightly wounded in the skull was insufficient, which lowered general/common/total operability all of those wounded the skull.

The primary processing of the wounds of skull and brain, which was being carried out in KhFFG, consisted in the carving of the territories of soft tissues, trepanation of the defect of skull and emptying of wound canal in the substance of brain. All process/operations were carried out under local anesthesia in combination with subcutaneous introduction 1 or 2 cm<sup>3</sup> 10/o solution/opening of morphine.

To the time of this combat operation there was disputed foreign neurosurgeons' opinion about contra-indication of the use/application of a morphine with the wounds of skull and brain in view of its suppressing activity on respiratory/breathing center. The experiment/experience of those preceding the Great Patriotic War of the combat operations of the Red Army ascertained that to the majority of those wounded into skull the introduction before the process/operation of morphine did not exert harmful effect. On the contrary, its use/application in combination with local anesthesia made it possible during this combat process/operation to perform the primary processing of the wound of skull and brain completely painless and besides in the necessary contact with wounded.

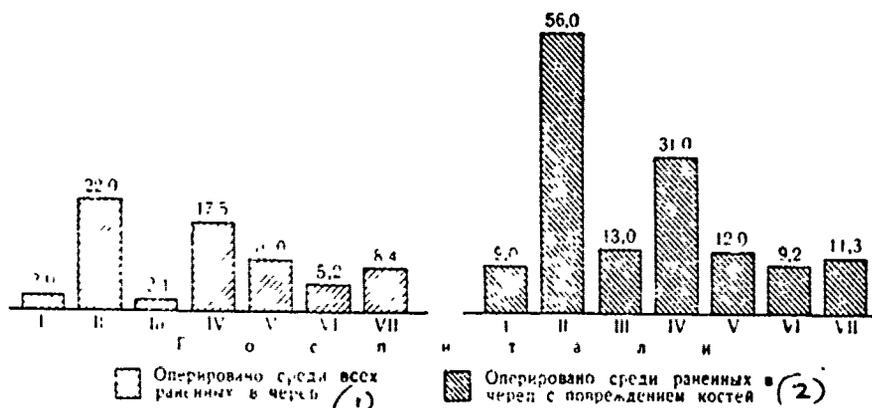


Fig. 3. Frequency of surgical process/operations on skull in individual hospitals of army during the rout of Germans under Moscow (in percentages).

Key: (1). It is operated among all those wounded the skull. (2). It is operated among wounded skull with damage bones.

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The use/application of a morphine was contraindicated only in the very heavy condition of that wounded the skull and the brain, in the absence of consciousness or with the expressed hanger-on symptoms. To anesthesia/narcosis (as a rule, in the form of the cautious intravenous introduction of hexeral) they resorted to the cases of the sharp psycho-motor excitation of wounded, which more frequently

was observed with the wounds of the frontal and frontal-orbital area of skull. In these cases frequently gave a good effect the granting to similar wounded of rest with the use/application of a luminal or chloral hydrate. With such tactics it was possible to produce the units of the wounded primary processing under local anesthesia, since psycho-motor excitation was relieved by the condition of somnolency and certain stupefaction.

Surgeons' series/rcw notes the difficulties of primary processing with continuous epileptic fits. Undertaken in these cases urgent process/operations (in view of suspicion to the continuous intracranial hemorrhage) were very complicated by spasms and the quality of interventions, naturally, descended. Work experience ascertained that into army therapeutic installations entered those wounded into skull most frequently with the ceasing intracranial hemorrhage. Epileptic fits in such wounded were usually caused by the stimulation of cerebral cortex by small hematomas, bone fragments or by metallic foreign bodies. Therefore these wounded, in which it was not the signs/criteria of growing compression of brain, before the process/operation were taken energetic anticonvulsive measures, and only after this therapy was conducted intervention on skull and brain under calmer conditions, with great care it is radical.

The acquired in the course of combat process/operation

experiment/experience convinced of the fact that the best results from the surgical treatment of those wounded the skull are received when primary processing was conducted not immediately by entry, but through several hours, after granting to the wounded of the necessary rest, together with the use/application of medicinal/medicamentous substances. Within this time the basic group of those wounded the skull left the heavy condition, caused in a number of cases, besides wound, by transportation, and it more easily transferred surgical intervention.

Great value for the establishment of the period of necessary rest before the process/operation was given to comprehensive evaluation of the general condition of wounded.

Besides character/nature the wounds, in this case considered the tension of combat, condition of climate and locality in which were located the soldiers during combat operations, the overvoltage of nervous system, the condition of their psychics/psyche, periods and quality of rendering to the first medical aid, form/species and duration of transportation, etc. At the same time, the surgeons had to consider the condition of wound, its infection and manifestation of infectious complications from the side of brain and its shells in order to in proper time begin antiseptic therapy, and in a number of cases to perform the primary processing of the wound of skull and

brain immediately after the entry of wounded.

During the rout of the Germans in the environs of Moscow occurred the cases when was shown urgent surgical intervention in view of the progressive deterioration in the condition of that wounded in skull. Discussion deals with progressive traumatic edema and bloating of brain, ventricular liquorrhea, with the phenomena of the advancing/attacking hypotension and the "collapse" of cerebral ventricles, and also about comparatively rare cases of the emergent under the effect of transportation of intracerebral hemorrhage as a result of the displacement of the bone or metallic fragment, which occluded the lumen of the damaged vessel.

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Therefore from the first days of combat process/operation from the surgeons of army was required precise establishment of readings to the sequence of surgical interventions. At the same time, it was necessary to come to light/detect/expose such wounded, which surgical intervention was contraindicated in view of the severity of general condition.

The undertaken process/operations individual wounded the skull in the sharply pronounced violation of respiration, heart activity

and presence of other hanger-on symptoms proved to be most frequently unsuccessful. In this respect great practical value acquired one of N. N. Burdenko's instructions about state of preservation or absence of the swallowing reflex, which solved in the majority of the cases of surgeons' doubt during the decision/solution of a question about readings to process/operation with heavy wounds.

As showed work experience, the series/row of similar incoperable wounded after energetic conservative measures left the extremely heavy condition and subsequently successfully underwent surgical treatment within later periods under conditions of GBF or in the rear specialized hospitals. Surgical intervention, produced by this wounded in acute/sharp period, as a result of additional of injury would prove to be for them disastrous.

The decrease of the individual cases of unsuccessful attempts at the surgical treatment of the hopeless wounded allowed to at the same time rationally utilize time of the surgeons, personnel and operating room for production in the necessary process/operations a larger number others of those wounded the skull.

During the dismantled combat process/operation was the virtually confirmed great therapeutic value of the blood transfusions that wounded into skull, that were being conducted by fractional portions

on 100-200 cm<sup>3</sup> in the cases of blood loss or weakening of organism by infectious complications from the side of shells and brain.

It is logical that the manufacture of correct readings to surgical interventions on skull and brain, their cautious and radical realization, and also ability to conduct under severe military field conditions entire complicated post-operation period taking into account the developing phenomena of edema and blocking of brain, violations of blood circulation and danger of different infectious complications from the side of brain required the acquisition of the necessary experiment/experience and in the initial period of the Great Patriotic War here was noted the series/row of shortages.

Total on all hospitals of army during the dismantled combat process/operation those wounded the skull were distributed in terms of gravity to the group of easily wounded, i.e., wounded the soft tissues, that composed 79.50/c, and heavily wounded, i.e., wounded the skull with the damage of bones, only 20.50/c. The relationships/ratios indicated in comparison with these DMP changed: increased group of those wounded to the soft tissues of skull and relative to decreased the group of wounded the skull with damage bones. This is explained by the fact that the unit of the easily wounded entered KhPPG directly from PMP; certain quantity of the

extremely heavily wounded with the extensive decomposition of the skull and brain, delivered from the field of combat to DMF, it perished.

Surgical treatment it underwent in the hospitals of army 10.40/o all of those wounded the skull.

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Among wounded the skull with damage bones the percentage of operational interventions in all KhPPG of army composed 49.5; here enters not only the primary perfecting of the wounds of skull and brain, but also intervention apropos of infecticus complications. Comparatively high operability is caused in essence by the fact that this army was arranged/located further from Moscow, than other attacked/advanced armies. In the latter operability was below, since those wounded the skull we could rapidly deliver into the specialized hospitals of front.

As far as the army in question is concerned, then of a number of wounded the skull with damage bones on DMF was operated by 30.00/o, and in KhPPG - 49.50/o. This shows that a considerable number of these heavily wounded was primary processed in the limits of the therapeutic installations of army. In this case the frequency of

surgical interventions in those wounded in skull with damage to bone was above in army area, than in army.

In the group of those wounded in the soft tissues of skull the frequency of surgical interventions in the therapeutic installations of army rear was below than on DMF. The significant part of those easily wounded the skull was evacuated from army to front line therapeutic installations. About 13.60/o of those wounded the soft tissues were left to recovery in KhPPG, moreover 5.80/o recovered during December and January, and the others - during February 1942.

It is evacuated from army during the rout of the Germans in the environs of Moscow 73.20/o all of those wounded into skull, that were being located undergoing medical treatment in KhPPG. Basic part of those evacuated composed easily wounded.

The evacuation of those wounded the skull into front line therapeutic installations was realized on the hospitals of the army in question for two directions. Their basic number was evacuated from KhPPG to evacuation point and from there already on GBF. The smaller unit of those wounded for skull was headed from KhPPG directly into the therapeutic installations of front line area. In this case those heavily wounded the skull they were frequently evacuated from KhPPG directly on GBF. Through evacuation points was directed on GBF the

majority of those wounded to the soft tissues of skull, that comprised to different periods of combat process/operation from 85.0 to 93.80/o all of those wounded the skull.

At evacuation points surgical interventions by that wounded in skull were not conducted. Evacuation points in essence fulfilled evacuation-sorting function, moreover in one of them it was left to the recovery 7.60/o of those wounded the soft tissues of the skulls which soon recovered.

The evacuation of wounded on GBF was carried out mainly by railroad; auto- and aircraft transport they occupied in this army the insignificant place. During combat was sent a considerable number of trains and "ambulances", from which the unit was equipped with Kruzhilin springs and it was intended for those heavily wounded the skull. In route/path by wounded was provided medical observation.

The treatment of wounded in the front during the rout of the Germans in the environs of Moscow was realized basically in therapeutic establishments of VEF. The latter, after arriving up to the moment of December offensive in front line area, contained of two large/coarse SEG and several hospitals on the basis of hospitals from the so-called operational cots.

VEP organized the evacuation to itself of wounded from army and the intense unloading of wounded from front line area into the rear.

Basic work lay to two SEG. Soon Narkomzdrav to the USSR secreted for VEP an additional number of cots. Were also attached three additional SEG several hospitals of the adjacent evacuation point.

The conditions for the work GEP during January 1942 were more favorably in the sense both of the presence of the necessary bed net/system and the fixed evacuation of wounded into the rear.

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Those wounded the skull arrived from armies on GBF mainly by railroad. VEP organized the railroad evacuee reception centers; unit of them made loading-unloading functions, unit - only discharging. Moreover, on the basic highways, which lead from front, were organized the medical posts, which accepted wounded the skull, evacuated on soil.

The majority of those wounded in skull, that arrived on GBF, entered SEG. In two most powerful/thick SEG were expanded/scanned the specialized neuro-surgical separations/sectors, which were being headed by experienced neurosurgeons. In these two SEG entered almost

3/4 all wounded the skull.

The relationship/ratio of wounded on the severity of damage on all evacuation points is characterized as follows: those wounded the skull with damage to bone composed 35.00/o easily wounded soft tissues -65.00/o. Approximately/exemplarily the same relationship/ratio of those wounded the skull is noted and in hospitals ("operational cots").

The specialized evacuation hospitals conducted great therapeutic work. In them widely were conducted measures, directed toward an improvement in the condition of the arrived heavily wounded, produced surgical interventions with the unfinished wounds, and also took measures for prophylaxis and treatment of infectious complications from the side of shells and brain.

In SEG was operated 15.10/c all entered with the wounds of skull. In one of SEG it underwent processing by 24.00/o of these all wounded.

It is necessary, however, to note that surgical interventions it underwent mainly the group of wounded the skull with damage bones. In particular, the trepanation of skull was produced in 40.00/o of wounded this group. Post-operation wounded left to recovery on the

spot. Known effect on so high operability in SEG had the fact that the armies, arranged/located on closer distance from GBF, than the army in question, had the opportunity to evacuate a considerably larger number unfinished of those wounded the skull; the periods of their entry into the therapeutic installations of front rear were comparatively early. In the therapeutic installations of front they produced, furthermore, reworkings of the wounds of skull and brain, and also surgical interventions apropos of osteomyelitis of the bones of skull, abscesses of brain in other complications.

Surgical interventions on skull and brain produced the highly-skilled specialists in equipped for this purpose operating rooms.

Were created all conditions for granting to the wounded of full/total/complete rest in post-operation period, and also turned particular attention to care of them.

In one of SEG was operated by 52.00% of those wounded the skull with the damage of bones with very small lethality, which profitably emphasizes its work. In all SEG of lethality among the operated wounded the skull with damage bones it composed 8.80%.

Should be also noted activity and the so-called operational acts

GBF which at that time only were created and had available smaller possibilities than powerful/thick SEG. Those wounded into skull entered hospitals with operational cots not only from SEG, but frequently and directly from armies. A number wounded, entered to operational cots GBF, composed only 1/9 all wounded into skull, that were being located in SEG.

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To surgical intervention in hospitals with operational cots were subjected during December 1941 5.3c/o all of those wounded the skull. In the group of wounded the skull with damage bones surgical interventions in this group composed 10.8o/c. The operational processing of the wounds of skull and brain was conducted mainly in two hospitals, which had operational cots. The fact that the post-operation lethality in the group of wounded into skull with the damage of bones proved to be in therapeutic installations with the operational cots doubtly higher than general/overall/total lethality, he says for the fact that process/operations underwent only the obtained heaviest wounds of skull and brain.

The frequency of surgical interventions with wounds in the soft tissues of skull proved to be during the rout of the Germans in the environs of Moscow and in SEG, and on the operational cots of

insufficient.

Although from a number of those wounded the soft tissues of skull in SEG during this combat process/operation recovered 11.80/o (and also 6.40/o left for recuperation on the spot) however in view of the established circumstances bulk - 81.80/o - easily wounded it was evacuated for further treatment from SEG into other hospitals.

In one of SEG the surgical treatment of those wounded into soft tissues was conducted more widely, which, together with granting to wounded in the initial period of full/total/complete rest, and also in connection with the methods of physiotherapy, made it possible to attain in the period of this combat process/operation 26.00/o recoveries. During February 1942 this percentage even more was increased.

On operational cots of GBF the percentage of recovered wounded the soft tissues of skull during December 1941 was somewhat lower than in SEG.

The evacuation of those wounded the skull from GBF into the rear was produced from SEG into 78.30/o, from hospitals with operational cots - into 9.10/o of cases.

SEG evacuated into rear 72.10/o of wounded the skull with damage bones, and hospitals with operational cots - 13.5c/c. Hence it is apparent that SEG, expanded/scanned several times are more than their authorized capacity, it had to evacuate a considerable quantity of the transportable wounded in order to be always finished/prepared to accept the necessary quantity of wounded from armies. The hospitals with operational cots, which were not overfilled over authorized capacity, could leave the large part of the wounded the skull with damage bones for treatment on the spot.

As an example it is possible to lead one of the highly skilled installations GBF with the operational cots where those wounded into skull underwent comprehensive examination/inspection and prolonged observation. As a result a considerable number of such wounded, who were being located in transportable condition and requiring through the character/nature of wound in prolonged treatment, was not evacuated into the rear specialized hospitals, but it remained on GBF.

The evacuation of those wounded the soft tissues of skull composed in SEG 81.80/c, and in hospitals with operational cots - 52.10/o.

Thus, if we compare the work of SEG and hospitals with

operational cots, then it will prove to be that the powerful/thick therapeutic installations such as were SEG, passed during December 1941 9 times of more those wounded the skull, than operational cots. It recovered wounded the skull in SEG 20 times more than in hospitals with operational cots. It is evacuated into the rear of the wounded the skull with damage bones, which require the prolonged treatment, of SEG 5 1/2 times more. To surgical treatment is subjected in SEG 3 times more those wounded the skull, than in hospitals with operational cots, and in the group of wounded the skull with damage bones this relationship/ratio proved to be equal to 4:1. In SEG the lethality among those wounded into skull also proved to be below.

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In the course of combat process/operation were accepted urgent measures for an improvement in the work of hospitals with operational cots. The cot resources of GBF during January 1942 was enlarged in essence due to these hospitals whose number increased more than 4 times.

Although the majority of those wounded the skull accepted to themselves during January 1942 as before SEG however about third of these wounded entered into hospitals with the operational cots which increased operational activity and attained during January 1942 of

the incomparably greater percentage of the recovery of those wounded the skull, than during December 1941, evacuated into the rear requiring in prolonged treatment of those wounded the skull almost 3 times more than during December, and decreased the evacuation of GBF of those wounded and the soft tissues of skull.

Thus, in the course of the strained offensive combat operations of our troops/forces on the rout of the Germans in the environs of Moscow the hospital basis of front ensured in essence with the specialized neuro-surgical aid of wounded the skull with damage bones.

In the beginning of combat this aid was provided mainly due to good work of two powerful/truck SEG, which had neuro-surgical separations/sections and corresponding specialists, while during January 1942, also, due to great aid, which showed/rendered to them the specialized therapeutic agencies of GBF with operational cots.

The evacuation of those wounded the skull from GBF into rear therapeutic installations was realized by railroad. The basic group of those wounded the skull was evacuated by permanent army medical trains. In this case heavy to those wounded the skull gave the places in the specially equipped cars. The unit of those easily wounded the soft tissues of skull was evacuated into the hospitals, located in

cities west of Volga, by medical "leaflets" and it is considerably less frequent by specially fitted out for wounded by passenger trains.

In route/path the wounded constantly observed medical and average/mean medical personnel.

Rendering to the medical aid by that wounded the skull during combat process/operation "battle in the environs of Stalingrad".

Unprecedented to its scales in the history of wars was deployed battle in the environs of Stalingrad. I. V. Stalin in 1942 noted that in the summer period of this year "the Fascist-German troops/forces using the absence of the second front in Europe, gathered all their free reserves, broke through the front in the southwestern direction and, after taking in their hands the initiative, passed by places in the course of 5 months to 500 kilometers". The main target of German offensive "consisted of going around of Moscow from the east, renouncing it from the Volga and Ural rear and then hitting to Moscow. The advance of the Germans to the south to the side of petroleum areas had by its auxiliary target not only and not so much an exercise of petroleum areas, as abstraction of our main reserves for south and weakening of Moscow front in order by the fact to more easily attain success with strike/shock in Moscow. By this it is

strictly and explained, that the main forces of the German troops/forces is located now not on the south, but in area of Orel and Stalingrad" 1.

FOOTNOTE 1. The 25th anniversary of the great October Socialist Revolution. Report of the chairman of the state committee of defense at the solemn conference of the Moscow advice/council of deputies of those laboring with the Party and community organizations of Moscow of 6 November 1942. ENDFOOTNOTE.

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In order No 345 of 7 November, 1942, comrade Stalin wrote:

"Enemy was stopped in the environs of Stalingrad. But, stopped in the environs of Stalingrad and already placed/assumed with those ten of thousands of his soldiers and officers, enemy throws in combat new divisions, straining latter/last forces. Struggle at Soviet-German front stops ever more stressed. On the issue of this struggle depends the fate of Soviet state, freedom and independence of our native land" 1.

FOOTNOTE 1. Order of the people commissar of the defense on 7 November, 1942, No 345, Moscow. ENDFOOTNOTE.

The heroic defenders of our native land intercepted to enemy. In the bitter battle the Fascist-German aggressors found their ignominious end under the walls of Stalingrad.

Comrade Stalin in order No 195 of 1 May, 1943, noted: "within the period of the winter campaign of 1942-1943 the Red Army inflicted serious damages/defeats to the Hitler troops/forces, it annihilated a vast quantity of manpower and equipment of enemy, surrounded and it eliminated two armies of enemy in the environs of Stalingrad, visors into the captivity of more than 300 thousand hostile soldiers and officers it freed from German IGA hundreds of Soviet cities and thousands of villages" 2.

FOOTNOTE 2. Order of Supreme Commander-In-Chief on 1 May 1943, No 195, Moscow. ENDFOOTNOTE.

"In order to have an idea of the sizes/dimensions of that unheard in history slaughter which was played in fields. Stalingrad, it is necessary to know that at the termination of Stalingrad battle there were selected and buried 147 thousand 200 killed German soldiers and officers and 46 thousand 700 killed Soviet soldiers and officers. Stalingrad was the setting of the Fascist-German army.

After Stalingrad slaughter, as is known, Germans could not already be set right" 3.

FOOTNOTE 3. the 26th anniversary of the great October Socialist Revolution. Report of the chairman of the state committee of defense at the solemn conference of the Moscow advice/council of the deputies of those laboring with party and community cres organically Moscow on 6 November, 1943. ENDFCCNOTE.

This was the year of the radical turning point in the course of war. Hitler hordes were shaken by the powerful strikes/shocks of the Red Army.

In combat process/operation "Battle in the environs of Stalingrad" were the following periods:

1) the defensive battle, continuing from 17 July through 19 November, 1942,;

2) the offensive of the Red Army, which ended by enclosing the grouping of the German troops/forces in the environs of Stalingrad in period from 19 November through 30 November, 1942,;

3) the elimination of attempts at the enemy to free the

surrounded in the environs of Stalingrad grouping of the troops/forces during December 1942;

4) destruction of the surrounded in the environs of Stalingrad Fascist-German troops/forces in connection with their failure surrender in period from 10 January through 3 February, 1943.

One of the armies, which was being located on the direction of main attack, conducted during this time active defensive actions on routes of approach and in Stalingrad itself, pinning down and bleeding white enemy, and to the moment of passing of adjacent armies and fronts into offensive also it passed into offensive, after freeing the series/row of important in strategic sense points/posts and areas in Stalingrad and its suburbs.

Rendering to the medical aid by wounded in this army had its special features/peculiarities, caused by combat circumstances.

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First aid by that wounded the skull in army consisted in the application of dressing and the most rapid possible and cautious carrying out of wounded from the field of combat to BMP.

Research of wounded on the field of battle and condition of their carrying out had during this combat process/operation their special features/peculiarities, different in phase of combat in interfluvial and during combat in Stalingrad.

During July and August of 1942 the army conducted combat after Don and in interfluvial routes of approach to Stalingrad. Locality to the West of Stalingrad is steppe, crossed by ravines and by beams/gullies; in northern part it is covered with bushes, there are no forests/scaffolding.

The research of wounded was conducted under the fire/light of enemy, having shot through the open sectors of the field of combat. In the series/row of areas was necessary to surmount considerable space, in order to deliver wounded into sheltered from fire/light place (Fig. 4). Of soldiers and aidmen was required the great art of camouflage and change to crawling carry wounded, protecting them from repeated wounds. With respect to wounded in the skull, being in unconscious state, was important to stave off the contusions of the head with their delivery/procurement to raincoat-tent from the firing line to the nearest cover.

Hot weather (to 35-40), and also small amount of precipitation caused the need for concentrating wounded in shadow (in ravines and beams/gullies) and organizing supply of water.



Fig. 4. Rendering of first aid to that wounded the skull on the field of battle (from the collection of military-medical museum of VM of the USSR).

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The evacuation of wounded to BMP and PMF was realized by mainly horse transport. In a number of cases of heavily wounded it was necessary to deliver to stretchers, being camouflaged on terrain, since vehicles with wounded on roads were fired on by the aviation of enemy. Above the field of combat, in area of the disposition of this army, often continuously were located enemy's 30-40 aircraft, and during the individual days of combat the total number of hostile

missions reached to 800.

The therapeutic installations of the army area in order to lighten and to accelerate the delivery/procurement of wounded for the fastest rendering by it of the qualified medical aid, it was necessary to considerably draw nearer the front/leading territory. At the same time was considered also the fact that tanks, having available extremely large tank groups, it sometimes broke through in individual sections our defense and it could renounce therapeutic installations from warheads.

Completely different conditions on search and carrying out of wounded from the field of combat were complicated during combat in Stalingrad. If in battles on routes of approach to city it was possible to apply the methods of mobile warfare, then with street combat the character/nature of combat operations changed. Stalingrad is arranged/located along the right shore of Volga and together with suburb stretches from the north to the south on 25 km, but from the west to the east - on 0.5-3 km. The general/common/total planning of city is sustained in the form of rectangular quarters with a large number of long, straight/direct streets. In the northern unit of the city are arranged/located three major plants. Locality from market to Mamayev of barrow, adjacent to plants, abounds by ravines and hills. In city there are artificially planted groves. City district from the

West to the east cross/intersect two small rivers. Volga in city district has into the width of 1-2 km. There are no bridge crossings across the river.

In outskirts of city, occupied with predominantly low wooden buildings/structures, our units forced were to perform in the quarters, filled by flame/blast or already burned. The extensive areas of the fires forced sometimes to search for alternate routes for the delivery/procurement of wounded from front/leading edge to BMP and PMP.



Fig. 5. Mutual assistance on the field of battle (from collection of military medical museum of VM of the USSR).

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During combat in internal blocks of the city with great stone houses and plant construction of the condition of rendering to the first medical aid and carrying out of wounded changed. The stone urban buildings/structures, joined into units/blocks and blocks (part

which was converted into ruins as a result of the preceding bombings and shellings), determined in a number of cases the activity of the small assault teams of our troops/forces. The troops/forces began to be concealed in cellars and ruins of the stone houses, converted into defensive strengthenings. Artillery in the aviation of the enemy conducted fire/light not directly according to the troops/forces, but with target the decomposition of buildings. In the presence of continuous front line combat they were deployed in essence around the individual strong points, which covered most important in tactical sense directions.

The defenders of city deposited the literally each span of the earth/ground. For enemy it was necessary to the price of the great losses of new combat not only for the specific city districts, but also for individual quarters, plants, shops, houses, for individual floors and even rooms in them. In these street battles predominated mortar, machine-gun, automatic and rifle fire/light from close distances (Fig. 5). The use/application of manual ones of Grant, delivery of fire by direct laying from light guns, bayonet/bar strike/shock characterize combat of this period. To be oriented in city was difficult, since the majority of quarters was destroyed, and streets were heaped up with the fragments of buildings.

To reach to certain wounded, who are located in the fired on

separate buildings, was often not easily (Fig. 6). Still more difficult it was carry wounded into skull, that were being located in unconscious condition, through the destroyed marches/passages, staircases and ruins of buildings. In the series/row of front sectors the need for overcoming the open places, shot through from many sides, forced sometimes to wait until onset of dark.

Wounded they carried from the field of combat on hands and on stretchers. The outlying from the firing line wounded were concentrated in the first floors and basements and on the communications trenches rapidly were delivered to arranged/located in immediate proximity of EMP.

In view of comparatively warm autumnal weather with insignificant sediments initially in those wounded the skull rarely were encountered the complications from the side of the lungs. The advanced winter made it necessary to conduct the series/row of urgent measures for warning/prevention in wounded pneumonia and freezings. Winter came immediately. The first snowfall was on 20 November. Snow lay in the latter/last days of November. The winter months were characterized by sharp southeastern winds, snow snowstorms and skidding; the temperature at the end of December achieved 25-27° frost with high wind. Vclya was completely covered with ice on 18 December, 1942.

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Fig. 6. Rendering of first aid to that wounded skull under conditions for street fightings. From the picture of military medical museum of VM of the USSR. (Artist V. N. Grandi.).

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PMP were located from BMP on several hundred meters.

However, from the first days of cooling the soldiers were provided with warm clothing, and were also they were carried out measures for the warming of the assembly points of wounded and therapeutic installations. On the firing lines the stretcher bearers took measures for the heating of wounded and warning/prevention in them of freezings.

The periods of the carrying out of those wounded the skull during street fightings and their delivery/procurement on BMP oscillated from several minutes to 1 hour. Sometimes, as already mentioned when it was it cannot be approached the wounded because of the fire/light of enemy, the carrying out of wounded from company sector was held up by several hours. In progress of combat the periods of the carrying out of wounded always were reduced due to the creation of the wide net/system of the communications trenches between dugouts, the fastened/strengthened cellars of buildings and weapon emplacements in a number of cases of wounded they became to deliver to BMP and PMP on sleighs.

Under severe medical-tactical conditions the work of BMP and PMP, naturally, was connected with the series/row of difficulties. Large/coarse measures were carried out on the permission of the problem of water supply, heating and illumination of therapeutic installations. Many efforts/forces extended medical workers, in order to adapt the destroyed quarters/premises and cellars under therapeutic installations and to create for wounded the necessary conditions. Systematic artillery fire and aerial bombardment made it necessary to select for BMP and PMP most frequently underground quarters/premises.

The first medical aid by that wounded into skull consisted on BMP and PMP in the examination/inspection of wound, the cessation of external hemorrhage and the application of aseptic dressing. Wounded they warmed, before evacuation to them they gave the necessary rest, were taken measures of the over-all strengthening character/nature, they applied sulfanilamides with purpose of prevention of infectious complications.

During the evacuation of those wounded in skull was conducted bandaging of head, but as a result of the acquired experiment/experience this measure underwent review. The fact is that the immobilization of head, neck and body with the aid of splints in individual those wounded into skull, that were being located in

unconscious condition, could create conditions for the aspiration of emetic masses, in view of the fact that of similar wounded with bandaged head was difficult to lie/fall/lay sideways. For the same those wounded the skull, which were found in consciousness, the immobilization of head proved to be excessive, since it only impeded their movements. If one considers that the splints for the immobilization of head were laid above clothing, then, naturally, occurred the cases when ties weakened and immobilization became meaningless. Therefore during this combat process/operation series/row of PMP began to practice the underlayer under the head of the wounded of cushion, folded overcoat or special well-packed sacs/bags/follicles with sand, which provided sufficient rest for a head and they made it possible to change the position/situation of those wounded into skull with the onset in them of vomiting. At the same time, were created the conditions for permanent observation of wounded in route/path by the escorting/tracking medical personnel. Vehicles were coldproof.

The conditions for deployment and work of DMP during combat on distant routes of approach to Stalingrad and in city itself were also different.

1. In phase of combat in interfluvial medical installations of divisions were arranged/located not far off from front/leading

territory. Approximation/approach of DMP was caused, as already mentioned, by the need for creating the conditions of the most rapid possible delivery/procurement of wounded for the rendering them of the qualified medical aid.

It is necessary to note sufficiently widely applied during this period of war separation of DMP into two echelons. The first echelons of DMP advanced forward, close to divisions, they were mobile, facilitated they had the necessary equipment for production in the urgent process/operations, including on skull. The second echelons of DMP were arranged/located in these cases on greater than usually, distance from front line. During this period the series/row of DMP underwent the attack of hostile aviation and were experienced difficulty with the delivery of medic-economic equipment.

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Losses in personnel of DMP caused the temporary/time incomplete set of cadres. The activity of the aviation of enemy in individual periods upset the operation of army ambulance transportation.

To the entrance into combat in this army was carried out the practical training of the doctors of the bandaging platoons of MSB, operating nurses and other medical personnel on the basis of

evacuation hospitals in Stalingrad. During combat this preparation/training had positive effect on work in military field circumstances.

Workers of DMP were sufficiently well familiar with the principles of the classification of the neuro-surgical wounded and produced surgical interventions on skull and brain less frequent than during the combat process/operation of the retreat of the Germans in the environs of Moscow. However, on DMP with difficulties with the evacuation of wounded in a number of cases of reading to process/operations on skull were expanded in connection with threat the developments of infectious complications.

Combat and operational-tactical situation forced sometimes to evacuate post-operation wounded within earlier periods. For the evacuation of those wounded the skull into army therapeutic installations, besides medical motor vehicles, was utilized incidental transport.

Those wounded the skull they guided into the hospitals of the first line and to evacuation point which in that period actually fulfilled functions KhPPG and to which for reinforcing were attached operations surgical groups.

Therapeutic installations were located in small cities in villages and in individual peasant construction. Frequent air raids and also the need for redislocation always did not make it possible to completely deploy KhPPG, or to adapt the occupied quarters/premises for therapeutic installations. Nevertheless KhPPG, as a rule, deployed and equipped operating room, medical dressing room and other basic subunits.

In army area outlined were specialized KhPPG due to imparting to them of the corresponding groups of OBMU; however, the manned neuro-surgical groups of reinforcing in this combat process/operation army yet did not have.

2. Completely particular conditions with respect to provision of those wounded skull by medical aid on DMP were formed during combat in city itself. This phase of combat (from September 1942 through January 1943) was for the medical service of army most difficult.

The heavy character/nature of wounds skulls, together with the difficulties of carrying out from firing lines and delivery/procurement of wounded into the therapeutic installations of army area, and also difficulty with their evacuation across the great river forced the medical department of army to accept the number of the necessary organizational measures for warning/prevention of the

ice (from 18 December, 1942, to the end of the combat process/operation).

a) In the first, autumnal, period DMF, KhFFG of the first line and the evacuation points were withdrawn to the right shore of Volga operations groups for the care of wounded. In the composition of the operations groups, which worked in city, entered the chief/leading surgeon, doctor, nurses and aidmen. These operations groups were arranged/located usually at a distance of 2.5-4 km from PMP and was rendered urgent surgical aid. Some of these groups provided the medical aid by wounded on crossings.

In accordance with combat and tactical situation the volume of the work of operations surgical groups consisted in the concentration of wounded in the specific places and the organization of nourishment, the supervision of tourniquet and the cessation of hemorrhage, amputation of extremities from urgent readings, the imposition of transport splints, the sewing up of the wound of breast with open pneumothorax, the use/application of medicinal/medicamentous substances and evacuation of wounded.

With the wounds of skull undertook the cessation of external hemorrhage, the supervision of bandage, antishock measures, introduction of the preparations, stimulating cardiovascular and

complications of the wounds of skull and brain.

The deployment of the therapeutic installations of divisions and army hospital base was not placed in ordinary schemes. The special features/peculiarities of the crossing of wounded through the river line, the long axis of evacuation with insufficiency and remoteness in that period of the hospital basis of front forced sanitary section of army sufficient to equip DMP after converting them actually into army type installations. Thus, army obtained the possibility to increase its hospital fund and ensured the tracer of evacuation.

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Surgical aid by wounded, including neuro-surgical, was determined in DMP by tactical conditions and it was subdivided within the time of combat in city for three fundamental periods:

a) autumn period (to half November);

b) the period of the waiting of ice formation and possibility of cessation of the work of crossings (second half November and first half December);

c) the period of the establishment of crossings through Volga on

respiratory/breathing activity, and also antiseptic substances and dehydration. In a number of cases was conducted the blood transfusion. Was given also attention to the correct immobilization of head.

On crossings those wounded the skull were provided the aid of the surgical operations groups of the army therapeutic installations, intensified by groups of DMP. Into the task of these groups entered the supervision of bandages, production from readings of the dressings of the wounds of skull, cessation of hemorrhage, etc.

Surgical interventions produced not on all crossings. The volume of operational work depended on combat and tactical situation. Sometimes circumstances was such, that the operations groups could make only sorting work and guide to the left shore first of all of those requiring in urgent surgical intervention. To the middle of Volga, on hare island, in dugout was equipped the operating room and surgical dressing. The surgical operations group, which worked on island, realized a medical service of wounded, and also it had to carry out the missions of emergency group in the case of the difficulty of the evacuation of wounded from island to the left shore of river. Easily wounded the skull were crossed to island on the footwalk heavily wounded they transported on the special boats, which accomodated 5-6 stretchers each. On the western and eastern shore of

island were separately isolated evacuation groups. Transportation across island were realized by horse transport. If the condition of wounded required complicated process/operation on skull and brain, which could not be accomplished in operating room on island, then wounded rapidly they crossed to the left shore of Volga in KhPPG.

A considerable number of those wounded in skull was transported from city on steamships and armed boats passing here island.

On the left shore of river always were duty medical motor vehicles and medical personnel. In crossings on the left shore of Volga were also dug out the dugouts for wounded, were organized feeding points/posts and points/posts of medical aid. All groups in crossing were organized by the medical department of army due to forces and substances of evacuation point and one of KhPPG. Transport was given from substances DMP and intensified by the medical motor vehicles, isolated with the medical control of front.

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Through 3-4 weeks the volume of the work of operations surgical groups in Stalingrad decreased, since to hold up wounded on the right shore of Volga was for a long time impossible. On measure the penetrations of enemy into the individual districts of the city of the condition of our troops/forces' defense considerably were complicated. Volga, which flowed/occurred/lasted directly in the disposition of the units of the army, troubled maneuver from depth and impeded delivery, because to construct the permanent crossings across the river it was impossible as a result of continuous artillery fire and raids of hostile aviation. A struggle for Stalingrad it was necessary to carry on under the most exacting conditions. Army had a front by elongation/extent into 25 km and depth of defensive zone from 200-300 m to 2-3 km. Our troops/forces' maneuver along front could be realized only on narrow coastal zone and only in night time, since entire/all depth of the defenses of army was shot through by artillery and mortar fire, and by places even from machine guns and submachine guns.

It is logical that it is under such conditions necessary it was

necessary to possibly more rapidly evacuate wounded from city.

The volume of the work of operations surgical groups with the wounds of skull as before was reduced to the cessation of external hemorrhage, the use/application of substances, stimulating the cardiovascular of activity and respiratory/breathing center, to introduction in the urgent readings of glucose, the issue of sulfanilamides and the supervision of immobilization. From city were soon sent the operations groups of KhPPG and evacuation point and were left only groups of DMP. At the end of September and during October operations surgical groups forced were to entirely end their work. On the right shore of Volga were left only evacuation groups, task which was urgent medical aid on crossings and the most rapid possible evacuation of wounded to the left shore of Volga.

b) In the second period - the waiting of ice formation and possibility of the curtailment of the work of crossings (second half November and first half December) - to the right shore of Volga were directed surgical platoons of MSB (according to a number of divisions) for the provision of units with surgical aid.

Taking into account that the right shore of Volga higher than left and that therefore the high abrupt shore created considerable dead area for a hostile fire/light, the medical service of army

utilized this advantage for the concentration of wounded. On the shore under break were dug out the dugouts, in which with each operations group were placed the operating rooms, surgical dressing and specific number of cots for wounded. Surgical groups had equipment for production in the necessary process/operations.

Those easily wounded the soft tissues skulls evacuated to their DMP with the aid of division boat crossing.

Heavily wounded the skull and the brain they evacuated from city on motor boats and steamships.

When the movement through Volga ceased and the evacuation of wounded became impossible, the first echelons of DMP, having the qualified surgeons, sufficient equipment and 15-day reserve of surgical dressings, successfully managed the medical service of wounded in city itself, in immediate proximity of the firing line. Thus, in the heavy period of ice formation when armored boats ended movement, the medical provision of an army was not disrupted. In this [Tr. note: Part of Russian text appears to be missing.] in one of the divisions, renounced from its army, which soon, however, again with it was connected.

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c) In the third period (from 18 December, 1942), when was established/installed first: pedestrian, and thereupon horse crossing on ice, all the care of wounded in divisions and their evacuation into army therapeutic installations were charged on DMP. Soon motor vehicles of DMP could approach directly the right shore and military divisions obtained the possibility to produce the evacuation of wounded along their axis.

Work of DMP on the left shore of Volga had its also special features/peculiarities. During execution by the second echelons of DMP of the functions of army therapeutic installations by them were attached 4 surgical groups of ORMU [separate medical reinforcement company] subordinate to Front line authority.

Subsequently, when DMP began to fulfill the work of army therapeutic installations, in them began to enter the wounded directly with PMP.

The crossing through Volga on ice made it possible to sharply shorten the periods of the entry of those wounded the skull on DMP, which is evident from Fig. 7.

The periods of the entry of those wounded the skull on DMP into the most difficult autumn-winter period of Stalingrad battle always were reduced. As can be seen from Fig. 7, in spite of the difficulty of the crossing through Volga, during November 1942 nevertheless it was possible to deliver on DMP 79.40/o of those wounded the skull for the first 24 hours from the moment of wound.

During December, although the crossing on ice became possible only from the 18th number, more than half all those wounded the skull were delivered on DMP in the first 6 hours from moment the wounds; for their first 12 hours entered 77.50/o.

During January 1943, when army attacked/advanced and advanced forward, work was organized so that the majority of those wounded into skull entered on DMP for the first 6 hours from the moment of wound.

Everything presented above with a certainty says about the serious successes of the organization of therapeutic aid by that wounded into skull under such unprecedented difficult conditions of the combat operations of the troops/forces such as were in Stalingrad.

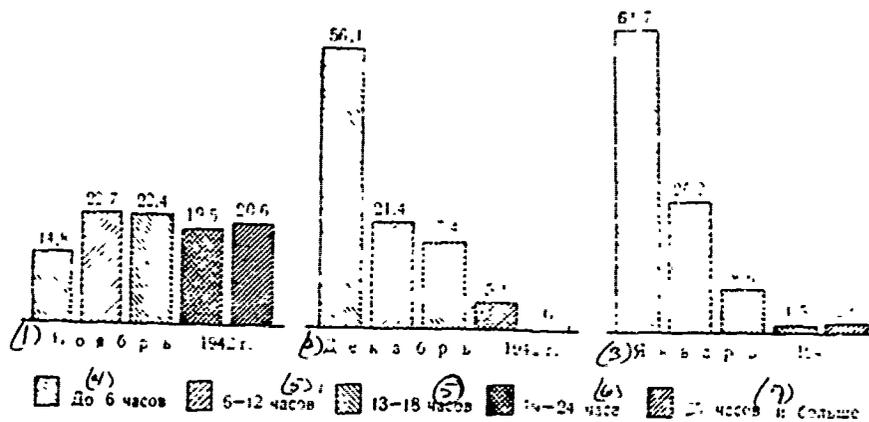


Fig. 7. Periods of the entry of wounded the skull on DMP armies during Stalingrad battle in the autumn-winter period (in percentages).

Key: (1). November. (2). December. (3). January. (4). To 6 hours. (5). hours. (6). hour. (7). hours and more.

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Summary data on DME within a 7-monthly period in Stalingrad - [Tr. note: Text missing in Russian text.] that the specific gravity/weight of these wounded into skull among all wounded, who entered DMP, was somewhat lower than during the combat process/operation of the rout of the Germans in the environs of Moscow, since unit of them directly entered in KhPPG of the first line.

On DMF the entry of those wounded into skull went in two directions: from PMP and directly from units. In view of the particular conditions for the combat process/operation when working parts were located in immediate proximity of river crossings, from PMP entered 60.00/o of those wounded into skull, and 40.00/o of them were directed directly from units.

The distribution of those wounded the skull according to the severity of damage shows that through DMF passed 75.00/o of those wounded the soft tissues and 25.00/o of wounded the skull with damage bones.

Operational of activity of DMF during Stalingrad battle was characterized by production in the primary processing in 10.30/o all of those wounded the skull.

In comparison with the combat process/operation of the part of the Germans in the environs of Moscow the readings to surgical interventions on skull were during Stalingrad battle somewhat narrowed due to the established in army area conditions, which did not favor production in the similar process/operations. If we consider moreover that in the known period of this combat

process/operation of DMP it was necessary to partially fulfill the functions of army therapeutic installations, then the percentage of surgical interventions should be recognized low. The surgeons of DMP sufficiently correctly understood their task in the relation to the medical aid by that wounded into skull and virtually began to transform it into life, performing process/operations on skull in the majority of the cases only from urgent readings. From a number of those wounded the skull with damage to bone it was operated on DMP 17.50/o, and among those wounded the soft tissues - 7.60/o.

These data indicate a descent in the percentage of surgical interventions during Stalingrad battle in the group of those heavily wounded the skull almost 2 times (in comparison with the described higher combat process/operation) and to an increase in the percentage of primary processings on DMP among those wounded into the soft tissues of skull.

During Stalingrad battle the lethality on DMP among those operated also noticeably was lowered.

Thus, the surgeons of DMP under the severe conditions of combat circumstances virtually realized of instruction of GVSU. The predominant number of process/operations on skull was produced with great care and radically. However, in the reports of KhPPG are

indications of abandonment sometimes of bone fragments in cerebral substance after interventions on DMP, which was caused partly by absence on DMP of the X-ray apparatuses and specialist-neurosurgeons.

The majority of those wounded skull (84.80/o) was evacuated in KhPPG. From a number of wounded the skull with damage bones it is evacuated by 76.90/o, while from those wounded the soft tissues - 87.60/o. These data also tell about increase in comparison with the preceding/previous combat process/operation of the percentage of the evacuation of those heavily wounded the skull from DMP to KhPPG.

Evacuation underwent those wounded the skull, the requiring the primary processing wounds and the capable ones due to their condition to transfer transportation in KhPPG. The evacuation of those wounded the skull in post-operation period was conducted usually after 2<sup>1</sup>/<sub>2</sub>-3 week hospitalization; however, occurred the individual cases of earlier evacuation in connection with the requirements of combat circumstances.

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For this combat process/operation on DMP recovered 7.30/o all of those wounded the skull, and among those wounded the soft tissues of skull - 9.50/o. These data, indicating the sufficiently high

percentage of those recovered at DMP, to known degree are explained by the fact that DMP certain time fulfilled the functions of army therapeutic installations.

Relative to left on DMP for treatment of wounded of the soft tissues of skull in explanatory notes to reports are instructions that this were the most easily wounded, who was subject soon to extraction.

Lethality on DMP among those wounded into skull proved to be below lethality in army therapeutic installations during the combat process/operation of the route of the Germans in the environs of Moscow. In this case nontransportable and post-operation wounded the skull were held up on DMP during Stalingrad battle for more prolonged period.

Among the reasons for lethality on DMP should be noted severity and vastness of the destruction of skull and brain, and also the multiple and combined wounds of head, chest, stomach and extremities. Furthermore, are indications of the relatively high percentage of infectious complications among dead persons from the wounds of skull. This fact is not characteristic for DMP and is explained by both the considerable contamination of the wounds, obtained under conditions for street fightings in winter period, and by prolonged

hospitalization of heavily wounded.

The evacuation of those wounded the skull from DMP to KhPPG of the first line was realized, as a rule, by motor transport. By winter vehicles were coldproof. In a number of cases it was necessary to utilize reverse empty car and horse transport. In route/path after those wounded the skull conserved medical personnel.

KhPPG of army were arranged/located at different distance from Volga.

In army they were isolated from KhPPG of the first line which picked up those wounded the skull from army area. Brief information about the conditions for deployment and work of the therapeutic installations of army area during combat in interfluve and on distant routes of approach to Stalingrad is given above. The operation of KhPPG of the first line during combat in Stalingrad flowed/occurred/lasted into somewhat different conditions. KhPPG were accommodated in mud huts, in the well coldproof tents, and also in cottages. Working conditions were fairly complicated, if one considers that these KhPPG were located in the sphere of influence of hostile artillery and aviation. Under conditions of shellings and aviation bombing among workers of KhPPG and wounded there were losses.

For reinforcing DMP, and also for approaching of the qualified medical aid and increase in the possibility of sufficient hospitalization of the nontransportable wounded the hospitals of the first line were expanded/scanned near crossings in 3-5 km from left shore.

As already mentioned, these KhPPG singled out operational surgical groups to the right shore of Volga, and therefore a number of authorized cots was somewhat abbreviated/reduced. KhPPG of the first line took upon themselves in essence function of medical service and hospitalization of untransportable wounded, producing all urgent surgical interventions.

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One of KhPPG of the first line from August through December 1942 accepted to itself a considerable number of wounded among whom 4.30/o composed the obtained wounds skulls. A great quantity of those wounded into skull entered during September and August 1942. According to the character/nature of damage of these wounded were distributed over the obtained bullet wounds of skull with the damage of bones (47.70/o) and obtained wounds soft tissues of skull

(52.30/o) .

According to the form/species of the wounding shell was noted the predominance of the fragmentation wounds of skull (61.90/c) above bullet ones (38.10/o). Street fightings were characterized by the wide application of a rifle and automatic fire/light, which gave the relatively high percentage of the bullet wounds of skull, if we compare it with the data of the maps/charts/cards of the deepened characteristics, given in the preceding/previous volume (page 54). Among the fragmentation wounds of skull more frequently were encountered the damages by the fragments of mines (31.80/o), aircraft bombs (19.00/o) and is thinner/less frequent by the fragments of artillery shells (6.10/c), and also grenades (5.00/c). Comparatively rare in other combat process/operations cases of the wounds of skull by the fragments of aircraft bombs and garnet were encountered into time of Stalingrad battle more frequently; the greatest percentage of the wounds of skull by the fragments of aircraft bombs was noted during September, August and October of 1942; during November and December similar wounds were single. The great percentage of wounds by the fragments of grenades (short-range weapon) is noted during December 1942 and during January 1943.

In this KhPPG of the first line basic work among those wounded the skull was reduced to the development/detection of the

nontransportable wounded, conducting of the number of the over-all strengthening and dehydrating measures, examination/inspection of wound and shave of hair around it, production in the process/operations on urgent readings and evacuation of wounded into the specialized hospitals of GBA.

After an improvement in a medical-tactical circumstances at the end of 1942 in this KhPPG began to more widely operate those wounded the soft tissues the skulls. For combat process/operation in KhPPG it is operated by 17.50/o all of those wounded the skull. Among wounded the skull with damage bones it underwent process/operation 20.60/o. In fourth of these process/operations intervention was restricted only to processing skin-bone wound. Lethality among the operated wounded the skull with damage bones composed 9.40/o. A great number of process/operations in wounded the skull with damage bones is produced during September. Among those wounded the soft tissues of skull it was operated by 15.00/c, mainly in winter time.

Basic part of those wounded the skull was evacuated into specialized KhPPG of GBA. The evacuation of wounded was conducted by motor transport up to the distance of 30-36 km.

Another KhPPG of the first line was deployed approximately/exemplarily under the same conditions, after changing

its deployment in 6 months of 7 times. Hospital also secreted operations surgical group to the right shore of Volga. In 5.30/o of all entered wounded had the bullet wounds of skull.

The surgical work of this KhPPG is characterized by high operational activity with respect to those wounded the skull. Among wounded the skull with damage bones to surgical interventions it underwent by 79.30/o, what is exclusion in the operation of KhPPG of the first line. From a number of those wounded the soft tissues there were primary processed 14.00/o.

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The treatment of the post-operation wounded consisted in the wide application of intravenous infusions of sulfidine, urotropin, streptocide and glucose. The wounds of skull conducted under loose bandages with weak antiseptic solutions/openings. Lethality among those operated was above than in first KhPPG, which to known degree is explained by the heavier condition entered of those wounded into skull.

The convalescents of wounded they guided into specialized KhPPG for neurologic examination/inspection and more detailed roentgenological examination/inspection.

The greatest unit of the wounded was evacuated. Evacuation was realized by its transport - cargo coldproof vehicles.

The hospitals, intended for the treatment of those wounded the skull in this army there were two, although they yet did not have neurosurgeons. However, in these hospitals worked the sufficiently qualified surgeons, who mastered cavitory process/operations technique.

1. First so-called specialized KhPPG in half-year of combat operations changed its deployment of 6 times. A great number of wounded entered during September, October and December.

During combat in Stalingrad this KhPPG was performed at first the role of sorting hospital, leaving on the spot of those only nontransportable wounded into skull. To this forced operational-tactical circumstances, since hospital was arranged/located not far off from KhPPG of the first line and was located in the sphere of influence of hostile aviation. After being relocated subsequently somewhat further into the army area (but being as before located nearer to river than by the second, so-called specialized KhPPG), this KhPPG accepted those heavily wounded the

skull, the breast, the stomach, the extremities, and also with the complications of anaerobic infection.

Hospital was attached the general-surgical and ocular group of ORMU. In last 3 months the hospital fulfilled the functions of that specialized.

Hospital accepted a considerable number of wounded, among them 8.90/o with the bullet wounds of skull (damages of the bones of skull were noted into 70.30/c of wound of soft tissues - only into 29.70/o). As can be seen from these data, the direction of those wounded the skull into this hospital was sufficiently sustained according to designation/purpose.

In hospital were produced surgical interventions in 37.20/o all of those wounded in skull.

In the group of wounded the skull with damage bones surgical interventions were produced in 49.00/o of wounded. The wounded the soft tissues skulls underwent the primary surgical processing of wounds into 9.00/o of cases.

Process/operations on skull were performed under local anesthesia. Cut all over territory the wounds of soft tissues. By the

forceps of Luer they expanded bone defect and drove out from the area of skull the visible bone fragments. Wounds powdered by streptocide and conducted under loose bandages. Dry suture was not applied. Lethality among those operated was equal to 16.90/o. Post-operation period was maintained/witstood in essence by period in 3 weeks; however, occurred the cases of the forced early evacuation of the operated wounded due to the established conditions of combat circumstances. The evacuation of wound ones with the nonpenetrating wounds of the skull was conducted usually after 12-13 days after process/operation. The predominant number of wounded was evacuated into second so-called specialized KhPPG, and certain unit directly on GBF. The evacuation of wounded was realized most frequently in the coldproof automatic motor vehicles.

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It should be noted that this KhPPG, working under difficult conditions and accepting heavily wounded, knew how to conduct great surgical work on the primary processing of the nontransportable wounded the skull by efforts general/common/total surgeons.

2. By the second so-called specialized KhPPG after half a year were relocated 8 times. During combat in the suburbs of Stalingrad and in city itself KhPPG serviced those wounded the skull and chest,

being arranged/located in one of the nearest cities. Hospital was accommodated in the building of school and habitable houses, being located somewhat further from Stalingrad, than the first.

Among all entered wounded those wounded the skull composed 12.30/o. Their great number entered in the same period, as into first KhPPG. According to the character/nature of damage the wounded were distributed over the obtained damages bones of skull (46.20/o) and wounded soft tissues (53.80/o).

In hospital worked the qualified surgeons and neuropathologist.

To surgical intervention it underwent by 16.50/o all of those wounded the skull; lethality among those operated composed 2.70/o. In the group of wounded the skull with damage bones it is operated by 17.80/o; lethality among them was equal altogether only by 6.10/o. The wounded the soft tissues skulls were operated into 15.00/o; lethality in this group it was not noted. A great number of process/operations is produced in the months of the great entries of those wounded the skull. The majority of wounded was evacuated on GBF; the unit of the easily wounded was directed in GLR. The evacuation of those wounded into skull was conducted by railroad and less frequently on motor vehicles on the associated siding to ground road. On-loading wounded into cars and evacuation by railroad

presented in that period the series/row of difficulties in view of the load of the iron road of the barbarous bombing of hospital trains, etc. In order to ensure timely evacuation, it was necessary in army area to form/activate staff from passenger and coaches, to warm them and to adapt for the transportation of wounded and nevertheless in the individual periods of combat process/operation was noted overload of KhPPG.

Facts indicated above forced the medical department of army to make a decision to guide transport means DMP for the evacuation of wounded when DMP, as has already been indicated, were converted for the specific period into army type therapeutic installations.

Besides the hospitals, specially intended for these wounded into skull, the unit wounded entered during this period in KhPPG of general-surgical profile/specialty. As an example it is possible to lead work on the treatment of those wounded into skull in one of similar KhPPG. This hospital was located not far off from KhPPG of the first line and among all those entered it accepted 2.60% of those wounded the skull. Thus, the specific gravity/weight of those wounded the skull in this hospital was considerably lower than in so-called specialized KhPPG.

The largest number of wounded entered during September and

October. Among those wounded the skull the damages of the bones of skull are noted in 46.30/o, and the wounds of soft tissues without the damage of bones - in 53.70/c.

Surgical interventions among all those wounded in skull were conducted sufficiently widely (30.40/o). This required the condition of the entered wounded and the threat of infectious complications.

Among those wounded the skull with the damage of the bones of process/operation they are produced into 41.00/o of cases. Lethality among those operated proved to be comparatively high that it is explained by the heavy condition those wounded subjected to process/operation. As a deficiency in the work of this hospital should be recognized attempts at the surgical treatment of certain group of extremely severe, inoperable wounded the skull.

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Focuses also attention comparatively high lethality among operated those wounded into the soft tissues of skull. The latter were subjected to process/operation into 22.00/o of cases. One should assume, that in the unit of these wounded doubtlessly had the severe closed injury of skull with multiple failure of the soft tissues of skull, that also caused this lethality. It is evacuated from this

KhPPG by 85.00/o all of those wounded the skull. From a number of wounded the skull with damage bones toward the end of accounting period it remained on the spot for recuperation 7.20/o.

It is necessary at least briefly to mention about work of KhPPG, intended for wounded commanders and command personnel. In this hospital those wounded the skull composed a comparatively small unit of the total number of entered wounded, in this case in 21.90/o there were damages of bones of skull (mainly not penetrating into brain), also, in 78.10/o - wound of soft tissues. Unit of them was processed in the preceding/previous therapeutic installations. In hospital were produced the process/operations in 11.70/o of those wounded into skull with low lethality among them (4.30/o). Within accounting period recovered 8.70/o all of those wounded the skull; it was evacuated to GBF 76.20/o and sufficiently considerable number of convalescents of the commanders it was left for recuperation.

Those wounded the soft tissues of skull, pass through so-called specialized KhPPG, were sent to GLR. The percentage of those wounded the soft tissues among all entered those wounded into skull oscillated in individual GLR from 85.6 to 96.0. The fact that among ~~those admitted to GLR~~ those wounded the skull there was a small quantity with the damage of the bones (which caused the small percentage of lethality), he speaks about the available still defects of evacuation

strictly according to designation/purpose.

Surgical interventions in case of GLR were produced with purpose of primary processing in 39.00/o those wounded into the soft tissues of skull. It recovered among those easily wounded the soft tissues of skull, on these different GLR, from 41.5 to 59.50/o. Thus, in the army in question was not unsuccessful it was carried out work on abandonment in the particular hospitals of series/rcw easily wounded into the soft tissues of skull and on their recuperation within the limits of army rear.

The total work of all hospitals of army from July 1942 through January 1943 (inclusively) can be represented as follows:

1. The distribution wounded the skull to group with damages of bones (30.00/o) and wounded the soft tissues of skull (70.00/o) indicates an increase of the number of those heavily wounded into skull, that entered into therapeutic installations during this combat process/operation.

For characteristics of those wounded the skull, the passed through KhPPG of army, should be noted by sufficiently high the percentage of bullet wounds (35.3); fragmentation wounds composed 64.70/o. Focuses attention the group of the multiple combined wounds

of the skull and other organs/controls (stomach, breast, etc.), which composed 20.00/o.

2. It is operated among all those wounded skull 28.20/o. To surgical interventions it underwent by 36.40/c wounded the skull with damage of bones and 15.90/o wounded the soft tissues of skull.

3. Lethality in group operated of those wounded skull composed 11.30/o.

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4. It recovered in hospitals of army 16.30/o of those wounded skull, and among those wounded soft tissues of skull - 23.10/o. During battle for Stalingrad was necessary to leave somewhat more than wounded on army hospital base due to readiness of GBF. Furthermore, was acquired already known experiment/experience in organization in the army of special hospitals for the treatment of easily wounded.

5. It is evacuated from army installations on GBF 67.70/c of those wounded skull: it is separate: 56.80/c of wounded with damage of bones and 72.40/o of those wounded soft tissues.

Summarizing entire work of the therapeutic installations of army area, one should also mention about loading of different KhPPG wounded the skull. If we take as an example two hospitals, intended for the treatment wounded in skull, two hospitals of general-surgical profile/specialty and two GLR and conditionally a number entered of those wounded into skull in the second, so-called specialized hospital to accept for 100, then loading these hospitals wounded in skull will be the following (Fig. 8).

As can be seen from Fig. 8, loading the hospitals of army, intended for the treatment of those wounded the skull, was nonuniform mainly as a result of the fact that first so-called specialized KhPPG was arranged/located nearer to KhPPG of the first line and accepted in essence wounded only with the right flank of army.

In KhPPG of general-surgical profile/specialty entered those wounded the skull with DMP, if they were arranged/located closely; GLR picked up considerable quantities of those wounded the soft tissues of skull.

In the army in question has already been carried out the evacuation of those wounded the skull according to designation/purpose, mainly heaviest. Among all KhPPG of army in the so-called specialized hospitals it was directed by 45.00% of those wounded to skull.

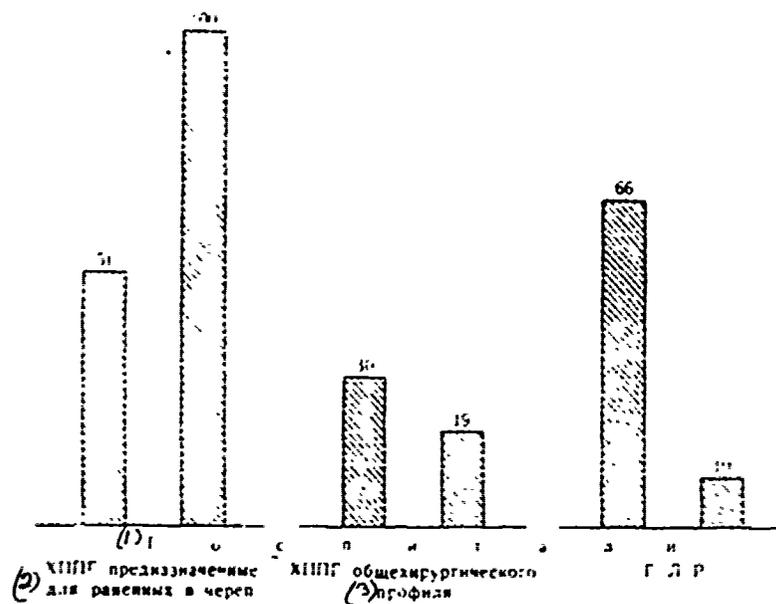


Fig. 8. Loading the individual hospitals of army wounded the skull during the Stalingrad battle (quantity of wounded in second KhPPG is conditionally undertaker 100).

Key: (1). Hospitals. (2). intended for those wounded skull. (3). general-surgical profile/specialty.

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In this case focuses attention that of all wounded into skull with damage bones, which passed through all KhPPG of army, in the so-called specialized hospitals entered 81.6c/c. These data tell about the considerable successes of evacuation according to

designation/purpose in the relation to heavily wounded the skull.

From a number of those wounded the soft tissues of skull in so-called specialized KnPPG entered altogether only 29.10/c; their significant part was directed of KnPPG of the first line directly in GLR.

The evacuation of those wounded the skull from army to GBF was realized by railroad, or medical motor vehicles and (considerably less frequent) on paired vehicles or sleighs. Aeromedical service for the evacuation of those wounded the skull was utilized in the restricted sizes/dimensions.

In proportion to an improvement in the work of rail transport the series/row of difficulties in work of GBA on the evacuation of wounded was eliminated. Positively pronounced also the acquired experiment/experience and selfless work of medical workers, who made many efforts, also, with the sincere love of the treated wounded and handled them.

Deployment and working conditions of the hospital basis of front had during battle in the environs of Stalingrad also a series/row of special features/peculiarities.

Those wounded from skull were headed from army on GBF. On the left shore of Volga GBF it three times changed its deployment, being moved in progress of combat further into the rear. In its composition there were at first altogether only several therapeutic installations; in first half September arrived another series/row of hospitals.

In second half October GBF in essence it was expanded/scanned, counting a by this time considerable quantity of cots, moreover the arrival of new hospitals and their deployment continually continued. In nearby cities and settlements it was possible to place only the unit of the cots; remaining hospitals were placed in villages along iron road, while in the unit of the cases and on 6-30 km to side of it. The evacuation of wounded from army occurred by railroad, by motor transport, by cartage, and sometimes on foot. By railroad those wounded the skull were evacuated on the organized in army hospital trains (September - October of 1942). Several attached to GBF military-medical trains had at first insufficient turnover. Were soon attached the even army medical trains, which were included in the export of wounded from army area. The barbarous raids of hostile aviation to trains and railway lines impeded the evacuation of wounded. In the course of deploying the front line hospitals when a number of cots still was insufficient, some trains with wounded were directed further into the rear. From second half October all wounded,

who arrive from army, were hospitalized on deployed by this time GBF. With the offensive of colds and snowfalls the evacuation of wounded by medical motor transport was ended. In SEG were organized the separations/sections for those wounded the skull, ENT organs, eyes, person, and also for those contused.

As an example can be given work of one of such SEG. Into this hospital entered those wounded in the skull not only from Stalingrad, but also from the adjacent populated areas and from the passing hospital trains, which suffered as a result of frequent hostile bombardment of therapeutic installations of GBF and railway stations, which took the place during September 1942. Those wounded the skull composed 2.40/o all of those entered in SEG. The wounds of skull with the damage of bones are noted in 22.00/o, while the wounds of soft tissues - in 78.00/o.

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Surgical interventions with the wounds of skull produced the chief/leading surgeon. Those wounded the skull with the damage of bones were subjected to process/operations into 9.20/o of cases. Lethality among those operated was comparatively high. Manifested itself great severity of wounds after air bombardments with the extensive destruction of skull and brain.

It is evacuated from this SEG into rear 94.00/o of those wounded the skull. Among those wounded the soft tissues recovered in this hospital of altogether only 3.70/o, since the convalescents of easily wounded were translated in GLR.

The total data about the treatment of those wounded the skull in all therapeutic installations of GBF for combat process/operation show that those wounded the skull with the damage of bones composed 27.30/o, and those wounded the soft tissues - 72.70/o.

The operational activity of hospitals was characterized by higher activity with wounds of the soft tissues of skull. The primary processing of wounds in this group of wounded was produced into 26.00/o of cases. If one considers that in the so-called specialized therapeutic agencies of army rear it was operated by 9.0-15.00/o of those wounded the soft tissues, and in individual GLR and KhPPG of general-surgical profile/specialty - 22.0-39.00/o, then should be noted the considerable progress in the treatment of this group of wounded during battle in the environs of Stalingrad.

In front line hospitals it was operated by 6.10/o of wounded the skull with damage bones. So low a percentage of surgical

interventions is explained by entry on GBF of a considerable number of those wounded the skull, already processed in the army so-called specialized hospitals, and also in the occurred individual cases of the direction of hospital trains further into the rear without unloading on GBF.

The general/common/total percentage of surgical interventions with the wounds of skull was equal on hospitals 3.5; lethality among those operated proved to be small.

From GBF it was evacuated into the rear only by 20.50/o of those wounded the skull. From a number of those wounded the skull with the damage of the bones of evacuation it underwent by 25.70/o, while from a number of those wounded soft tissue of skull - 19.20/o. So insignificant a percentage of the evacuation of wounded into the rear is caused by putting into action of correct installations about direction into the rear hospitals of those only those wounded into skull, which require in prolonged treatment or they will be subsequently disabled.

All remaining wounded into skull remained undergoing medical treatment on GBF.

As a result for combat process/operation in hospitals recovered

27.30/o of those wounded the skull (33.9c/o among those wounded the soft tissues and 8.6o/c in group with the damage of the bones of skull). Furthermore, from those finished treatment it was acknowledged by temporarily disabled 1.8o/o of those wounded the skull (5.2o/o among the wounded with damage bones of skull and 0.3o/o in the group of those wounded the soft tissues).

The average duration of the treatment recovered of those wounded the skull was different. For wounded the skull with damage bones the average period of treatment was 53.2 days from the moment of wound (of them 29.4 days on GBF), while for those wounded the soft tissues - 35.9 days (of them 26.5 days on GBF).

For the termination of treatment toward the end of the combat process/operation on GBF it remained 47.8o/o of those wounded into skull (of them 65.7o/o with the damage of bones and 46.4o/o of those wounded the soft tissues).

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Thus, hospital basis of front was comparatively successfully solved the problem of the treatment of those wounded the skull, although into the period of installation of therapeutic installations of GBF entered the predominantly easily wounded, and trains with

heavily wounded passed to the hotel cases as transit through GBF i. to the rear. Subsequently the entry of those heavily wounded the skull occurred from army area on GBF completely and only on the latter it was solved a question about their abandonment on the spot or evacuation into the rear. Those wounded into skull, that require in prolonged treatment or lost ability to work, they evacuated into rear therapeutic installations by railroad under permanent medical observation. A large number of those easily wounded the skull was left for treatment on GBF, the considerable percentage of these wounded recovering as far back as of the combat operations of the army in question in the environs of Stalingrad.

Rendering to the medical aid by that wounded the skull during combat process/operation the "Blockade break-through of Leningrad".

The penetration of the hostile annulus of the blockade of Leningrad signified by itself further successes of the Red Army in struggle with the Fascist-German aggressors.

The calculations of enemy to break down resistance of the defenders of city by cold and hunger, unceasing shellings and air bombings failed. Hero-city, because of the aid of the entire country, could under the most severe conditions be prepared for decisive engagement with enemy.

As show the reports/summaries of soviet information bureau, to January 1943 the troops/forces of Leningrad front, having solidly taken the initiative of combat operations in their hands, jointly with the troops/forces of Volkhov front began the realization of the widely planned by supreme command offensive operation on the blockade break-through of city. The perceptible strikes/shocks on enemy, plotted/applied by the Red Army in the winter of 1943 during blockade break-through, by the spring - under Krasnyy Bor and summer - in area of the Sinyavinsk heights, created all prerequisites/premises for the final rout of the Fascist-German troops/forces in the environs of Leningrad, realized during January 1944, when was completely taken/removed the blockade of Lenin city and enemy was forever banished from Leningrad region.

Comrade Stalin, estimating military activities in the environs of Leningrad, it noted in its order No 16 of 23 February, 1944,:

Great victory was gained by the Soviet troops/forces in the environs of Leningrad. Our troops/forces forced open the powerful/thick system of the lasting, deeply distributed in depth strengthenings of the enemy, routed German troops/forces' strong group, they completely freed Leningrad from hostile blockade and

barbarian shellings"<sup>1</sup>.

FOOTNOTE <sup>1</sup>. Order of the supreme commander-in-chief on 23 February, 1944 No 16, Moscow. ENDFOOTNOTE.

During the first large-scale offensive operation, which was being carried out at the very beginning of 1943, the dismantled army of Leningrad Front accomplished a blockade break-through of Leningrad simultaneously with advancing/attacking it towards by the army of the Volkhov Front; at this time several armies both of Leningrad and Volkhov Front they applied to enemy the series/row of the perceptible strikes/shocks, which had secondary importance.

Combat process/operation on the blockade break-through of Leningrad along the southern shore of Ladoga lake continued from 12 to 18 January, 1943; however, it was required even approximately one month of combat in order to enlarge the recaptured in enemy territory, to eliminate his ganglia/nodes of resistance and to ensure the possibility of railroad communications of Leningrad with the rear of the country.

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Rendering of first aid by that wounded the skull on the field of

battle during this combat process/operation was conducted mainly by aidmen and medical instructors. Warheads in the period of blockade break-through were completely manned by aidmer and medical instructors up to auxiliary aidmen's presence in each platoon and even in the series/row of separations/sections. Subsequently in connection with aidmen's combat losses increased the percentage of mutual assistance (Table 1).

To the research of those wounded within skull on the field of battle and periods of rendering of first aid affected the character/nature of the combat operations of the troops/forces, special feature/peculiarity of locality and meteorological conditions.

Great natural obstacle with offensive was river Neva. For entire elongation/extent of the region of assault crossing in long to 18 km the river had uniformly high ones (to 8-12 m), steep/abrupt ones, and by places abrupt shores.

The width of river oscillated from 400 to 700 m. Ice cover achieved 40-50 cm. In some sectors abrupt shores were converted by enemy into almost impregnable obstacles by watering by their water. This ice shaft was, in particular, it was created by enemy on routes of approach to Shlisselburg.

Era the natural barrier/obstacle whose each meter was examined/scanned by enemy and was shot through from 10-12 different directions, our troops/forces after powerful/thick artillery preparation forced for 7-10 minutes and broke to the front/leading territory of the defense of the enemy.

Further advance of our units of the depthward occupied with enemy territory occurred during bitter resistance of enemy in connection with presence in this area of large/coarse strong points which it was necessary to envelop, to encircle and then to eliminate.

The research of wounded and their carrying out from the field of combat under these conditions were connected with great difficulties, especially as a result of the use/application of white camouflage suits. Although the locality in area of combat, occupied with enemy, was plain, however on right flank there were mixed forests, where to find wounded was very difficultly, especially in evening time.

To aidmen and medical instructors lay the crucial task of staving off freezings in those wounded the skull. The temperature of air was on the average about - 12°, being reduced during individual

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days to - 16-18°. In period from 12 to 19 January were observed southern and southeastern, predominantly gentle breezes. By the day of on 15 and 16 January in open places were noted blowing snow. Snowfalls were insignificant and with the interruptions; snow cover on the average achieved 20 cm.

Table 1. Rendering of first aid by wounded on the field of battle during the period of combat process/operation (in percentages).

(1) Самостоятельно	(2) Самостоятельно Инструкторами	(3) Инструкторами фельдшерами	(4) Врачами	(5) Самостоятельно	(6) Взаимная помощь	(7) Не установлено
1.0	23.0	5.5	6.0	10.3	34.5	2.7

Key: (1). By aidmen. (2). By medical instructors. (3). By feldshers. (4). By doctors. (5). Self-help. (6). Mutual assistance. (7). Not established/installed.

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The repeated transitions of the enemy into counterattacks, intense artillery and mortar fire, especially from converted into fortress of GES, bomb and attack flights of hostile aviation in a number of cases impeded rapid rendering of first aid by that wounded the skull. Particularly difficult conditions for rendering to medical aid wounded were in strong detachments.

The periods of rendering of first aid on the field of battle during this combat process/operation should be counted in the relation to the predominant number of wounded sufficiently short ones. During the period up to 1 hour from the moment of wound the first aid was shown/rendered 69.70% of wounded, while in time from 1

to 3 hours - 20.7o/o of wounded. Only into 9.6o/o of cases first aid was shown/rendered in time more than 3 hours due to the fire insulation of wounded in the course of combat operations or as a result of the difficulties, which appeared with research in the evening time of those wounded the skull, which were being located in unconscious condition and dressed into the camouflage suits.

The carrying out of those wounded the skull from the field of combat required considerable efforts/forces, since many of them were without consciousness. Based on materials of one of the divisions, it is carried out from the field of combat on stretchers 52.0o/o of those wounded the skull, it is delivered with the aid of comrades 18.0o/o and independently it reached BMP <sup>30.0%.</sup> ~~30.0%.~~

For entire combat process/operation of heavily wounded they carried from the field of combat on stretchers, on overcoats, on cape-tents, on ski installations and on sledges.

With the transference of those wounded the skull on trenches and courses the statements in a number of cases used cape-tents with the posts pulled through them, they transferred on shoulders two porters.

In progress of combat it was carried out from the firing lines

almost  $\frac{3}{4}$  of those wounded the skull and only  $\frac{1}{4}$  - in the period of calm, which indicates good organization of the carrying out of wounded.

For the delivery/procurement of wounded on BMP were isolated medical instructors, who had at their disposal on two teams of the porters with sledges and substances of warming. Each company had 3-5 such teams. In progress of combat these teams crossed wounded to the nearest medical aid station or to transport groups on the shore of Neva. In the specific, previously known to stretcher bearers places there were duty transport groups, arranged/located each by two sleighs with the expanded runners. These transport groups ("relays") in turn, evacuated those wounded the skull to the right shore of river to BMP or more frequent to PMP. On crossings were organized special heating points/posts.

Wounded the skull they transported through Neva two porters, moreover to avoid failures/dips/troughs under ice (river was shot through by enemy) one of the porters drew sleighs from the front, and another went with fixed to sleighs cord from behind (Fig. 9).

During the advance of units forward the evacuation of those wounded the skull across the river began to be realized before PMP by the horse transport; still later was set up the evacuation through

Neva motor transport.

According to the available data, for entire combat process/operation on BMP it was carried out by aidmen and are exported by 55.20/o of heavily wounded 44.80/c of wounded gain independently.

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BMP in the beginning of combat process/operation followed their units and was rendered aid under the open sky, and then they began to be set up most frequently in the mud huts, left by enemy. On BMP in a number of cases with the wounds of skull it was necessary to apply the substances, stimulating the cardiovascular and respiratory/breathing activity; usually were limited to the inspection/check of bandage on head, to its tightening by soaking, inspection/check and correction of the immobilization heads, which was being applied in the unit of those heavily wounded into skull, and also by the heating of wounded.

The unit of those wounded the skull, passing BMP, entered directly on PMP; another unit after taking of the necessary therapeutic measures on BMP was rapidly delivered on PMP.

Loading PMP wounded was at the most stressed moments of combat of very considerable, moreover it entered on PMP in heavy condition 24.40/o of wounded, in the condition of average/mean severity - 39.30/o, in satisfactory condition - 36.30/o. According to the form/species of the wounding shell bullet wounds are noted into 34.40/o of cases, fragmentation wounds - into 65.50/o and wounds by silent weaponry - into 6.10/o.

The percentage of those wounded the skull, delivered on PMP, among all wounded was above than with two preceding/previous combat process/operations.

The volume of medical measures in the relation to wounded the skull was the same as in the preceding/previous combat process/operations; in rare cases it appeared the need for the cessation of external hemorrhage, they more frequently only amended or relieved bandage, were introduced the substances, stimulating cardiovascular and respiratory/breathing activity in those heavily wounded the skull, they applied from urgent readings the dehydrating substances and so forth (Fig. 10).

Basic task of PMP was as rapidly as possible to deliver wounded to DMP. However, in the course of combat process/operation were difficulties with the expert of wounded from PMP. The clear work of

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automobile transportation was hindered/hampered due to the poor condition of the roads, leading to the right shore of Neva. In the series/row of sectors there were the single-lane, difficultly passable roads with bottlenecks. Some roads were broken by tanks. In this condition there was, for example, one of the roads, leading from PMP to KhPPG of the first line of the left flank of army.

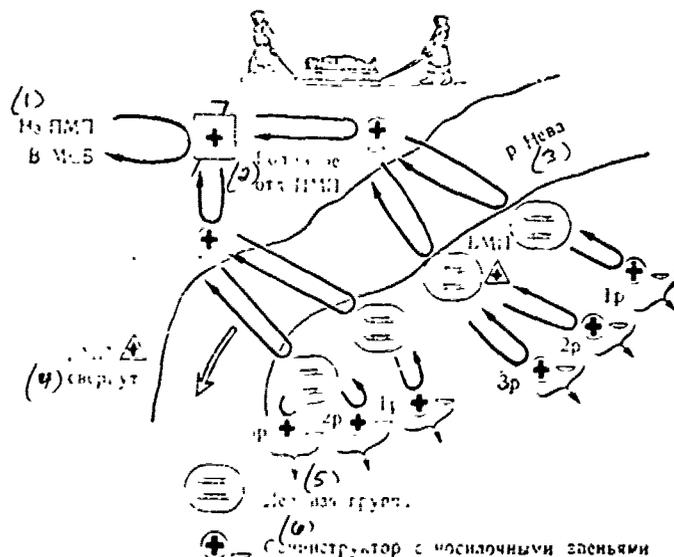


Fig. 9. Scheme of the evacuation of wounded through Neva during the blockade break-through of Leningrad.

Key: (1). On. (2). Head section of PMP. (3). Neva river. (4). it is convoluted. (5). Ice group. (6). Medical instructor with stretcher teams.

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In proportion to the advance of our troops/forces depthward of the defense of the enemy and in proportion to the redislocation of PMP after the troops/forces to the left shore of river, medical motor transport, which was headed after wounded, it was necessary to

overcome in some sectors difficult descents/releases and inclines along the Neva coasts. The condition of roads in the recaptured in enemy territory proved to be very poor and in many places was required urgent repair.

Division medical aid stations were arranged/located comparatively not far from PMP and, being set up, compulsorily was utilized tent and dugout fund. Living quarters in immediate rear on both shores of Neva completely were absent. In two nearby populated areas they were half-wrecked.

In the beginning of combat process/operation DMP were found on their initial positions, with exception of several ones which immediately were relocated to the right shore of river, to the advancing troops/forces. Subsequently, when occurred combat on the elimination of the strong points of the enemy, the significant part of DMP, especially left flank, was relocated to the freed territory.

In the period of the blockade break-through of Leningrad the majority of DMP and KhPPG of the first line was arranged/located closely each other. There were actually two sufficient great bush of the therapeutic installations of immediate rear, that included and KhPPG of the first line, intended separately for the right and left flank of army. Those wounded the skull they evacuated either directly on DMP or in KhPPG of the first line. DMP received to themselves 47.90/o of those wounded the skull, in KhPPG of their first line entered 52.10/o.



Fig. 10. Dressing of the wounded soft tissue of skull on PMP (from the collection of military medical museum VM USSR).

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Thus, the functions of these therapeutic installations were identical. During February 1943, when the left flank of army considerably moved forward, DMP were arranged/located nearer to front line, then followed KhPPG of the first line. On right flank the initial disposition of therapeutic installations remained during combat process/operation almost without changes.

Loading DMP by wounded in individual phases of combat was

considerable. Those wounded the skull were by comparatively high the percentage all of those entered. The majority of those wounded skull (92.80/o) entered from EMP, and those entered of units directly composed very small unit (7.20/c); in this case latter/last group in essence was related to easily wounded.

On DMP of those wounded the skull distributed with respect to character/nature the wounds. In particular, wounded with the damage of the bones of skull composed ~~43.4%~~<sup>43.4%</sup>, and the wounded the soft tissues skulls - 56.60/c.

At DMP were equipped the antishock tents, in which they hospitalized the unit of those heavily wounded the skull, especially with the multiple wounds of the organs/centrals of thoracic and abdominal area, which were being found in shock condition.

In operating rooms worked the most experienced surgeons of DMP. In view of the fact that the need for urgent process/operations was sufficiently great, they forced were the large part of their time to give to work in operating room. In series/rcw of DMP this it was repelled in the classification of wounded which sometimes fulfilled the less experienced in surgical work doctors. In connection with this in the difficult cases occurred the wider direction of those wounded into skull, that were being found in heavy condition, into

the therapeutic installations of army rear, while the unit of such wounded she was to leave on DMP as nontransportable ones. In the course of combat process/operation these individual shortages were eliminated.

To surgical interventions on DMP it was subjected to 6.0c/o of those wounded in skull. Among wounded the skull with damage bones it was operated by 4.9o/o, and in the group of those wounded the soft tissues of skull - 6.8c/o. Thus, the percentage of surgical interventions in the group of wounded the skull with damage bones proved to be below than percentage in the group of those wounded the soft tissues of skull, and in comparison with two preceding/previous combat process/operations it decreased.

This fact testifies about subsequent growth of GVSU installations, according to which surgical interventions on skull must be conducted on DMP only from vital readings and in which the center of gravity of the specialized neuro-surgical aid was transferred into the therapeutic installations of army rear.

And actually/really, if we compare the timeliness of wounded the skull with damage bones with lethality among those operated on DMP (which was equal to 22.0c/o), then it will prove to be that interventions were conducted only in most heavily wounded. Among

these process/operations increased a number of interventions apropos of intracranial hematomas.

From the defects of operational work of DMP should be noted the individual cases of the incomplete distance/separation of bone fragments from the wound of brain, which always was not attained, if one considers that the process/operations were conducted without the preliminary x-ray examination of skull.

By processing the wounds of the soft tissues of skull the surgeons of DMP were occupied only in the periods of relative calm at front, when less it entered wounded. The cases of the excessive exposure of bone during processing of the wounds of the soft tissues of skull were in this combat process/operation rare exceptions.

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The combat situation, which determined the need for the advance of some DMP forward, and also difficulties with housing fund made it necessary these DMP sometimes to evacuate these wounded the skull with the damage of bones after 6-7 days after surgical interventions. The percentage of recoveries among all those wounded the skull on DMP was small. This is explained by the fact that DMP were briefed about the need guide convalescents for those wounded the soft tissues of

skull into the therapeutic installations of army rear, since the expert conclusions with respect to those wounded the skull could be established/installed only in KhPPG after the appropriate x-ray and neurologic examination. Therefore only very easily wounded with the damage only of skin heads, without any signs/criteria of brain concussion, acknowledged on DMP by those recovered that had the place during this combat process/operation into 1.6c/o of cases. This is explained also by the fact that on DMP during the blockade break-through of Leningrad there was not the proper conditions for the prolonged stay of these easily wounded into skull.

It should be noted that none of the wounded the skull with damage bones was acknowledged on DMP by that recovered. All wounded of this group they guided for expert conclusion in KhPPG. It is evacuated in the army therapeutic establishments 92.1c/o of those wounded the skull, moreover from a number of wounded the skull with damage bones - 85.0c/o, and from a number of those wounded the soft tissues of skull - 97.9c/o. Thus, for treatment on DMP left only extremely heavy nontransportable wounded the skull. It must be noted that the difficult road with DMP into specialized KhPPG must pay the attention of some surgeons of DMP to the need for delaying the evacuation individual of those wounded the skull, that were being found in the doubtful in the sense of transportability condition which could deteriorate under the effect of the unfavorable

conditions of transportation. As a result of the transportation of such wounded from DMP as this will be noted below, occurred the cases of sharp deterioration in the condition of those wounded into skull in route/path among those entered into specialized KhPPG.

Medical motor vehicles were coldproof. Those wounded the skull they are sent to KhPPG under the observation of medical personnel. As already mentioned, road they were broken, unit of them it presented corduroy road, since the locality where they were arranged/located with DMP and KhPPG of army, it was swampy, and by the places for hilly.

Those wounded the skull they evacuated with DMP and of KhPPG of the first line in three directions: into specialized KhPPG, which was being located in the center of army, and to two evacuation points, arranged/located on wings of army at railroads. From evacuation points those wounded for skull were headed directly on GBF or, less frequent, into army specialized KhPPG. However, the first evacuation route, to the center of army, was considerably more shortly. A great number of those wounded the skull was evacuated according to designation/purpose with DMP and their KhPPG of the first line directly into the specialized hospital.

Specialized KhPPG was located from the nearest railway station

on 9 km and from GBF - on 30 km. The evacuation of wounded was realized only by medical motor transport.

In first half combat process/operation into this specialized KhPPG entered 80.00/o of those wounded the skull directly from the therapeutic installations of immediate rear. The entry of those wounded the skull into this hospital occurred during January and in first half February of 1943.

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Hospital occupied quarters/premises of the school; in it there was admitting-sorting separation/section, great surgical dressing, operating, shock ward, hospital for nontransportable wounded and evacuation separation/section. Was expanded also hospital for post-operational wounded the skull. In hospital there were individual wards for those wounded into skull, person, eyes, ENT organs and for the wounded of general-surgical profile.

Into specialized KhPPG entered, together with those wounded the head, and the wounded of general-surgical profile. Loading hospital was considerable. Wounds were distributed on localization as follows (Table 2).

As can be seen from Table 2, a considerable number of entered into hospital wounded required the specialized aid. Almost all wounded the skull were not processed in foremost therapeutic installations. Their significant part entered in the heavy condition, caused not only by the character/nature of wound, but also by the difficulty of delivery/procurement along the broken roads.

In the work of medical dressing room was noted the series/row of difficulties in connection with the multidisciplinary nature of the entered wounded. One should also consider that the hair-cutting and the shave of hair on head, the examination/inspection of wound, the examination/inspection of nervous system and internal organs/controls (especially the respiratory organs) occupied sufficiently much time; therefore during an entire combat process/operation work in medical dressing room was carried out 24-hour (Fig. 11). These being in two neurosurgeons' this hospital organized work so that each of them half days worked in receiving-sorting separation/section and in medical dressing room, but 6 hours thus far they worked in operating room, hospital and in evacuation separation/section. The available on individual nights "windows" in the work of medical dressing room, as a result of the smaller entry of wounded, made it possible to perform, also, at this time the primary processing of the wounds of skull and brain in operating room.

Two created in hospital brigades of the doctors, where it entered on one neurosurgeon, it was possible to ensure a trouble-free operation of medical dressing room, to produce surgical interventions and to service wounded in hospital.

Those wounded into skull, that were requiring due to their condition in surgical intervention, underwent careful neurologic and x-ray examination. In hospital there was an X-ray room; however, its capacity always did not permit implementation of roentgenological examination/inspection all entered of those wounded into skull.

Table 2. Distribution of the wounded, who entered in KhPPG, on localization of wound (in percentages).

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9) Количества	
Голова	Лицо	Глаза	Шея	Грудь	Живот	Позвоночник	Таз и мочеполовые органы	(10) Верхние	(11) Нижние
10.1	20.3	4.8	2.9	4.3	1.1	0.8	1.6	16.3	17.5

Key: (1). Skull. (2). Face. (3). Eyes. (4). Neck. (5). Breast. (6). Stomach. (7). Spine. (8). Pelvis and urino-gerital organs/controls. (9). Extremities. (10). upper. (11). lower.

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In this, by the way, and was not to particular need, since not far off was arranged/located powerful/thick GBF, equipped by the entire necessary equipment. Therefore in this hospital x-ray examination underwent only nontransportable or questionable in sense transportability wounded the skull, and also the wounded, who were requiring the process/operation.

Surgical interventions by the wounds of skull were conducted, as a rule, by one neurosurgeon with assistance of the specially trained surgical nurses. In more detail the surgical work of the specialized hospital will be described below.

The nearness of powerful/thick GBF with the wide net/system of the specialized neuro-surgical hospitals made it possible to evacuate 88.70/o all wounded in skull. A question about transportation in GBF usually was solved after granting to the arrived wounded of necessary rest. From a number of those wounded the soft tissues of skull it was evacuated by 95.90/o, since on GBF for their treatment there were special therapeutic installations. From a number of wounded the skull with damage bones it was directed to GBF 78.8c/c, here entered the unit of the post-operation wounded, who spent on the cot 3-3<sup>1</sup>/<sub>2</sub> weeks during uncomplicated course. Remaining wounded the skull were toward the end of the combat process/operation even in nontransportable condition.

Road from specialized KhPPC to GBF was in a good condition. Attached to hospital buses had suspension damping/amortization/shock absorption and provided the sufficiently rapid and cautious evacuation of those wounded the skull on GBF.



Fig. 11. Surgical dressing of specialized KhFPG (from the collection of military medical museum of the VM USSE).

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In the middle of February when the entry of those wounded the skull into specialized KhPPG almost ceased in connection with the fact that the left flank of army considerably moved forward and it changed the direction of evacuation, in this hospital was left one neurosurgeon for the treatment of the post-operation and nontransportable wounded. Another neurosurgeon, and also stomatologists and ophthalmologists were transferred in KhPPG into the left flank of army - to Lagoda lake.

Newly organized specialized KhPPG was located not far from evacuee reception center and was accommodated in injured/damaged from shellings stone building. In this hospital were also expanded/scanned all necessary separations/sections, great surgical dressing, operating and X-ray room.

During this period into hospital entered a considerable quantity of those wounded into skull, and therefore work it was necessary to change so as to the available one neurosurgeon to ensure in essence the classification of wounded in skull, and also production most

necessary surgical interventions.

All wounded the soft tissues skulls were sent to GBF without treatment, processing, and from a number of wounded the skull with damage bones they hospitalized on the spot only of nontransportable ones. By very heavy damages in those wounded into skull, that entered during this period of combat process/operation, is explained the fact that only 57.20/o of wounded with the damage of the bones of skull were evacuated to GBF; the others were hospitalized in specialized KhPPG.

The remotness of this KhPPG on GBF, and also the dependence of evacuation from the arrival of hospital trains somewhat narrowed readings to the evacuation of heavily wounded.

In this KhPPG was carried out great surgical work in the relation to wounded the skull. The capacity of the X-ray room could not ensure with X-ray study of all wounded; therefore the series/row of process/operations it was necessary to produce without the X-ray analysis of skull.

At the end of February in hospital arrived one additional specialist - a neurosurgeon, which made it possible to remove/take with general/common/total surgeons the unit of the functions of the

care of hospital, surgical dressing and evacuation separation/section. The commander of the neuro-surgical group of ORMU, besides work in this KhPPG, obtained the possibility daily to be in the evacuee reception center where was inspected wounded the skull in medical dressing room, on the spot it assorted them and guided the subjects of evacuation directly to train. By this was removed the excess stage of evacuation into specialized KhPPG for wounded, subjects to direction on GBF.

The total data about work of both specialized hospitals show that into first KhPPG, which was being arranged/located in the course of the first month of combat process/operation in the center of army, entered 54.20/o all of those wounded into the skull; into second KhPPG entered 45.80/o during its work on the left flank of the army. It should be noted that the operating cycle of the second specialized KhPPG was more shortly, and, thus, into it daily it entered wounded the skull not less than into the first hospital.

If we particularly secrete only the period of blockade break-through (from 12 to 19 January), then quantity of those wounded the skull within this time composed 22.10/o all of those wounded into skull, that entered into specialized KhPPG. Thus, the first days of military process/operation proved to be most stressed in the sense of rendering to the therapeutic aid of these by wounded.

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The periods of the entry of those wounded the skull into specialized KHPPG during this combat process/operation oscillated from 1 to 4 days from the moment of wound. 70.20/o of those wounded into skull entered to the 2nd and 4th day and 24.80/o were delivered into the 1st and 4th day. Only 5.00/o of wounded entered to the 5th day and it is later from the moment of the wound; this were heavily wounded the skull, left on DMF and in KhPPG of the first line before their bringing into transportable condition.

About 30.00/o of wounded entered with the immobilization of head by the sagittal arranged/located splints of Cramer which were removed/taken immediately on the arrival of wounded.

According to the character/nature of damage the entered wounded were distributed as follows: in 39.40/o of wounded had the wounds of skull with the damage of bones and in 60.60/o - wound of soft tissues. The bullet wounds of skull it composed 16.00/o, fragmentation - 84.00/o. Blind wounds of skull were 51.00/o, tangents - 30.40/o, through - 18.60/o. The majority of blind wounds was plotted/applied by fragments. Among through ones, especially among

diametric ones, wounds predominated bullet. Tangential wounds were distributed according to the form/species of the wounding shell approximately/exemplarily just as in all entered those wounded into skull.

The multiple wounds of skull had in 8.4c/o of the wounded, who entered into specialized KhPPG. As far as wounded are concerned in the skull, left in hospitals as a result of heavy condition, then multiple wounds among them composed 24.3o/o. Into latter/last group entered the wounded, who obtained on 3-4-5 simultaneous wounds of the skulls unit from which was penetrating.

It should be noted that in 35.6o/o of wounded were the multiple wounds of the skull and other organs/controls, which burdened their condition and required the combined operations of surgeon and neurosurgeon. In these cases, if there was not urgent readings to surgical intervention on skull apropos of the continuous intracranial hemorrhage, then first of all performed process/operations on the organs/controls of abdominal and thoracic area, and also processing of the bullet breaks of bones. With the penetrating wounds the skulls and the multiple wounds of the soft tissues of other organs/controls first of all processed the wound of skull, and then performed the primary processing of other wounds.

Attention is drawn to the considerable contamination of the wounds of skull and their early festering. Already to the 3-4th day in the majority of wounded were noted those inflamed of the territory of wounds or purulent discharge from wounds. In 30.00/o entered of those wounded into skull had pure/clean wounds, in 55.00/o were the wounds contaminated with the inflamed territories and in 15.00/o there were wounds with purulent or putrefactive discharge.

As a result of very heavy wounds during stressed combat and unfavorable conditions of transportation along PCR roads of approximately 20.00/o of wounded the skull with damage bones entered in the unconscious condition; in the condition of stupefaction it was delivered to 40.00/o and in clear consciousness entered also about 40.00/o of those wounded into skull.

In 21.00/o of those wounded the skull were established/installed catarrhal diseases (influenza, bronchitis, pneumonia). The freezings of extremities are noted sometimes.

To the entered wounded they, first of all, gave the full/total/complete rest; was applied medicinal/medicamentous therapy from readings and established/installed sequence their examinations/inspections in medical dressing room.

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The work of the neuro-surgical group of CRMU was reduced in essence to the classification entered of those wounded in the skull, the examination/inspection of all wounded in medical dressing room with hair-cutting and shave hair and dressing of wounds, to rendering to the nontransportable wounded of aid, including operational, from urgent readings, to the treatment of the post-operation and untransportable wounded, and also to the evacuation of wounded to GPF.

During this combat process/operation nontransportable in view of heavy condition considered those wounded the skull:

- 1) with continuing intracerebral bleeding or growing hypertension syndrome;
- 2) in the condition of shock or in unconscious condition if after the appropriate therapeutic measures wounded they did not move out this condition;
- 3) with the extensive wounds of the substance of brain with the damage of the trunk of brain, ventricles, two or three fractions/portions, two hemispheres of brain and so forth;
- 4) with massive neurologic violations in the form of bulbar symptoms, of quadraplegia, and so forth;

5) with the signs/criteria of the development of intracranial complications in the form of meningitides, encephalitides and observed sometimes of the early abscesses of brain. The presence of the "malignant" protrusion of brain was also contraindication to transportation to GBF;

6) in the presence of pneumonia.

Here were related the individual cases of the closed injury of skull with similar phenomena.

The unit of the nontransportable wounded (about 88.00/o) after conservative therapeutic measures in the form of rest, heating, introduction of the substances, which stimulate cardiovascular and respiratory/breathing activity, dehydration, the transfusions of blood, sulfanilamides and so forth was soon brought out from heavy condition and after 1-2 daytime hospitalization it was evacuated to GBF. However, basic part of the wounded required the more prolonged treatment in specialized army KhPPG. KhPEG, which accepted those wounded the skull mainly since the beginning of the combat process/operation to 10-12 February, can be sent to GBF a larger number of wounded, since during February the condition of the

post-operation and nontransportable wounded was improved and made it possible to transport them further. The periods of hospitalization after surgical intervention achieved toward the end of February of 3-3 1/2 weeks. Moreover as we already noted, first specialized KhPPG was arranged/located not far from GBF and it was connected with it with a good road. As a result toward the end of the combat process/operation in this KhPPG it remained for further treatment only 2.60/o all entered of those wounded into skull.

In second specialized KhPPG, which accepted those wounded the skull with second half combat process/operation nontransportable wounded toward the end of February were considerably greater percentage. This is explained by the fact that basic part of the post-operation wounded still was found in nontransportable condition with periods after process/operation during 6-8-12 days. The insignificant evacuation of wounded the skull with the damage of bones of second that specialized KhPPG, which comprised during February 57.20/o, is caused also by the fact that the distance from this specialized KhPPG to GBF increased; the evacuation of wounded was realized by railroad, and therefore there was a dependence of evacuation on the timetable of the movement of army medical trains.

Before on-loading in transport was conducted repeated examination/inspection. Sometimes when the condition of those wounded in the skull within short retention time of their in evacuation separation/section deteriorated, their evacuations it was abolished.

For entire combat process/operation it was evacuated of two specialized KhPPG in GBF 86.10/o of those wounded the skull, moreover from a number of wounded the skull with damage bones it was evacuated by 62.20/o, and from a number of those wounded the soft tissues - 94.10/o.

The treatment of those wounded the soft tissues of skull was organized on GBF, where also were arranged/located those intended for this installation of this army.

Operational activity of specialized KhPPG was characterized by production in the primary processings of the wounds of skull and brain in 14.10/o of all entered wounded. Although in percentage expression these data indicate relatively low operability of those wounded the skull however in absolute expression a number of produced surgical interventions is considerably more than a quantity of similar process/operations, produced in all KhPPG of the dismantled/selected army for the time of combat on the rout of the Germans in the environs of Moscow, or in so-called specialized KhPPG

during entire semi-annual period of Stalingrad battle. At the same time it should be noted that the nearness of powerful/thick GBF caused direction from the army of the significant part transportable of those wounded the skull for their processing in the therapeutic installations of front line area. This especially is related to the first arranged/located not far from GBF army specialized hospital where operability composed altogether only 11.3c/o, while in more distant, second KhPPG it achieved 17.40/o.

Loading hospitals entered wounded into skull, naturally, caused an increase of sorting-evacuatic work and the decrease of operational activity in the days of great entries which increased with a comparatively small quantity of the arrived wounded. In particular, operability among wounded the skull in January in first KhPPG after the entry of a large number wounded composed 10.40/o and almost two times it increased during February when wounded it entered less, after achieving 20.50/o. During February the unit of operation produced by certain wounded with the nonpenetrating wounds of skull.

However, as a rule, in specialized KhPPG operated wounded with the penetrating damages of the skull and brain, nontransportable in view of severity their conditions. In particular, in second specialized KhPPG among entered those wounded into skull with the damage of brain it was subjected to surgical intervention 33.00/o.

For characteristics of the wounded, who had the penetrating wounds of skull and brain and who were subjected to surgical interventions, one should, first of all, indicate that of them only 3.20/o were found with entry in satisfactory condition and clear consciousness. Of lethalties in this group of those operated it was not.

In 45.20/o of cases surgical interventions were conducted in wounded, whose consciousness was stunned, and the general condition was average/mean severity.

As reading to process/operation in KhPPG it served in this case the early festering of wound and the signs/criteria of infectious complications from the side of brain and its shells. Lethality in this group was equal to 8.20/o.

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Those wounded into skull, that entered in heavy condition and located without consciousness, were subjected to surgical interventions after the appropriate conservative measures, after composing 35.20/o of cases of all operated wounded. Lethality among

those operated in this group composed 25.40/c.

Furthermore, should be particularly secreted the groups of those wounded into skull, in which was observed sharp psycho-motor excitation when the series/row of hanger-on symptoms is present,. This group of wounded composed 6.80/o of all operated persons and gave comparative; high lethality. At the same time the fact that more than 2/5 these extremely heavy wounded recovered, he speaks, that the readings to process/operation were rationally substantiated.

Finally, 9.30/o of operated wounded composed those entered in the condition of shock. Surgical interventions on skull were undertaken after antishock therapy, it is more frequent after interventions on other organs/controls, since in the majority of these wounded had the heavy multiple wounds of skull, breast, organs/controls of abdominal area or the breaks of extremities. Lethality among the operated wounded of this group proved to be somewhat smaller than than in the preceding/previous group.

Considerable attention was given during this combat process/operation to perfecting the heavy combined wounds of skull, orbit, sinuses of nose, ear and mastoid extension.

The known dependence of the issues of process/operation on the

condition of wound was revealed in these specialized KhPPG. In particular, of all operated that wounded the skull and the brain wounds without the visible signs/criteria of inflammation are noted in 38.40%. Lethality among those operated upon in this group was 13.50%. During processing of the contaminated wounds with initial inflammatory phenomena, produced in 41.10% of cases, the lethality among those operated was equal to 21.80%. Processing the wounds of skull and brain with the explicit signs/criteria of the infectious process, in the presence of purulent or putrefactive discharge from wound, produced in 20.50% of cases, was characterized by lethality among those operated in this group in 33.30%.

During the combat process/operation in question is noted also certain special feature/peculiarity the dependence between the periods of process/operation on the moment of wound and the lethality of those operated. Obtained by this time wide acceptance the so-called deferred processing of the wounds of skull and brain with impossibility to perform early primary processing gave on the whole good results.

The particular conditions of Leningrad Front during blockade into 1941-1942, when had to possibly produce on each DMP the majority of wounded careful dress/lavatory of wound with hair-cutting and shave of hair, and also short evacuation routes to GBF, allowed in the basis of the highly skilled front line **specialized hospital** to

establish that interventions during the first 6 days from the moment of wound give good and approximately/exemplarily identical results of the treatment (see Vol. 4, page 534).

During the combat process/operation of the blockade break-through of Leningrad into 1943 issues of the deferred processings they changed as a result of the considerable contamination of the wounds of skull and absence on DMP of the possibility to pass all wounded in the skull through the medical dressing room with the appropriate hair-cutting hair, cleaning/purification of wounds and by need for the carving of the hanging in series/row cases above the early hours of rags of skin or autopsy of "pockets". The data about lethality among the operated wounded with the penetrating damages of skull depending on the periods of primary processing are given in Table 3.

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As can be seen from Table 3, lethality among the operated wounded during the deferred processings to the 2-3-4th day is not so/such great, if we compare it with the results of interventions in the later periods when lethality sharply increases.

It is logical that to make any conclusion about lethality among

the operated wounded, being based only on the periods of process/operation, would be incorrectly, since here are not considered severity and character/nature of the wounds of skull and brain, condition of wounds, presence of the associated complications, etc. However, this table reflects/represents exemplary/approximate characteristics of the considerable infection of the wounds of skull and brain during this offensive operation in comparison with the period of the blockade of Leningrad, since in section it was established/installed, that in the majority of the cases by direct cause death were the infectious complications.

During the primary processing of the wound of brain in specialized KhPPG was conducted into 46.3c/o of cases the dressing of the damaged vessels of brain and shells. Interventions apropos of the damage of the venous sinuses of solid cerebral shell when the penetrating wounds of skull and brain are present, are produced in 9.5c/o of wounded. The character/nature of damage made it necessary in half these cases to use facing and dressing of venous sinuses as a result of their full/total/complete transverse break. Tamponade of gauze in these cases was not applied. In half wounded during the damages only of upper wall or upper-lateral surfaces of sinuses hemostasis successfully was realized by an occlusion of the defect of sinus by the small piece of muscle or apcneurcsis, undertaken in the neighborhood. In the single cases it was possible to put vascular

suture with the linear breaks of the upper wall of sinus.

During perfecting of similar wounds after the cessation of hemorrhage from sinus was conducted the emptying of the contained wound canal in the substance of brain with the distance/separation of bone fragments, available metallic foreign bodies, blood clots, destroyed particles of the brain, etc.

Ventricular liquorrhea was noted in 3.2c/o of cases during processing of the wound of brain. In all cases were superimposed anechoic sutures to the integuments of skull, after which liquorrhea ceased.

Wounds after process/operation conducted in essence under a bandage of the type Mikulich-Denmer-Goykhman. With the penetrating wounds this bandage during the uncomplicated course was not relieved during 15-18 days; with nonpenetrating ones - during 8-10 days. For 2-3 for before evacuation primary post-operation bandage was relieved to the same long-term bandage, if only the course of wound was not complicated.

Table 3. Lethality among operated-on wounded with the penetrating damages of skull and brain depending on periods from the moment of wound to primary processing in specialized KhEPG (in percentages).

№ 1	(1) CYTON	1-2 CYTON (2)	2-3 CYTON (2)	3-4 CYTON (2)	(3) Cumulative CYTON
	15,6	18,8	19,2	20,5	52,3

Key: (1). To 24 hrs. (2). 3 days. (3). It is more than 4 days.

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To pure/clean wounds within early periods, and also with ventricular liquorrhea in 6.20/c of operated wounded were superimposed anechcic sutures. The healing of wound by primary tension is noted in 2/3 cases. In post-operation period in these wounded (during observation before evacuation during 3 weeks) complications it was not noted. In third of wounded in post-operation period the wounds festered and sutures were turned loose.

After processing of purulent wounds were applied the loose gauze bandages, moistened by hypertonic solution.

In post-operation period all wounded received with preventive target sulfanilamides. With the expressed phenomena of intracranial

pressure increase was carried out dehydration therapy in the form of the intravenous infusions 40% solution/opening glucose and lumbar punctures.

Meningitides are noted in 18.20% of post-operation wounded with the penetrating damages of skull and brain. Treatment was carried out in essence by sulfidine on 22-27 to course, together with dehydration and fractional blood transfusions. Lethality with the complication of the penetrating wounds of meningitis achieved during this combat process/operation 41.6c/c.

The early abscesses of brain are noted in 6.00% of all left to recovery wounded. Surgical interventions with the abscesses of brain were reduced to the autopsy of the capsule of abscess, evacuation of pus and the subsequent draining of the area of abscess by delicate rubber strips. Sometimes was used only the puncture method with the washing of the area of abscess with antiseptic solutions/openings; however, punctures they most frequently used only with diagnostic target, if abscess was arranged/located beside wound canal. The carving of abscess with capsule was not conducted, since abscesses were early.

Lethality among all operated apropos penetrating wounds of skull and brain comprised during the blockade break-through of Leningrad in

these specialized army hospitals 22.30/o.

Through all army hospitals, including those specialized, it passed during the dismantled combat process/operation from a total number of those entered - wounded in skull with damage bones 34.30/o and those wounded the soft tissues of skull 65.70/o.

From army therapeutic installations it was directed directly to specialized KhPPG 47.70/o of those wounded the skull. Furthermore, into specialized KhPPG it was directed from evacuation points to the first period of combat process/operation 4.00/o of the neuro-surgical wounded.

Thus, during the blockade break-through of Leningrad it was encompassed by specialized aid by 51.70/o of those wounded the skull in the dismantled army; from a number of wounded the skull with damage bones it was directed to specialized KhPPG 52.30/o, and from those wounded the soft tissues of skull - 44.60/o.

The percentage of envelopment by the specialized aid somewhat will increase, if one considers that during February by neurosurgeon was conducted the examination/inspection of those wounded into skull directly at evacuation point. In this case the majority of those wounded into skull, that were being located in transportable

condition, was headed directly for front line area, passing specialized KhPPG, and therefore without taking into account by the latter.

About half all those wounded the skull they passed from army to the front line area through hospitals general-surgical profile/specialty into evacuation points and from there into front line therapeutic installations. Only in a comparatively small number of cases (from 1.5 to 2.5%) those severely wounded in the skull were directed from evacuation points not to GEP, but to army specialized KhPPG.

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The exemplary/approximate scheme of the evacuation of those wounded the skull in the army in question during the blockade break-through of Leningrad is represented in Fig. 12.

As can be seen from this scheme, about 9.0% of those wounded the skull were left for treatment in army therapeutic installations (8.3% in specialized KhPPG, 0.2% - at the evacuation point of left flank and 0.4% - at the evacuation point of the right flank of army).

The percentage of evacuation of all KhPPG of army in GBF comprised for the group of those wounded the soft tissues of skull 98.5, and for the group of wounded the skull with damage bones - 76.9. Of the left in army comparatively small number of those wounded the soft tissues more than half recovered during combat process/operation. Thus, the nearness of powerful/thick GBF, where were concentrated also army therapeutic installations for easily wounded, and, furthermore, a sufficient quantity of cots on front line base for the entered wounded caused so high an evacuation of those wounded the soft tissues skulls from army during the blockade break-through of Leningrad.

At the same time, a considerable number of those wounded the skull with damage to bone was left in army in connection with their untransportability or the severity of condition.

Surgical interventions in all KhPPG and at all evacuation points of army were produced in 7.4% of those wounded into skull. The overwhelming majority of these process/operations (98.60%) produced the neuro-surgical group of GRMU. In treatment installations of army area operability of wounded the skull with damages bones comprised 15.50%, while in the group of those wounded the soft tissues of skull - 3.20%.

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As already mentioned, the evacuation of those wounded into skull on GBF was conducted by motor transport only from first specialized KhPPG, which was being arranged/located in the center of army. From evacuation points, and subsequently and from second specialized KhPPG the evacuation was conducted in essence by railroad. The feed of hospital trains in the individual periods of combat process/operation always was not regular and evacuation points during these days tested/experienced the series/row of difficulties in work.

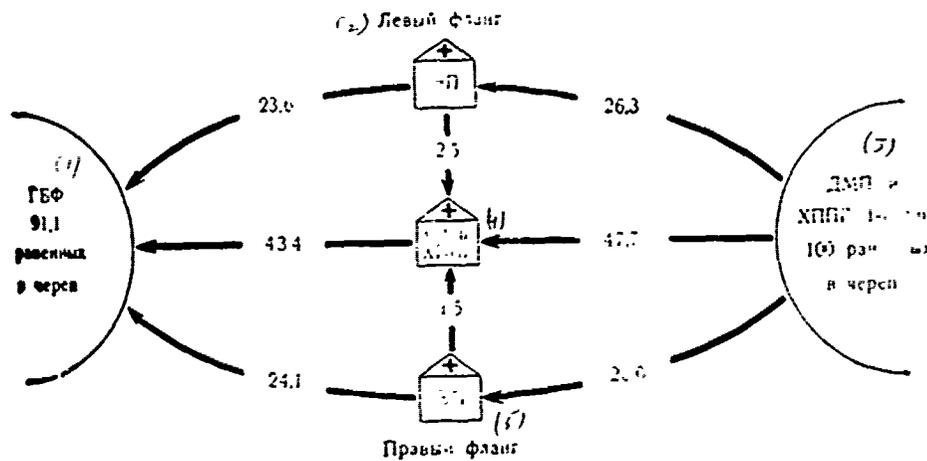


Fig. 12. The exemplary/approximate scheme of the evacuation of those wounded the skull in army during the blockade break-through of Leningrad (quantity of those wounded the skull in army; therapeutic installations is conditionally accept as 100).

Key: (1). GBF 91.1 of those wounded the skull. (2). Left flank. (3). DMP and KhPPG 1st line, 100 of those wounded skull. (4). Special KhPPG. (5). Right flank.

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This is related mainly to the right flank of the army where from evacuation point to GBF went the single-track iron road, which was being found in poor condition and frequently occupied with other troop trains. The aviation of enemy was suppressed by our fighter

airplanes; raids on motor transport and to iron roads it did not produce.

The evacuation of wounded to GBF by aircraft transport during this combat process/operation was barely applied, since in this case were considered comparatively short evacuation routes on soil and by railroad.

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The hospital basis of Leningrad Front had the developed net/system of the specialized hospitals. Reception/procedure and distribution of those wounded into skull realized in basic two large/coarse SEG, had by this time already considerable work experience.

In first SEG, which had available railroad evacuee reception center, was conducted by experienced surgeons' participation the examination/inspection of wounded and their distribution according to designation/purpose into the specialized evacuation hospitals GBF. In this SEG remained only nontransportable wounded the skull whose hospitalization was realized in the specialized separation/section.

Another SEG was an even more powerful/thick therapeutic

installation, occupying the leading place in reception/procedure and distribution of those wounded the skull according to the hospitals of front line area. In this SEG there was neuro-surgical separation/section, led by experienced specialist.

Among the wide net/system of therapeutic installations GL should be especially noted one of the large/coarse specialized evacuation hospitals, which had available a considerable number of cots for those wounded the skull, the person, the eye, the ENT organs, the spine and the peripheral nerves. Furthermore, into this hospital they guided the wounded of general-surgical profile (wound of pelvis, the breaks of great tubular bones, etc.).

In hospital there were neurosurgeons, stomatologists, oculists, otiatrists, neuropathologists, and also permanent consultants: urologist, psychiatrist, logopedician, orthopedist, etc.

In this evacuation hospital there were several separations/sections for wounded with the damage of the arch/summary of skull, basis of skull, with the wounds, complicated by the infectious processes in shells and substance of brain, for those wounded the spine and the peripheral nervous system. Therefore this hospital rightfully was named the neuro-surgical center of front.

Besides this hospital, GBF had available even several evacuation hospitals with neuro-surgical separations/sections, and also Leningrad neuro-surgical institute. Furthermore, was an evacuation hospital for those obtained the closed injury of skull and for those contused.

Work of GBF on the treatment of those wounded the skull during the blockade break-through of Leningrad will become more clearly, if we at first give data about the work of this large/coarse neuro-surgical hospital, and then the total information about all evacuation hospitals, which serviced those wounded the skull.

In January and February 1943 in central neuro-surgical hospital it was operated 37.7% all located undergoing medical treatment of those wounded into skull. If one considers that third of wounded consisted undergoing medical treatment and it was already processed prior to the beginning of combat process/operation on the blockade break-through of Leningrad, then the operability entered of those wounded into skull will increase to 50.0-51.0%.

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For the group of heavily wounded the skull with damage bones the percentage of surgical interventions comprised among all those

locating undergoing medical treatment 47.4, and in the relation to only entered within the period of combat process/operation - 60.6. These data tell about the high surgical activity of hospital. In this case one should consider that among the entered wounded into skull with damage bones was certain unit of those of already processed in the army specialized hospitals both of the army in question and other armies of front, and also certain number of extremely heavy inoperable wounded. Thus, in effect in this hospital were operated all requiring the primary processing wounded the skull with the damage of bones.

Work in the operating room of hospital passed under permanent observation also with highly skilled neurosurgeons' direct participation. Hospital is produced during the individual days of combat process/operation on 60 and more surgical interventions on skull and substance of brain.

Particular attention turned to the careful and comprehensive clinical examination/inspection of the entered wounded by neurosurgeon, neuropathologist and roentgenologist.

After medical processing, examination/inspection in medical dressing room and x-ray examination to that wounded the skull, if it was not urgent indications for intervention, was given rest by

several hours.

In operating room was realized the bacteriological laminar supervision of the wound of the skin, bones and cerebral substance.

The majority of post-operation wounds was conducted under the long-term bandage of Mikulich-Demmer-Goykhman. Within early periods on pure/clean wounds was laid in a number of cases anechoic suture. Wounds with purulent or putrefactive discharge conducted under bandages with hypertonic solutions, and also widely was conducted their ultraviolet lighting.

In hospital it was operated by 29.6% all located undergoing medical treatment of those wounded into the soft tissues of skull. The percentage of surgical interventions only in those entered during combat process/operation grows/rises respectively to 39.0-40.0.

This percentage should be counted sufficiently to high ones, if one considers that into this number enters only primary processings of wounds, produced in operating rooms, and is not connected the series/row of small interventions, produced in medical dressing rooms (splitting up of "pockets", distance/separation of the scraps of tissues, foreign bodies, splitting up of the small/fine wounds of soft tissues, etc.).

Thus, virtually all entered wounded into skull, obtained in treatment of wounds, were operated. Unoperated remained only extremely heavy wounded with the phenomena of the expressed hanger-on violations, and also unit of the wounded with the sharply infected wounds of skulls and brain, whose outflow from wound was not hindered/hampered. After the use/application of energetic conservative of measures it was possible the unit of these extremely heavy wounded to derive from incoperable condition and to operate after 1-2 months from the moment of wound.

In the unit of the wounded with the manifestations of the violent infection by which was not conducted intervention on the wound of brain, it was possible via energetic sulfanilamide therapy and physiotherapy to cure infectious complications. After healing of wound, in 1 1/2-2 months from the moment of wound, with these wounded for the purpose of prophylaxis of late abscesses, epilepsy and other complications produced the full/total/complete carving of cerebral scar together with bone fragments and metallic foreign bodies.

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Frequently in such cut all over scars detected around bone fragments

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small/fine abscesses. Similar process/operations concluded, as a rule, with anechoic suture and gave good results.

Among all treated in hospital those wounded the skull the percentage of lethality was small. In the group of wounded the skull with damage bones the lethality among those operated was equal to 11.80/o; lethal outcomes among unoperated wounded the soft tissues of skull it was not.

One should add that among all those wounded the skull, operated in the army specialized hospitals and delivered for further treatment into this hospital, it died within different periods of the moment of intervention 0.70/o. Lethality among those wounded the skull with damage to bone, operated in the army hospitals, composed 0.9c/c.

In this hospital within comparatively short time of combat operation recovered 11.1c/o all of those wounded the skull; for heavily wounded this percentage composed 8.8, and for those wounded the soft tissues of skull - 17.2. It was acknowledged by disabled 0.70/o of wounded, mainly the inhabitants of Leningrad whom not rationally it was evacuate into the rear in order there to recognize disabled and again to return on the place of residence.

It is necessary to especially note carried out in this hospital

great work with those wounded into skull, that had motor fallouts or violations of speech. Systematic exercises by the therapeutic exercise employing the specially developed procedure and with individual approach, and also the permanent work of logopedicians, physiologists and psychiatrists on the restoration/reduction of the second signal system of distance good results found their reflection in the medical press.

The renewed during February railroad evacuation into the rear of the country made it possible to the end of the month to evacuate 32.00% of wounded (37.70% in the group of heavily wounded and 18.40% in the group of those wounded the soft tissues of skull). In rear therapeutic installations they evacuated mainly wounded the skull with prolonged periods of treatment or lost ability to work. For further treatment it was left in hospital toward the end of the studied period more than half all those wounded into skull, the periods of stay of which in hospital to recovery did not exceed 3 months. This were in essence recently those operated or wounded with infectious complications from the side of shells and substance of brain.

The short performance characteristic of all therapeutic installations on the treatment of those wounded the skull during January and February 1943 is such: the predominant unit of those

wounded the skull (about 90.00/o) entered during this period on GBF from army, which run the blockade of Leningrad.

Taking into account difficult conditions during the blockade of the evacuation of wounded into the rear, which was possible only by air and through the Lagoda lake, it should be noted that the final backgrounds of front line hospitals and to the beginning of the dismantled combat process/operation to third was already loaded by wounded. Hospitals tested the series/row of difficulties because of the need during blockade break-through to deploy supplementary cots.

Entered wounded into skull were distributed over obtained damage bones (38.00/o) and wounded the soft tissues of skull (62.00/o).

Of all entered that wounded into skull it was operated by 22.70/o; lethality among those operated composed 9.90/o. From located undergoing medical treatment those wounded into skull recovered 19.40/o, it is evacuated into rear 10.70/o. Remaining wounded toward the end of the combat process/operation were left for treatment from the place of lethality of the medium all of those wounded into skull it proved to be low.

The reason for death, besides the extensive and heavy decomposition of brain, were also infectious complications. Unit among them composed abscesses of brain and diffuse meningoencephalites. Attention is drawn to the heavy forms of meningitides, which developed against the background of sub-arachnoidal hemorrhage. Are noted also the cases of anaerobic encephalitis.

In the group of the entered wounded the skull with damage bones it is operated by 46.7c/c. If one considers that in the army hospitals it was operated, furthermore, 17.3c/o of wounded this group, then general/common/total surgical activity during the blockade break-through of Leningrad was already sufficient high. Lethality among the operated wounded the skull with damage bones in the specialized front line hospitals composed 12.6o/o. It recovered within the period of combat process/operation 8.2c/c of wounded, it is evacuated into rear 20.3o/o. The large part of the wounded of this group toward the end of the studied period still consisted undergoing medical treatment.

Within the period of this combat process/operation recovered 26.30/o wounded the soft tissues of skull. It was acknowledged by temporarily disabled 0.10/o. It is evacuated into the rear of the country due to the need for prolonged treatment or time/temporary disablement 5.00/o. Lethality among those wounded the soft tissues of skull composed 0.10/c and depended in essence on the severity of the closed damage of brain together with the surface wound of the soft integuments of head. It is left for further treatment in connection with expected soon recovery 68.50/c of wounded of this group.

Thus, in the specialized front line hospitals was provided the comprehensive clinical examination/inspection entered of those wounded into skull, their surgical and conservative treatment, and also strictly differentiated approach during the decision/solution of a question about the evacuation of wounded into the rear. In essence the wounded remained for treatment in place, moreover 19.40/c recovered already during combat process/operation, but among the others the periods of recovery did not exceed 1-2-3 months.

The special feature/peculiarity of work of GSF should be considered comparatively short evacuation routes from army, and also favorable conditions for her deployment on the basis of the highly skilled therapeutic installations of Leningrad.

Neuro-surgical aid provided those wounded the skull not only on GBF, but also in army, which run the blockade; with this more than half those wounded the skull was directed to army specialized KhPPG.

Most heavy of them, nontransportable due to their condition, were processed by neurosurgeons in army. Rendering to the medical aid by that wounded the skull during combat process/operation "Orel-Kursk battle". Orel-Kursk battle is the largest in the history of the third year of the Great Patriotic War battle for Kursk bridgehead/beachhead and is distinguished by the rout of the Fascist-German troops/forces, which were attempting in narrow front sector to break through our troops/forces' defense.

Comrade Stalin in his report on 6 November 1943, dedicated to the 26th anniversary of the great October Socialist Revolution, gave the following characteristics to the military activities of Soviet troops:

Battle near Kursk was begun with the attack of the Germans on Kursk from north and south. This was Germans' latter/last attempt carry out a great summer offensive and in the case of its success to make up that lost.

Offensive was finished, as is known, by failure<sup>1</sup>".

FOOTNOTE 1. The 26th anniversary of the great October Socialist Revolution. Report of the chairman of the state committee of defense at the solemn conference of the Moscow advice/council of the deputies of those labeling with the party and community organizations of Moscow on 6 November 1943. ENDFOOTNOTE.

"Our troops/forces during several days eliminated the summer offensive of the Germans and those they buried the Hitler plan/layout of the rout main forces of the Red Army and turning movement of Moscow from the side of Crek- Kursk. Moreover, the Red Army itself passed into decisive attack, forced open the powerful/thick defensive zones of the enemy and in the course of three months it rejected/threw him to the West by places to 400-450 kilometers. Within the time of summer campaign our troops/forces banished enemy from the left-bank Ukraine, from Donbass, Taran', Orlovshchina, Smolennshchina, entered the right-bank Ukraine, they mastered the capital of the Soviet Ukraine - by Kiev, they entered Belorussia, engaged routes of approach to Crimea, freed more than 160 cities and more than 38000 populated areas<sup>2</sup>".

FOOTNOTE 2. Order of supreme commander-in-chief on 7 November 1943, No 309, Moscow. ENDFOOTNOTE.

"If battle in the environs of Stalingrad betokened the setting of the Fascist-German army, then battle near Kursk placed it before the catastrophe". "Germans expected to carry out by the summer of this year a successful offensive on Soviet-German front in order to return to themselves that lost and to raise its shaking authority in Europe. But the Red Army overturned the calculations of the Germans, repulsed their offensive, itself passed into offensive and repulsed Germans to the West, after trampling thereby the authority of German weaponry<sup>3</sup>".

FOOTNOTE 3. The 26th anniversary of the great October Socialist Revolution. Report of the chairman of the state committee of defense on solemn session of the Moscow advice/council of the deputies of those laboring with the party and community organizations of Moscow on 6 November 1943. ENDFOOTNOTE.

On the northern basis of Kursk prominence the dismantled army, that accepted on 5 July 1943 to itself the main attack of enemy, in spite of the massed artillery fire and continuous aircraft flights of hostile aircraft, in the bitter defensive actions it stopped enemy, intercepted to heavy tanks and self-propelled guns, routed its

manpower and after 7 days itself it passed into counteroffensive, it restored/reduced initial position it began to pursue the routed Fascist-German troops/forces.

The combat operations of this army are shared into three fundamental periods:

the first - a period of the bitter defensive actions and partial withdrawal/departure to the second defensive line from 5 to 14 July 1943;

by the second - a period of decisive counterattack of army and restoration/reduction of initial position from 15 to 20 July 1943;

the third - a period of the pursuit of the routed hostile troops from 20 July through 8 August 1943.

The intensified study underwent the periods of active defense and counterattack to the return of our units to initial position, since these periods are characterized by the most difficult conditions for the medical service of those wounded the skull in army.

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First aid by wounded on the field of battle proved to be under the sustained fire of enemy under conditions for furious fighting. Primary bandages were superimposed by aidmen into 27.40/o of cases, by medical instructors - in 27.20/o and by feldshers - into 9.80/o; in order/formation self- and mutual assistance - into 35.6c/c.

The carrying out of those wounded the skull from the field of combat was conducted mainly on cape-tents and on wheel-stretcher installations. In some units for the export of wounded they used canine harnesses. This method of export completely justified itself during this battle. Locality conditions made it possible in the series/row of sectors to carry wounded into natural covers. Combat of this army were deployed in the locality, strongly cut by many ravines, which were being pulled in different directions. Individual elevations achieved the height of 280-290 m, counting from the foot; the depth of ravines - 40-70 m. There was a great quantity of rivers and passes/grooves with the swampy shores, which required construction in the series/row of the sectors of special gangway beside roads, since the latter underwent the attack of the aviation of enemy.

Combat operations occurred by summer in dry, hot weather.

Especially difficult conditions on rendering of first aid and to the carrying out of those wounded the skull from the field of combat were formed in the beginning of the combat process/operation when enemy in order to break through our defense, threw in combat new and new units, aviation, tanks and self-propelled guns, considering not what losses. Because of Soviet troops/forces' heroic staying power/persistency only 7-8 days of combat it after became it is clear that the offensive of the enemy is doomed to failure. Within this time manpower and the enemy technique proved to be to a considerable degree annihilated. ¶ The character/nature of combat forced some therapeutic installations to frequently change its deployment. Those wounded the skull they rapidly sent to the PMP.

The transportation of wounded to PMP was realized by most frequently horse transport, and sometimes also by motor vehicles. During the period up to 4 hours from the moment of wound to PMP entered 70.20/o of wounded, which indicates the promptness of their delivery/procurement. Among those delivered to PMP 30.9c/o comprised the litter wounded, 40.0c/o they were delivered in the field of transportation sitting even to 29.10/o of gain independently.

The volume of therapeutic measures at the PMP in the relation to wounded the skull was ordinary. Certain difference from other combat process/operations consists in the fact that wounded greatly rapidly they evacuated to DMP. Transport possibilities of DMP made it possible to without interruption evacuate wounded to themselves. Furthermore, according to the character/nature of battle in the beginning of combat process/operation it proved to be necessary not only to rapidly unload PMP, but also to comparatively frequently change its deployment.

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The work of division medical aid stations in first half of July during the offensive of the hostile troops/forces passed to very severe conditions. DMP were accommodated in the half-wrecked community buildings, sheds, collective farm barns, half-preserved buildings of schools, in peasant huts and mainly in mud huts, tents and huts.

Series/row of DMP underwent shelling and bitter air raids of the enemy. Some DMP were relocated within these short periods of defense and counteroffensive on 10-14 times. They were divided into two

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groups, DMP left medical personnel for the care of the post-operation and nontransportable wounded, and they themselves moved forward after the troops/forces.

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The periods of the entry of those wounded the skull on DMP during combat process/operation were following: during the period up to 6 hours from the moment of wound entered 52.60/o, after 6 hours - 47.40/o of those wounded into skull. The condition entered of those wounded into skull was in a number of cases very heavy, since with PMP were evacuated as far as possible all wounded without depending on their condition. On DMP those wounded the skull were distributed over obtained damage bones (3<sup>1</sup>.30/o) and wounded the soft tissues of skull (62.70/o).

On DMP of army the work was organized so that the significant part of those wounded the skull traversed medical dressing rooms, where was conducted general/common/total evaluation of the condition of wounded, examination/inspection of wound, shave of hair around it and application of dressing. However, on individual DMP these measures began to carry out not with the first days of combat process/operation, which forced army surgeon immediately require from some DMP the clear execution of measures for warning/prevention of

the secondary infection of the wounds of skull and brain and not to be limited only to the surface hair-cutting of hair, without the shave of the fibrous units of the head.

On DMP the shock was noted in 23.30/o of wounded the skull with damage bones. These wounded they guided in <sup>Kh</sup>EEG only after energetic antishock therapy and their emergence from heavy condition.

On all DMP within the time of combat operation were produced operational intervention in 9.8c/o of those wounded into skull, moreover from a number of wounded the skull with damage bones to operational intervention it underwent by 4.5c/o, and among those wounded the soft tissues - 13.00/o. Thus, process/operations were performed on DMP mainly in those easily wounded the skull.

Lethality among all those operated proved to be equally to 0.60/o; in the group of the operated wounded the skull with damage bones - 3.60/o. This makes it possible to assume that operational intervention were undertaken predominantly with preventive target. Lethal outcomes among operated those wounded the soft tissues of skull it was not.

Attention is drawn to the nonuniformity of surgical activity in the relation to wounded into skull in some DMP. On individual DMP of

those worked under calmer conditions, operability all of those wounded the skull was comparatively high, on another DMP the working conditions were very difficult, and process/operations on skull not at all were conducted or were undertaken only from the urgent readings.

Recovery on DMP is noted only among those wounded the soft tissues of skull (19.3c/o). This percentage should be recognized high, if we consider the complicated conditions for work DMP and their restricted possibilities for hospitalization and detailed examination/inspection of those wounded into skull. So high a percentage of recoveries is explained by the fact that certain unit of the wounded with the surface wounds of the soft tissues of skull and without the signs/criteria of brain concussion in anamnesis was left on individual DMP as aidmen and trained care of wounded due to losses among the service personnel.

Thus, although these wounded were acknowledged by those recovered, however, working on DMP, they constantly were found under medical observation.

As an example it is possible to give two DMP, which worked under varied conditions of combat circumstances.

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One of them, after sustaining the considerable losses of the service personnel, kept undergoing medical treatment about half most slightly wounded in soft ones the tissue of skull and in proportion to the recovery of these wounded included them in work on DMP. Another DMP, working under calmer conditions, guided in <sup>the</sup> EEG all of those wounded in soft ones the tissues of skull for neurologic and roentgenological examination/inspection and subsequent treatment.

It is evacuated from all DMP into the therapeutic installations of army rear 74.70/o of those wounded in the skull; from a number of those wounded the soft tissues of skull it is evacuated by 72.30/o. Toward the end of the studied period of the combat process/operation of these wounded it remained undergoing medical treatment on DMP 8.40/o. Lethality among them was not noted. However, from heavily wounded the skull with damage bones were evacuated 78.90/o, others were left to recovery on DMP as nontransportable.

The large part of the wounded the skull with damage bones was evacuated into the army specialized hospital by motor transport, and sometimes - on ambulance aircraft. From the defects of evacuation should be noted the direction some of those wounded the skull with the damage of bones not on stretchers, but sitting. Medical motor

transport in this combat process/operation worked sufficiently clearly. The available medical motor transport company, and attached from front two medical transport platoons also ensured timely the export of wounded with DEP. For an increase in the load capacity on all motor vehicles it was made in 4 additional suspension stretchers, which made it possible to simultaneously take 8 horizontal/lying and 4 sedentary wounded. In route/path the wounded observed either their escorted/tracked hygiene instructor or nurse.

The roads, which lead to specialized <sup>Kh</sup> PPG of army, were in satisfactory condition and they made it possible to deliver those wounded the skull fast enough and with great care.

In army there were two specialized PPG. The first of them was arranged/located in the center of army and accepted to itself the majority of those wounded the skull. Another <sup>Kh</sup> PPG was included/connected in the treatment of those wounded the skull only in the period of the pursuit of the routed hostile troops. Therefore in more detail will be illuminated the work of first specialized <sup>Kh</sup> PPG.

1. In village where was situated this hospital, community buildings, besides small school, it was not. In connection with the offensive of the warm period and the waiting of the considerable entry of those wounded into skull were urgently expanded/scanned the

tents and were constructed huts.

In view of the fact that were expected the air raids of enemy, the bandaging unit/block and sorting separation/section were placed in the equipped mud huts.

Hospital accepted those wounded the head and the breast.

In hospital was expanded/scanned neurosurgical separation/section with a sufficient quantity of cots for those wounded the skull and with the closed injury of skull.

The chief/leading neurosurgeon was sufficiently experienced specialist. Furthermore, in this hospital it worked from the group of ORNU of 4 neurosurgeons, 2 maxillofacial surgeons and 2 ophthalmologists. The capacity of the X-ray room made it possible to subject to the X-ray analysis all of those wounded the skull with suspicion to the penetrating wound.

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Those wounded into skull entered with DMF and of <sup>KK</sup> PPG of the first line. The realized in essence principle of evacuation according to designation/purpose allowed hospital to organizationally service

wounded. Hospital was filled profile with those wounded.

Among all those entered those wounded into skull composed 31.70/o. From them almost in 2/3 (63.70/c) were wounds of skull with the damage of bones and more than third (36.30/c) wound of soft tissues. This again confirms the correctness of the direction of wounded from foremost therapeutic installations for designation/purpose into specialized <sup>kh</sup> PPG, since a number of wounded the skull with damage bones in this hospital composed almost 90.00/o of similar wounded in all hospitals armies.

Furthermore, into this hospital entered a considerable number of those contused. As a result of massive air bombings and shellings during this bitter battle increased a quantity of closed injuries of skull. After the appropriate medical classification in 10.00/o wounded was revealed the severe closed injury of skull with the organic symptoms of the damage/defeat of central nervous system or the depressed breaks of skull. These victims he was necessary treatment in neurosurgical hospitals. The others they guided into the arranged/located not far off hospital, which had neurologic department and hospital for those obtained LCF damages.

Those wounded into skull entered in essence not finished. In their significant part were pure/clean wounds with that shaved around

the surface of skin.

On the localization: the wounds of frontal area are noted in 21.00/o of wounded, sincipital - in 30.7c/c, temporal - in 14.60/o, postcranial area and posterior cranial pit - in 10.30/o and wounds of two and more than areas - in 23.40/o of wounded. Conceal by mode, in fourth of all wounded were almost extensive damages of skull.

In view of the considerable entry of wounded into specialized <sup>KK</sup> PPG, and also needs for subsequent movement <sup>K G</sup> forward, during this combat process/operation in hospital processing underwent only requiring the urgent process/operations and grown heavy wounded the skull. During readings to process/operation they were guided not so much by the periods, which passed from the moment of wound, as by condition of wounded and his wound. As already mentioned, all wounded into the skull before the process/operation underwent x-ray examination.

Operational intervention are produced in 19.00/o all entered of those wounded into the skull; among wounded with the damage of the bones of skull it was operated by 25.00/c, and from a number of those wounded into soft tissues - 7.6c/o.

All surgical interventions were conducted under local anesthesia

and consisted in the carving of the wound of soft tissues, trepanation of bone defect, the distance/separation of all bone and available metallic fragments, and also in the emptying of wound canal in cerebral substance from the blood clots and detrite. With the cessation of hemorrhage from the damaged vencus sinuses was usually applied tamponade by catgut.

Considerable attention was given to proccessing the heavy combined wounds of the tasis of skull and orbit, paranasal sinuses or ear.

Lethality in the group operated of those wounded the soft tissues of skull did not occur; amcng wounded into skull with damage bones it composed 9.50/c.

Inoperable with respect to the severity of the condition of those wounded the skull and the brain amcng all those entered it proved to be 9.70/o.

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The treatment of both post-operation ones and inoperable wounded consisted in the granting by them of rest, the use/application of a medicinal/medicamentous therapy, including dehydrating and antiseptic

substances, in the blood transfusion, and also permanent observation of the course of wound, neurologic and general condition.

In post-operation period are noted the following complications: epilepsy - in 0.70/o of wounded, the abscesses of brain - in 0.9, the meningoencephalites - in 0.20/o and meningitides - in 23.20/o of wounded. The abscesses of brain were early, without the sufficiently formed capsule. After autopsy and draining of abscesses half wounded recovered.

The great percentage of meningitides, together with a small number of meningoencephalites, makes it necessary to assume that their differential diagnosis under military field conditions was difficult and it depended faster on the installations of the doctors in attendance. Summarizing these two forms of complications, it should be noted that among all located undergoing medical treatment those wounded into skull meningitis and meningoencephalitis is noted in 5.10/o. In this number enter also several cases of meningitis in wounded, who were being located in this hospital prior to the beginning of combat process/operation, and, furthermore, several wounded, who entered into hospital with the already developing picture of this complication. The issues of treatment with the wounds, complicated by meningitis and meningoencephalitis, which follow: from all quantity 5.10/o of wounded with complications they

recovered and they were evacuated on GBF 1.00/o; they moved out the heavy condition; however, they remained even for further treatment on the spot for 1.90/o and died 2.20/o these of those wounded the skull.

Among those wounded the soft tissues of skull it recovered within the time of combat operation 9.40/o, it remained on cct in connection with predicting soon recovery 1.60/c. The recovery of wounded the skull with damage bones for this short phase of combat is noted in the single cases, mainly long ago operated wounded, who remained in hospital at the beginning of combat because of the need for several days of treatment to final recovery.

During the combat process/operation conditions the works of specialized <sup>Kh</sup> PPG were such, that in it it was not possibility leave for recuperation the considerable group of those easily wounded the skull.

Together with operational activity, specialized <sup>Kh</sup> PPG made great sorting-evacuation work. It is evacuated on GBF by 75.30/o all of those wounded into skull, that were being located in satisfactory condition. This was caused by the considerable entry of wounded during combat process/operation. From a number of wounded the skull with damage bones were evacuated into the specialized front line hospitals for primary processing 67.00/c.

It is characteristic that among wounded the frontal area with damage to bone transportable ones it proved to be 71.00/o, into sincipital area - 70.00/c, into temporal area - 80.00/o, into postcranial area and posterior cranial area - 62.00/o, also, into two and more than area only 48.00/o of wounded.

Thus, on the basis of severity conditions in hospital left mainly wounded with the extensive damages of skull and brain (52.00/o of nontransportable ones) and with the wounds of postcranial area and posterior cranial pit (38.00/o of nontransportable ones).

From a number of these wounded the soft tissues of skull it was evacuated by 89.00/o. For the evacuation of wounded on GBF to the arranged/located hereabout from hospital landing pad was supplied a sufficient quantity of ambulance aircraft (Fig. 13).

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The presence of this powerful/thick air evacuation, together with short evacuation routes, allowed specialized <sup>kh</sup>EPG successfully to manage the work, in spite of the considerable entry of those wounded the skull, the wounded, evacuated for processing into the specialized

agencies GBF, in short periods achieving point of destination.

Those obtained the severe closed injury of skull, those not required according to character/nature the damages of urgent surgical treatment, also evacuated by aircraft transport on GBF.

Among dead persons in the specialized hospital large part composed the wounded with the heavy penetrating wounds of skull and brain. However, sometimes lethal outcome attacked/advanced with nonpenetrating wound or as a result of the closed injury of skull with the contusion of the hanger-on departments of brain.

If we calculate lethality depending on localization of wound, then is noted its build-up/growth from the frontal standard of brain to postcranial.

The distribution of dead persons from the wounds of skull according to periods from the moment of wound is represented in Fig. 14. From this diagram it is evident that the lethal outcomes are noted mainly to 2-3 and the 4th day from the moment of wound, i.e., exactly in that period when those wounded the skull arrived into specialized PPG. There is no doubt that certain unit of them due to heavy condition had to be left in PPG of the first line and it was not subject to transportation.

From dead persons in this specialized PPG <sup>Kh</sup> 2/3 perished as a result of the heavy damage of skull and brain, and third - from infectious complications from the side of brain and its shells.

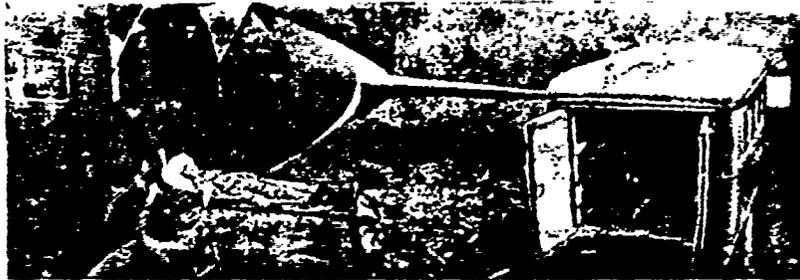


Fig. 13. On-loading that wounded the skull to aircraft (from the collection of military medical museum VM of the USSR).

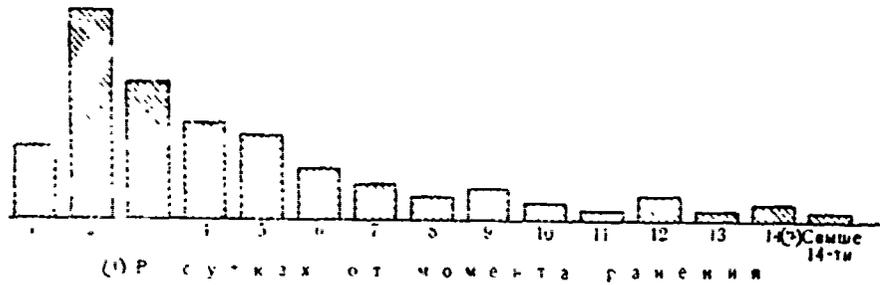


Fig. 14. Distribution of dead persons in specialized PPG from wounds of skull according to periods from moment of wound during Orel-Kurs battle.

Key: (1). A day from the moment of wound. (2). It is more than 14.

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The comparison of these two basic reasons for death on the periods, which passed from the moment of the wound of skull, is represented in Fig. 16.

Fig. 15 shows that from the severity of the injury of skull and brain death attacked/advanced mainly on the 1-2nd and 3rd day from the moment of wound. Beginning from the 4th day and especially to the 5th and 6th day after wound in this specialized <sup>Kh</sup> FPG more than half among all dead persons it perished from infectious complications from the side of brain and its shells. Much later the basic reason for death were only infectious complications. This once more confirms the need for the early preventive use/application of sulfanilamides, and to known degree also substantiates both the readings and the sequence of processing the wound of skull and brain not only on the periods, which passed from the moment of wound, but also due to the general condition of wounded and according to character/nature of his wound.

Examining the group of wounded, subsequently of dead persons as a result of the heavy damage of skull and brain, one should note first of all, that 3/4 of them from the moment of wound to lethal outcome were found in comatose condition, and in third of wounded, besides the wound of skull, had the multiple heavy wounds of other organs/controls. Operational interventions were undertaken in the single cases. In all dead section in 1/4, the basic reason for death of whom proved to be the changes, connected with the direct activity of injury, were discovered hematomas. Death advanced in these cases

on the 1-2nd and 3rd day from the moment of wound.

Among the wounded who subsequently died of infectious complications from the side of brain and its shells, 1/6 it was delivered into hospital also able of coma. The primary processings of the wounds of skull and brain was produced in 42.20/o of wounded (from this number 14.0c/c they were processed on DMP and evacuated after process/operation to the 6-8-10th day). In remaining 57.80/o of wounded were not conducted operational interventions on the wound of brain in view of the severity of their condition. In the section of dead persons from infectious complications from the side of brain and its shells in 60.0 was discovered meningitis, the meningoencephalitis - in 25.80/o, the abscess of brain in 7.7c/c, suppuration of wound canal - in 3.30/o and anaerobic encephalitis - in 3.20/o. With meningitis and meningoencephalitis in 1/5 were established/installed liquo. ventricular fistulas.

Pneumonia in those wounded the skull were observed very rarely and in section they were discovered only in the single cases.

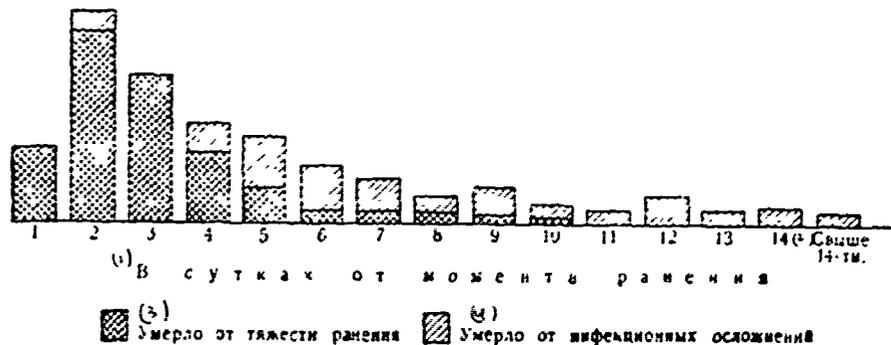


Fig. 15. Distribution of dead persons in specialized PPG from the wound of skull according to basic reasons and periods, which passed from the moment of wound during an Orel-Kursk battle.

Key: (1). A day from the moment of wound. (2). It is more than 14. (3). It died of severity of wound. (4). It died of infectious complications.

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2. Second specialized by KhPPG army, separated at first into reserve, was located on left flank and during studied period of combat process/operation forced it was 4 times to change its location. This hospital barely accepted wounded and was found in half-cutback condition. Medical personnel and equipment of hospital were attached in basic one of KhPPG of the first line where was provided the qualified classification of those wounded into skull and

were conducted process/operations only from urgent readings.

In this specialized KhPPG entered within the time of defense and counter offense of our troops/forces a very small number of those wounded in skull; 1/4 of them it was operated, and the others were evacuated on GBP.

Up to the moment of pursuit by our troops/forces of the routed enemy first specialized KhPPG it was filled by post-operation and nontransportable wounded. In connection with this by the second specialized KhPPG was urgently newly manned by cadres and medical equipment and was advanced forward, to the freed territory, for the provision with therapeutic aid of that wounded entering the skull. In further first specialized KhPPG, after being unloaded from wounded, by "sand bar" it was advanced still further forward.

Characterizing as a whole the work of all hospitals of army, it should be noted that among wounded the skull during July 1943 into different KhPPG entered 46.00/o wounded with damage of bones and 54.00/o wounded in soft ones tissue. Those wounded into skull entered mainly with DMP and only 27.40/c were directed of KhPPG of the first line.

According to the form/species of the wounding shell the wounds

into skull were distributed to bullet ones (30.1c/o) and fragmentation ones (65.4c/o); into 4.50/c of cases the form/species of the wounding shell was not established/installed.

From the given number of fragmentation wounds of skull into 11.40/o are noted the fragments of artillery shells, into 48.00/o - min, into 5.40/o - aircraft bombs and into 0.60/o - a garnet.

With respect to the periods of combat process/operation percentage relationships/ratios of the wounds of skull according to form/species of the wounding shell underwent changes. In particular, in the period of defense is noted a relatively smaller number of bullet wounds and increases a number of wounds by the fragments of mines and aircraft bombs. In the period of counter offensive increased the relative number of bullet wounds of skull and decreased a number of wounds by the fragments of artillery shells. In the period of the pursuit of enemy the relative number of bullet wounds remained without changes, a number of wounds by the fragments of artillery shells increased, and by the fragments of mines and aircraft bombs it decreased.

In the group of wounded the skull with damage bones blind-end wounds composed 59.90/c, tangents - 31.20/o and through - 8.90/o.

The distribution of those wounded the skull according to the character/nature of wound in different periods of combat process/operation also underwent some oscillations. The perforating wounds of skull were encountered comparatively frequently in the period of defense, still more their quantity increased with counteroffensive and sharply it decreased during enemy's pursuit. The blind-end wounds of skull it was relatively more in the period of the pursuit of enemy. Tangential wounds more frequently were noted in the period of counter offensive.

Among wounded the skull with damage bones the penetrating wounds of skull and brain were noted in 73.2c/o of wounded, but nonpenetrating in 26.8c/o.

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Surgical interventions with all wounds of skull were produced, according to the total data of the hospitals of army, into 18.0o/o of cases. Those wounded the skull with the damage of bones were subjected to primary processing into 22.4o/o of cases. Almost all these process/operations are produced in specialized KhPPG.

Those wounded in soft ones the tissues of skull guided from army therapeutic installations into all hospitals; 14.0o/o of them were

operated in army therapeutic installations. Were distributed all these process/operations as follows: 23.00/o of process/operations produced specialized KhPPG, 63.00/o - KhPPG of general-surgical profile/specialty and 14.00/o - GLR. Is hence visible a comparatively great activity KhPPG of general-surgical profile/specialty in the relation to the surgical treatment of those wounded the soft tissues of skull. Chrome of that, one should consider that a quantity of wounded was distributed approximately/exemplarily identical: into specialized KhPPG entered 48.00/o all wounded the soft tissues of skull, and in KhPPG of general-surgical profile/specialty - 52.00/o. KhPPG of general-surgical profile/specialty after processing or only examination/inspection of wounded guided them during the uncomplicated course in GLR.

Taking into account the great loading of specialized KhPPG, one should recognize that during this combat process/operation neurosurgeons' attention was completely correctly directed toward processing mainly the group those more heavily wounded to skull.

Of lethalties among the operated wounded into the soft tissues of skull it was not. Among those wounded the skull with damage to bone the lethality operated on all hospitals armies was equal to 9.50/o.

It recovered in July of all those wounded skull 10.90/o, that predominantly wounded the soft tissues.

It is evacuated on GBF by 59.60/o all of those wounded the skull, among them were 56.20/o of obtained damage bones and 61.80/c of those wounded the soft tissues. So high an evacuation of those easily wounded the skull was caused by need to unload hospitals for further advance forward. Only 16.70/o of those wounded the soft tissues were left in GIB in connection with short periods to recovery.

The sufficiently great percentage of those wounded the skull from damage of bones remained undergoing medical treatment in specialized KhPPG, since toward the end of the studied period of combat operations they yet did not move out the heavy condition or the periods, which elapsed after process/operation, had they small.

Summing up the work of all hospitals, it should be noted that during an Orel-Kursk battle in the army in question it was encompassed by specialized aid by 67.50/o of those wounded the skull.

The envelopment of that specialized the aid of the heaviest group of wounded into skull with damage bones achieved 90.00/c. From a number of those wounded in soft ones the tissue of skull it was

directed to specialized KhPPG 48.90/o, and the others entered into the hospitals of general-surgical profile/specialty. Subsequently the unit most of the lungs according to the character/nature of wound and due to general condition of wounded concluded its treatment in GLR.

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By special features/peculiarities the organization of medical service in the army of those wounded the skull for these the first two periods of an Orel-Kursk battle were:

1) entry into the therapeutic installations of a considerable number of those wounded the skull in connection with furious fighting for the duration of a comparatively short defensive period and the need for their medical service during the simultaneous preparation of therapeutic installations for rapid advance forward;

2) creation in the army of special evacuation group, which realized a dispatcher function in army area and an evacuation of wounded of designation/purpose into the specialized hospital;

3) the release of second specialized KhPPG into reserve for the provision of a possibility of the maneuver;

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4) creation in the army of two echelons of the hospitals of which one was located on line of iron road, and another - in soil, having, besides other hospitals, specialized neuro-surgical KhPPG;

5) specialized KhPPG was provided with a sufficient number of doctor-specialists, it was equipped X-ray installation, having available considerable bed-patient fund and great evacuation substances it knew how to organize the high-quality medical service of those wounded the skull.

The evacuation of those wounded the skull from different armies to the hospital basis of front during an Orel-Kursk battle was conducted both by the aircraft transport and by railroad and on soil.

Those wounded the skull they evacuated in essence in two directions.

The first evacuation point had its specialized hospitals with neuro-surgical base. Even long before the beginning of combat process/operation was carried out great work on training of the specialists. On basis of several hospitals under the leadership/manual of the senior inspectors, neurosurgeon and neuropathologist were carried out in the course of several months of exercise for the specialization of medical composition by military

field neurosurgery, and also the training assemblies of the neuro-surgical groups of ORMU.

Three specialized hospitals, that were on this GBF, were by correspondingly equipped by instrumentation, X-ray equipment and electric power economy.

The first evacuation point entered a considerable quantity of wounded. Great role played evacuation by the aircraft transport of those wounded the skull. From nearby armies the unit of the wounded was delivered on soil. As far as evacuation is concerned railroad, then, as it follows from the report of the commander of FEP, "it into this combat process/operation played insignificant role, since railway lines at the very beginning of process/operation frequently were already damaged by the strikes/shocks of hostile aviation."

During this period of combat process/operation worked only the 2 specialized hospitals. The third neuro-surgical hospital of wounded did not accept and it was finished/prepared if necessary move forward, that also was realized subsequently.

The scheme of neuro-surgical separation/section of one of the operating front line specialized hospitals is represented in Fig. 16.

Entered wounded into skull after medical processing underwent examination/inspection in the medical dressing room; with it produced the hair-cutting of hair and shave skins around wound, laid bandages they guided them in X-ray room. After x-ray examination those wounded into skull, that were requiring the surgical processing, entered operating room and from there - into hospital.

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In these specialized hospitals it was operated by 78.30/o of wounded the skull with damage bones. Lethality among those operated composed 8.80/o.

Thus, in front line hospitals was carried out the principle of the maximum envelopment of wounded the skull with damage bones by preventive neuro-surgical aid.

Process/operations were conducted under morphine-novocaine anesthesia. To wounded before the process/operation were introduced intravenously 2 cm<sup>3</sup> 1c/o of solution/opening of morphine. The primary processing technique of the wounds of skull and brain was conventional. Post-operation wound they powdered by streptocide or on it laid the bandage, moistened by the emulsion of streptocide. After the entry of wounded on the 5-6th day after the wound of

process/operation in the majority of the cases also they were conducted; however, the volume of intervention depended on the general condition of wounded and degree of the infection of the wound of skull and brain.

In post-operation period all wounded received sulfanilamides on 6.0 during 3-5 days. During the complicated course sulfanilamides were introduced intravenously. Furthermore, in post-operation period used extensively dehydration therapy in the form of the intravenous infusions of hypertonic solution/opening glucoses or sodium chloride. The research of cerebro-spinal fluid, and also bacteriological research were realized on the basis of not on the staff laboratory.

The wounded the soft tissues skulls were operated into 16.30/o of cases. Of lethalties among those operated it was not noted.

Toward the end of the studied period of combat process/operation the majority of wounded into skull with damage bones remained undergoing medical treatment in these hospitals.

The hospitals of another evacuation point were located in cities, villages and villages. The hospitals, which were being arranged/located in villages, had usually by series/row landing pad for ambulance aircraft and were located near from railway stations.

For deployment were used the cottages, sheds, schools and other quarters/premises. Working conditions of the hospitals, expanded/scanned in cities, were complicated by raids of the aviation of the enemy.

This evacuation point had

4 specialized hospitals with neuro-surgical separations/sections in them. In the beginning of an Orel-Kursk battle - 5th and 6th July - those wounded the skull arrived on ambulance aircraft, and with 7th July they began to enter, also, by railroad.

The total quantity of those wounded in skull, that arrived in the hospitals of this evacuation point, proved to be several times less than in the hospitals of the first evacuation point.

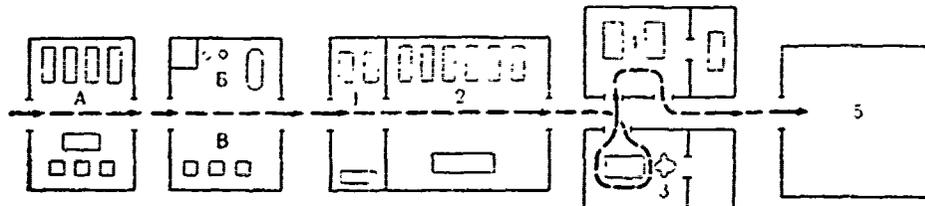


Fig. 16. Scheme of the neuro-surgical separation/section of the specialized front line hospital (Orel- Kursk battle). A - is receiving-sorting; B - disinfection chamber; C - toilet; 1 - barbershop; 2 - surgical dressing; 3 - the X-ray room; 4 - operating; 5 - hospital.

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In the specialized hospitals entered 69.00/o all arrived to evacuation point of those wounded in skull. From a number of all wounded the skull with damage bones from the specialized hospitals it was directed by 48.00/c, while from a number of those wounded to soft tissues it entered into specialized evacuation hospitals 72.00/o all of those arrived.

Smaller envelopment by the specialized aid of heavily wounded the skull with damage bones is explained by the fact that the remaining unit was urgently directed to arranged/located not far off one additional evacuation point or the condition of these wounded was

such heavy which them was necessary to hospitalize in that hospital of general-surgical profile/specialty, where they entered. Should be in this case considered the considerable disconnection of the arranged/located on great area different hospitals of evacuation point.

The total work of four specialized hospitals of evacuation point is characterized by the following: operational interventions are produced in 2.20/o all of those wounded into skull. Operability in the group of wounded the skull with damage bones composed 7.0c/o, and in the group of those wounded the soft tissues of skull - 1.0c/o. the surgical activity of these specialized hospitals in the initial periods of an Orel-Kursk battle should be recognized low. Moreover, in absolute expression a quantity entered to this evacuation point of those wounded the skull was small.

Of lethalties among operated those wounded the soft tissues of skull it was not. In the group of the operated wounded the skull with damage bones the lethality was equal to 11.1c/o.

In the specialized hospitals in July recovered 0.9o/o wounded into the soft tissues of the skull; evacuated by 45.0c/o of these wounded it remained for further treatment 54.1o/o.

From a number of wounded the skull with damage bones it is evacuated by 43.80/o; the others were left for treatment on the spot.

In all hospitals of evacuation point, including here and those specialized, during July recovered 4.00/c wounded the soft tissues of skull.

Evacuation to deeper arranged/located evacuation point, and also abandonment on the spot for further treatment approximately/exemplarily they coincide with the data given above on four specialized hospitals. One should only note that among all process/operations with the wounds of skull, produced in the hospitals of evacuation point, the specialized hospitals produced 32.00/o, although they accepted 69.00/o all entered of those wounded into skull.

During August 1943 in the period of the pursuit of hostile troops the specialized hospitals considerably increased their surgical activity. As an example it is possible to lead one of the separations/sections of the specialized hospital loaded by those wounded into skull and ENT organs and headed by a surgeon.

After this separation/section was divided into two - separation/section for those wounded the skull and the

separation/section for those wounded the ENT organs, was organized hereabout X-ray room and bandaging unit/block, and was also commissioned experienced neurosurgeon, the percentage of surgical interventions, produced by that wounded into skull already into the first ten-day period/decade of August increased to 41.0. Was improved also the comprehensive examination/inspection of the entered wounded. Inspected on 12 August this hospital chief surgeon of the Red Army N. N. Burdenko recognized work neurosurgical separation/section of good.

Together with adjustment at the evacuation point of the direction of the entered wounded into the hospitals of the corresponding profile/specialty, was improved the work also of other specialized hospitals.

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Thus the leading role in rendering to the medical aid by that wounded the skull in the first two periods of an Orel-Kursk battle in the army in question belonged to specialized KhPPG, and in front line area - to the specialized hospitals of the first evacuation point.

In the work of the specialized hospitals of another evacuation point was a series/row of the shortages which to second half combat process/operation were corrected.

Rendering to the medical aid by that wounded the skull during combat process/operation the "Liberation of Belcrussia".

The combat operations of the Soviet troops/forces at the fronts of the Great Patriotic War, which occurred in 1944, signified by themselves Fascist-German aggressors' exile from the limits of our native land and liberation from fascist captivities of millions of Soviet people. Speaking about 10 powerful/thick strikes/shocks of the Red Army, plotted/applied in 1944 to the Fascist-German aggressors, comrade Stalin as follows characterizes the course of the military activities of those led to liberation by Belcrussian SSR: "the fifth strike/shock was plotted/applied to Germans during June - July of this year when the Red Army smashed the German troops/forces under Vitebsk, Bobruiskiy, Mogilev it completed its strike/shock by enclosing 30 German divisions in the environs of Minsk. As a result of this strike/shock our troops/forces: a) completely freed the Belorussian Soviet republic; b) moved out to the vistula and freed the significant part of the union to us Poland; c) moved out to the niemen and freed the large part of the Lithuanian Soviet republic; d) forced the niemen and they approached the borders of Germany" <sup>1</sup>.

FOOTNOTE <sup>1</sup>. the 27th anniversary of great October of the Socialist

revolution. Report of the chairman of the state committee of defense at the solemn conference of the Moscow advice/council of the deputies of those laboring with the party and community organizations Moscow on 6 November, 1944. ENDFCCINCTE.

'In historical battle on the Belorussian earth/ground the troops/forces of the Red Army smashed German troops/forces' central grouping the consisting of three armies, after smashing and captivating in this case 540 thousand German soldiers and officers" 2.

FOCTNOTE 2. Order of the supreme commander-in-chief on 7 November, 1944, No 220, Moscow. ENDFCCINOTE.

Object/subject for studying the medical aid by that wounded into skull was one of the armies, which was being located on the main direction of the fifth strike/shock of the Red Army, against which spoke comrade Stalin in 1944.

The high maneuverability units, the penetration of the fastened/strengthened front, the rapidity of advance, assault crossing the river lines, rout of the defended enemy, and also enclosing and elimination of our left in the rear troops/forces of enemy's groups characterize the basic means of the activities of the

dismantled army into this combat process/operation.

The combat operations of this army are shared into three main periods:

1. Penetration of the positional defense of enemy and mastery of the series/row of the ganglia/nodes of resistance (among other things one of the large/coarse cities) with our troops/forces' output/yield to Berezin from 23 to 30 June, 1944.

2. Assault crossing of Berezin and mastery of two large/coarse cities, converted into ganglia/nodes of resistance, from 1 through 5 July, 1944.

3. Rapid pursuit of enemy, mastery of numerous ganglia/nodes of resistance, assault crossing ~~river~~ and capture of bridgehead/beachhead on western shore from 6 to 18 July, 1944.

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In the progress of combat of army it was necessary not only to break through the powerful/thick defensive line of enemy and to eliminate the ganglia/nodes of his resistance, but also to struggle with the frequent counterattacks of enemy, who threw in combat great

military formations,

tanks, self-propelled guns and aviation.

The offensive spirit of our troops/forces was so great that within 26 days of stressed combat the troops/forces of army made victorious route/path of approximately 500 km.

The organization of the medical aid by that wounded the skull had during this combat process/operation its special features/peculiarities, escape/ensuing from the character/nature of the combat operations of the troops/forces.

Aid by that wounded the skull on the field of battle in the predominant majority rendered aidmen and medical instructors.

The research of wounded on the field of battle during the penetration of the defense of enemy was conducted in the sharply swampy locality. Although the combat process/operation occurred under conditions of warm summer period with solar weather however frequent thunderstorm rains supported the swampiness of the territory of combat and eroded in a number of cases of road.

The carrying out of those wounded the skull from the field of

combat was realized on stretchers, and also with the aid of the ponchos and other improvised means by stretcher bearers or specially isolated soldiers. During this period are noted several cases of the late carrying out of the wounded, which were being found in unconscious condition, as a result of the impossibility to approach them due to strong hostile fire/light. After the suppression of the weapon emplacements of the enemy these wounded the skull were carried out on BMP.

The carrying out of the majority of wounded was conducted most frequently to the places of cover ("loculi/nests") (Fig. 17). From "loculi/nests" to BMP of wounded in a number of cases they delivered to canine harnesses. Subsequently in connection with the advance of our units forward the delivery/procurement of wounded on BMP began to be realized by horse transport. With the output/yield of army to operational scope the carrying out of wounded from the field of combat was facilitated. Since our units rapidly advanced forward, in the majority of the cases it proved to be possible not to carry wounded far, but to accumulate them in the places of cover and to transmit to approaching EMP and PME.

On PME inspected/checked or again were laid the bandages on head, they inspected/checked correctness the impositions of splints, if simultaneously there was wound of extremities, and also were taken

through readings antishock measures (morphine, alcohol, substances, stimulating cardiovascular and respiratory/breathing activity and, etc.).

The evacuation of those wounded the skull with PMP was realized by transport of medical companies. Subsequently the combat operations of the advancing army were deployed in flat terrain with the widely developed net/system of country and highways, the rare, scattered sectors of forest, numerous rivers, great and small swamps/marshes. Thus, the delivery/procurement of wounded on PMP to some front sectors was realized under favorable conditions, on others was somewhat hindered/hampered in view of need overcome natural barriers/obstacles.

The periods of the delivery/procurement of the litter wounded on PMP from the moment of wound are characterized by the following data: during the period up to 1 hour it is delivered to 24.20/o, from 1 to 2 hours - 24.10/o, from 2 to 3 hours - 16.20/c, from 3 to 4 hours - 11.40/o, from 4 to 5 hours - 7.80/o, from 5 to 6 hours - 6.20/o, it is more than 6 hours - 10.10/o of wounded.

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Thus, the majority of the litter wounded entered on PMP to 3 hours

from the moment of wound. The periods of the delivery/procurement of wounded in the period of the rapid advance of the troops/forces were more shortly than in the period of assault crossing Niemen and capture of bridgehead/beachhead on its western shore.

During each new advance PMF they were deployed usually completely, but in a number of cases it was necessary to be limited to incomplete deployment, since combat situation caused the need for further advance of them forward.

If were allowed conditions, then on PMF many by that wounded into skull was conducted the shave of hair, skin around wound they lubricated by the solution of iodine or processed by chloramine or neopantocide were driven out the free foreign bodies they laid aseptic bandage. Heavy to those wounded into skull were introduced the substances, stimulating cardiovascular either respiratory/breathing activity, intravenously introduced hypertonic solution glucoses or sodium chloride. By all wounded compulsorily was introduced antitetanus serum.

In some periods of combat process/operation during the advance of the troops/forces on 40 km in a 24 hour period PMF they were deployed only for rendering to the necessary minimum aid by wounded, their transportation to roads ("high roads") and leaving under the

observation of medical workers to the approach of transport DMP. The difficulties of the evacuation of wounded with FMP were caused in a number of cases on the fact that the roads were fired on by enemy.

Entire phase of combat from the moment of the output/yield of army to operational scope, assault crossings from the course of Berezin and to approach to the Niemen is characterized by the rapid advance of the troops/forces with overcoming of the defensive zones of enemy and his ganglia/nodes of resistance.

On the Niemen combat were especially bitter. Therefore if in the first periods of the combat process/operation of particular difficulties with the delivery/procurement of wounded from the field of combat it was not, then with assault crossing of the Niemen it was necessary to organize and to advance forward to the coast of river special points/pcsts from DMP the consisting of two doctors, nurses and aidmen, which rendered aid not only to wounded, carried out from the field of combat or delivered with FMP, but wounded also with shellings and air raids of enemy on crossings.



Fig. 17. Place of the assembly of those wounded into skull ("loculus/nest") (from the collection of military medical museum VM of the USSR).

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On crossings at this time worked the special rescue units, equipped with boats. Furthermore, were put out division posts in crossings for the direction of wounded in their DMP.

In particular, in case of the divisions with assault crossing of the niemen the evacuation of wounded was realized as follows: during the first day the assault crossings of porters realized delivery/procurement of wounded to the western shore of river and crossed them through the niemen on rubber boats or rafts. From the eastern shore of wounded rapidly they delivered by the transport of medical companies on PMP. On the western shore of river were organized also the posts of the assembly of the wounded who realized an evacuation of wounded across the river. On eastern shore there were posts of motor transport DMP. After assault crossing of the niemen to western shore was isolated the special group with DMP, which in 2-2.5 km from the line of combat deployed sorting, medical dressing room and evacuation separation/section. The delivery/procurement of wounded with eastern shore of river 400 m of

crossing it was they will completely deploy DMP. All these measures as a whole ensured the rapid delivery/prccurement of wounded from the field of combat to DMP, what was the initial mission of the medical service of army during this period of combat process/operation.

Working conditcns of divisicn medical aid stations during combat process/operation were different.

In the beginning of combat with penetration the defenses of enemy DMP were set up in wards. As a result of threat from air, and also due to the absence of forests on the elongation/extent of the majority of route/path it was necessary with enemy's pursuit to be deployed in quarters/premises. This was allowed, furthermore, immediately on arrival in new pcint of destination to be included in therapeutic work.

Within the time of combat operation DMP they relieved their deployment on 20-26 times, echelcning in route. Head echelon DMP deployed all subunits and was rendered full/tctal/complete surgical aid by the entered wounded. The second echelon DMP serviced nontransportable and pcst-operation wounded those left at the preceding/previous locations, expecting apprcach KhPPG or evacuating brought-out from heavy condition wounded. Individual DMP due to the conditions of tactical operation circumstances were shared into

several echelons. This, however, it did not violate their work. Sometimes when it was extremely difficultly deploy DMP, the unit more easily wounded they guided without dress/lavatory of wounds in KhPPG of the first line.

Within all DMP there existed two routes for the wounded: one for stretcher ones and another for walking ones.

A great number of wounded entered with the penetration of the defense of enemy into first 2-3 for a combat process/operation. Subsequently a number of wounded considerably decreased in connection with the rout of the main forces of enemy and the output/yield of our units to operational scope.

Taking into account the need for advance forward, in the beginning of combat process/operation DMP the unit of the wounded they evacuated without processing into the approximate army therapeutic installations.

Into the period of enemy's pursuit a number of entered wounded was minimal. They all were processed on DMP, with exception of the transportable wounded, who were requiring the specialized aid.

In proportion to approximation/approach to the Niemen a number of wounded gradually grew/rose, since it was necessary to overcome enemy's counterattacks. The latter/last two days of this period of combat process/operation, in connection with heavy fighting with assault crossing of the niemen and annihilation of the large/coarse ganglion/node of its defense, were characterized by the considerable entry of wounded on DMF.

The predominant number of those wounded into skull entered on DMF during the periods up to 12 hours from the moment of wound.

According to the form/species of the wounding shell the wounds and the damage of skull were distributed over DMF to bullet (33.00/o), fragmentation (65.00/o) and damages by other forms/species by shell (2.00/o).

Among entered to all DMF those wounded into skull the group of the obtained wounds with the damage bones composed 47.00/o, and wounded the soft tissues - 53.00/o.

This combat process/operation is characterized by the future decrease of a number of surgical interventions with the penetrating

wounds of skull on DMP. To them they resorted only in the cases of the progressive build-up/growth of the hypertonic phenomena when it predicted intracranial hemorrhage. Process/operations with the wounds of skull with the damage of bones were produced only into 0.60/o of cases with comparatively high lethality among those operated (28.40/o), which indicates the considerable severity of these wounds. However, almost into 75.00/o of these cases to urgent process/operation gave positive effect and made it possible to save the life of a number of severely wounded who due to their condition would not transfer evacuation into the army specialized therapeutic agencies.

Together with this, wounded into the soft tissues of skull the primary processing of wounds of soft tissues of skull is produced on DMP in 13.80/o of wounded, KhPPG and GLR noting that did not have not one case of the excessive exposure of bone or cutting "five-kepek pieces" processed on DMP. When such wounded could be delayed to longer period in hospital, series/row DMP applied the drawing together rare sutures to the wounds of soft tissues. In particular, this took place in by dignity the end of the combat process/operation when DMP did not change their location.

Surgical interventions were produced by 7.60/o all of those wounded into skull.

Estimating the surgical of work DMP, army surgeon notes, that trepanation of skulls were conducted during combat process/operation, as a rule, from vital readings.

During discussed combat process/operation in the majority of those wounded the skull cleaned skin in periphery the wounds and shaved off hair.

With the extensive wounds of skull on DME it was applied emulsion of streptocide, by which they wet the bandage, laid on the wound of brain.

The recovery of those wounded the skull during this combat process/operation noted into combat therapeutic installations only in the group of those wounded and the soft tissues of skull composed 10.40/o among the latter. Healed recognized wounded, who did not lose consciousness during wound, after treatment did not complain of headaches, who had strengthened scars after surface damage only skins of head.

Predominating number of wounded into soft tissues was evacuated and army therapeutic institutions for detailed examination/inspection

and further treatment.

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With DMP it is evacuated by 85.00/o of those wounded the soft tissues and it is left on the spot for 5.70/o in connection with their predicted recovery within the nearest periods.

From a number of wounded the skull with damage bones it is evacuated in KhPPG 80.10/o. The others were left on DMP in view of heavy condition. The evacuation of the wounded was accomplished on motor transport, is thinner/less frequent on reverse empty car. Occurred the cases when KhPPG followed not far off from DMP and accepted those wounded the skull, left floor/sex by the observation of medical personnel in those places where before this it was expanded by DMP. Great role in the organization of the evacuation of wounded according to designation/purpose played distribution points.

In the latter/last period of combat process/operation the unit of the left on DMP nontransportable wounded moved out the heavy condition and they planned to evacuate them in KhPPG.

In work KhPPG also was a series/row of peculiarities associated with peculiar with the conditions of combat and medical-tactical

circumstances of this process/operation.

On the initial position KhPPG of the first line they were deployed in the swampy locality. Poor siding tracks caused the need for urgent repair by their their forces in order to ensure the delivery of wounded from units. Locality conditions did not make it possible to maximally draw nearer all KhPPG the army area. Nevertheless the series/row KhPPG of the first line was advanced to one line with DMP or it was located from them on 1-2 km. KhPPG of the first line were deployed mainly in tents, while the further arranged/located hospitals were deployed in rural type construction, utilizing also tents. KhPPG of first line were intensified by the general-surgical groups of ORMU and by doctors of the spare hospitals.

Entered wounded into skull they subjected to examination/inspection and urgently they evacuated into specialized KhPPG. In wounded with extensive destruction, and also in the cases of the violation of respiratory/breathing or cardiovascular activity was carried out the series/row of conservative measures. That certain wounded the skull, was hospitalized in KhPPG of the first line in view of their heavy condition, were produced surgical interventions.

The evacuation of those wounded the skull of KhPPG of the first

line was realized strictly according to designation/purpose. Basic part of the wounded was directed to army specialized KhPPG. Those wounded who due to their condition could transfer more lasting transportation, they guided directly into the approximate to army front line specialized evacuation hospital. The evacuation of those wounded the skull of particular difficulty did not present, since in KhPPG of the first line arrived not only the medical motor transport of army, but also vehicle of front line therapeutic installations. Furthermore, KhPPG of the first line had available their transport. All this it made it possible to ensure sufficiently well the evacuation of those wounded the skull from army area.

Specialized KhPPG was arranged/located in the center of the disposition of army. The entry of those wounded the skull into this KhPPG occurred always and ceased only by 8-10 July when field forces moved far forward.

In hospital worked two neuro-surgical groups of ORMU. After 12 days from the beginning of combat process/operation in connection with the decrease of a number of coming wounded and new tasks one of the groups was moved forward, nearer to army area, for caring wounded in the skull.

Specialized KhPPG was deployed in habitable houses, tents and sheds. In the course of combat process/operation neuro-surgical separation/section was increased. The entered receiving-sorting separation/section wounded passed through sanitation point and they were headed for dressing neuro-surgical separation/section. Next to medical dressing room was arranged/located the X-ray room and tent for wounded, who were being found in the condition of shock.

In medical dressing room they inspected all those wounded the skull. With the combined wounds of skull and orbit, sinuses of nose or ear in the examination/inspection of wounded participated the corresponding specialists.

Operating room was arranged/located in individual house at small distance from medical dressing room and had 3 tables, on which it was possible to simultaneously perform processing wounds. Before the operating room was expanded/scanned the ward for several cots where the outlined to process/operation wounded rested under the observation of medical personnel thus far it was not suitable in turn for the primary processing of the wound of skull and brain.

The wounded of general-surgical profile and wounded the ENT

organs were processed in their operating rooms.

Post-operation wounded the skull they guided into the hospital where they provided the necessary departure/attendance.

The entry of wounded was begun with the first day of combat process/operation and, progressively growing, it achieved its maximum to 6 - 7 - 8th day of combat. At this time the operating room worked 24-hour.

Among all wounded, who entered into this hospital those wounded in the skull composed 23.10/o. Within always of combat process/operation into the specialized hospital entered wounded the skull directly with PMP 12 7/o/o, with DMF - 43.80/o and of KhFPG of the first line - 43.50/c.

The group of wounded with the damage of the bones of skull composed 58.40/o (of them in two thirds had the penetrating wounds of skull and brain, also, in third - nonpenetrating wounds), while the group of those wounded the soft tissues of skull - 41.60/o.

The penetrating wounds of skull and brain were distributed according to the character/nature of wound as follows: blind-end wounds were 58.30/o, tangents - 38.00/o and through - 3.70/o (into

this number it enters 2.80/o of segmental and 0.90/o diametric wounds of skull). Among the nonpenetrating wounds of skull half was blind, and half - tangents. Among wounds into the soft tissues of the skull it is noted of 3/4 tangents and 1/4 blind ones.

Focused attention a small quantity of bullet wounds (9.20/o) in comparison with fragmentation ones (90.80/o). Among the latter predominated the wounds by the fragments of artillery ones by shell and min.

Characteristically were distributed the wounds of skull depending on that, was put on helmet at the moment of wound. From a number of those obtained the wounds of the soft tissues of skull the helmet was put on in 12.40/o, the nonpenetrating wounds of skull - in 10.80/o, and the penetrating wounds of skull and brain - only in 4.60/o. in spite of the absence of the data about that quantity of troops which the helmet generally protected from the wound of skull, nevertheless it is possible to trace that among those wounded the skull a greater quantity, being in helmet, was wounded only into soft tissues or were obtained the nonpenetrating damages of skull without the damage/defeat of brain.

It is significant, that in the group of the penetrating wounds of skull and brain it is not completely noted of heavy perforating wounds in the presence of helmet. Wounds were predominantly surface, tangents. In the group of wounded with the nonpenetrating wounds of skull, that were being located to helmet, all obtained tangential wounds and only one wounded - blind. Among those easily wounded the soft tissues of skull those put on helmet obtained mainly surface blind-end wounds (by fragments of helmet).

Thus, if we examine only wounded into the skull (without taking into account those soldiers which the helmet protected from wound), then one should conclude that the carrying of helmet decreases the severity of wound.

The periods of the entry of wounded into the specialized hospital are characterized in essence by the first two days from the moment of wound, which indicates their rapid carrying out from the field of combat and good organization of the evacuation of those wounded the skull. During the latter/last days of the work of this hospital the periods of the entry of those wounded the skull grew to 4-5 days from the moment of wound, that was caused by the advance of the troops/forces and foremost therapeutic installations up to considerable distance forward. Furthermore, part of those wounded in skull left in these foremost therapeutic installations for certain

period in view of need conducting the series/row of the therapeutic measures before their prolonged transportation.

As already mentioned, in hospital worked two neuro-surgical groups of ORMU. There were performed process/operation in 82.00/o all entered of those wounded into skull. In other words, virtually all wounded, who were requiring the processing, were operated. Exception was only the group of the extremely heavily wounded by which the process/operation was contrasted. In particular among those wounded the skull with the damage of the bones of process/operation it underwent by 70.50/o.

In the group of those wounded the soft tissues of skull the primary processing was performed into 98.60/c of cases. By so/such high the percentage of operability among slightly wounded is explained by the fact that the significant part of them, that obtained the wounds only on skin or not requiring the process/operation, was previously left on DMP or directed in GLR. In specialized KhPPG guided those those wounded into soft tissues the skulls which required in more detailed examination/inspection and primary processing of wound.

Among all process/operations with the wounds of skull about half comprised the trepanations, since a quantity of the entered wounded

into skull with damage bones was more than wounded ones the soft tissues.

Process/operations usually were performed under local anesthesia. In rare cases for an inhalation anesthesia was applied ethyl chloride in combination with ether/ester. With trepanations the skulls of hemorrhage from venous sinuses are noted into 3.40/o of cases. Hemostasis was realized usually with the aid of free plastic surgery of the small piece of muscle.

In 5.00/o of wounded the skull with damage bones are noted infectious complications from the side of brain and its shells. Meningitis was observed in 0.30/c, the meningencephalitis - in 2.80/o, encephalitis - in 1.40/c and the early abscesses of brain - in 0.50/o of these wounded. The treatment of meningitis and meningoencephalitis was carried out through ordinary schemes by sulfanilamides simultaneously with cerebrospinal puncture and introduction to the sub-arachnoidal space 0.8c/c solution/opening of streptocide. The abscesses of brain revealed and drained by the delicate strips of rubber. with the autopsy of abscesses in a number of cases from the area of abscess there were removed bone fragments, and in one wounded - metallic foreign body.

In specialized hospital for the time of combat operation it is

evacuated on GBF by 56.3c/o of wounded the skull with damage bones. The unit of operated in the beginning combat of wounded moved out the nontransportable condition and could be evacuated on GBF; however, their considerable quantity remained toward the end of the studied period even in hospital.

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Among those wounded the soft tissues it is evacuated from this hospital 79.4o/o. Their large part was directed in GLR in connection with the short periods, which were remaining to recovery. The unit of those wounded the soft tissues of skull was evacuated on GBF. Toward the end of the combat process/operation for further treatment in specialized KhPPG of them it remained 20.6o/o.

Thus, toward the end of the studied period this hospital evacuated 2/3 those wounded the skull, after leaving for further treatment only of nontransportable ones in view of the severity of their condition and the unit of those wounded the soft tissues of the skulls which after certain period of treatment were subject to the translation/conversion in GLR.

In the course of further combat and pursuits of enemy the medical aid by that wounded the skull was provided by the maneuver of

the neuro-surgical groups of ORMU which it was given into one of foremost KhPPG and they serviced the entered wounded.

In particular, during combat on line Bobr river and approach to Berezin the specialized aid by that wounded into skull realized KhPPG, which was being arranged/located near from the place of combat. In this KhPPG worked the neuro-surgical group of ORMU, which arrived from the first specialized hospital. Among all those entered into this hospital those wounded the skull composed 8.90/o, moreover almost 3/4 of them were easily wounded into the soft tissues of skull.

Conditions of deployment and the work of hospital during the first days were difficult, since the unit of the equipment of this KhPPG was located even in route/path. Were required also significant efforts/forces, in order to distribute the entered wounded on localization of wound and to ensure with their specialized aid. The chief surgeon of front, this visited hospital, noted the series/row of shortages in work and helped to amend them in short time.

The majority of those wounded the skull after dressing and examination/inspection was evacuated into the first specialized hospital. To surgical treatment it underwent only by 11.10/o of heavily wounded the skull with damage bones, nontransportable due to

their condition. Furthermore, surgical processing was produced in 8.50/o those wounded into the soft tissues of skull. The significant part of the easily wounded was also evacuated into the first specialized hospital of the army where they were operated.

Through several days of work to the place of deployment KhPPG arrived the front line specialized hospital, which accepted those remaining wounded into skull on the spot and made possible to this KhPPG and to neuro-surgical group of ORMU to be relocated forward.

Forcing Berezin, army continued its rapid offensive. During this period forward were advanced different KhPPG. Near Bobr river was organized the interarmy hospital base, which contained several hospitals of front, including the specialized evacuation hospital for those wounded the skull. The creation of this interarmy hospital base made it possible to considerably shorten the evacuation routes of wounded from army KhPPG.

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Two neuro-surgical groups of ORMU realized the specialized aid by that wounded into skull in foremost army KhPPG being moved by the method of "sand bars". Such "sand bars" during combat process/operation after assault crossing of Berezin were made three:

1) in KhPPG, which accepted to itself those wounded the skull upon elimination of one of the large/coarse ganglia/nodes of enemy opposition;

2) in KhPPG, which accepted to itself wounded in skull during offensive combat with approach to the niemem;

3) into KhPPG, which accepted to itself those wounded the skull with assault crossing of the niemem and during combat for bridgehead/beachhead on its western shore.

In the first of these KhPPG neuro-surgical group worked only 2 days, after having time to operate 29.40/o of wounded into skull with damage bones and 12.40/o of wounded in soft tissues of skull. A quantity entered of those wounded into skull was small. Surgical treatment underwent either very heavy of them, nontransportable due to their condition, or easily wounded the soft tissues with assumed period treatments not more than 2-3 weeks. Incoperable on the severity of condition it proved to be 6.00/o among most heavily wounded into skull with damage bones. All others were rapidly evacuated by medical motor transport to interarmy hospital base.

The secondly of these foremost KhPPG also entered a small number of those wounded into skull. The neuro-surgical group of ORMU primary processed third of wounded the skull with damage bones and several those wounded the soft tissues. Remaining wounded were evacuated for process/operation into the specialized front line evacuation hospital.

The third of these KhPPG worked more lasting time, servicing wounded with assault crossing of the niemen. Hospital deployed all its subunits, after being placed in houses, sheds and tents. A quantity of those wounded the skull was somewhat more than in two preceding/previous KhPPG. The significant part of the wounded it had the penetrating wounds of skull and brain. The neuro-surgical group of ORMU to the end of the studied period had time to process those only most heavily wounded into skull. Operability in the group of wounded with the damage of bones of skull composed 22.20/o. Furthermore the unit of the wounded was processed already after the termination of combat operations. A great number of those wounded the skull (mainly easily wounded the soft tissues) was also evacuated to the interarmy hospital base where they were operated.

Thus during this combat process/operation the medical aid by that wounded the skull proved to be at first on the basis specialized by KhPPG of that arranging/locating on initial position in the center

of army, then in one of icremcst KhPPG where was commissioned the neuro-surgical group of CRMU, and, finally after assault crossing Berezin and during combat on the niemen in advanced alternately forward three KhPPG.

The neuro-surgical groups of CRMU were moved during this period by "sand bars" and provided with the specialized aid of those wounded the skull during an entire combat process/operation. Their surgical activity was reduced in essence toward a sorting-evacuation work with the direction of the transportable wounded in the advanced forward interarmy hospital base, which had the specialized front line evacuation hospital and also to processing mainly of those most heavily wounded the skull and the brain.

In these hospitals they guided furthermore, that obtained the severe closed injury of skull unit of them in the presence of urgent readings was operated on the spct; patients, who were being found in transportable condition, were directed to the specialized hospitals of front line base.

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Aid by that contused was organized during initial position/situation of army in one of the hospitals, and then on

interarmy hospital base.

The total work of all KhPPG of army, including the here and specialized hospitals, is characterized during this combat process/operation by the following data:

1. Within entire studied period it entered wounded into skull from units and with FMP 51.30/o, with DME - 48.70/o. The great percentage of those wounded into skull, that entered directly from units and with PMP, is explained by the fact that the neuro-surgical groups of ORMU were given by KhPPG of the first line, and distribution points realized evacuation from FMP according to designation/purpose in by these placed specialized KhPPG.

2. In entered in all KhPPG those wounded into head wounds of skull composed 40.30/o, wounds of face and jaws - 22.40/o, wounds of eye - 10.30/o and wound of nose, its additional areas and ear - 27.00/o.

3. Those wounded skull were distributed to group with damage of bones (46.00/o) and group of those wounded soft tissues (54.00/o). More than in half wounded the skull with damage bones had the penetrating wounds of brain.

4. Among penetrating wounds of skull and brain blind-end wounds composed 58.00/o, tangents - 38/00/o and through - 4.00/o (into this number it enters 3.0c/c of segmental and 1.0c/c diametric wounds). Among nonpenetrating wounds with the damages of the bones of skull half composed blind-end wounds and half - the tangents. In the group of those wounded the soft tissues the percentage of blind-end wounds was equal altogether only by 30, while tangents there were 70.00/o.

5. Periods of entry of those wounded skull in KhPPG were following: during period up to 6 hours from moment of wound entered 3.9c/c, from 6 to 12 hours - 8.70/c, from 12 to 18 hours - 19.10/c, from 18 to 24 hours - 34.60/o; later than 24 hours entered only 33.70/o of wounded.

6. It is operated by 31.80/o all of those wounded skull, moreover from number of obtained damages bones of skull it is operated by 38.30/c, and from those wounded soft tissues - 26.20/c. Lethality among operated heavily those wounded the skull composed 11.50/o. In the group of those wounded the soft tissues of lethality among those operated it was not.

7. Recovery during period of combat operations is noted in 24.90/o those wounded soft tissues of skull. Furthermore 45.3c/o of them were located undergoing medical treatment in army KhPPG and GLR

in connection with short periods to full/total/complete recovery. It is evacuated from the army 29.6% of those wounded the soft tissues of skull.

8. Among wounded skull with damage bones percentage of those evacuated on GBF composed 48.1. This remaining wounded groups were left for further treatment in view of heavy condition or in connection with the short periods, which passed after intervention on skull and brain.

Envelopment by the specialized aid all of those wounded the skull composed in this combat process/operation 71.7%.

It is characteristic that 85.9% of wounded the skull had damage bones, were directed for treatment to specialized KhPPG, i.e., virtually all transportable wounded this groups were evacuated according to designation/purpose.

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The great value in this case acquired specially created in army distribution points which, in spite of rapid development the offensives of our troops/forces, ensured the direction of the wounded strictly according to designation/purpose from field therapeutic

installations into army KhPPG. One should note also that the specialized aid was organized in foremost KhPPG due to correct maneuver by the neuro-surgical groups ORMU, creation and advancement of forward interarmy hospital base.

From a number of those wounded into the soft tissues of skull it entered into specialized hospitals 62.40/o. Only about third of most lightly wounded traversed the hospitals of general-surgical profile/specialty or it was directly directed in GLR. However, in essence the wounded the soft tissues skulls in detail were inspected in specialized KhPPG, in fourth of cases they underwent processing and only after this they were headed in GLR or on GEF.

It should also be noted that by 97.20/o process/operation on skull were conducted by neurosurgeons and only 2.80/o - by general/common/total surgeons. In this case surgical interventions on skull were undertaken in KhPPG of general-surgical profile/specialty in essence only from vital readings, about which testifies comparatively high lethality in them among those operated (22.10/o). Lethality among operated in specialized KhPPG those wounded into skull with damage bones composed 9.70/o.

During this combat process/operation were noted the early periods of interventions on skull from the moment of wound. In

specialized KhPPG to 6 hours from the moment of wound it was produced by 1.80/o of all process/operations, from 6 to 12 hours - 7.30/o, from 12 to 18 hours - 14.30/o, from 18 to 24 hours - 31.30/o and it is more than days - 45.30/o of all process/operations.

Surgical interventions were conducted after the preliminary composite examination/inspection of wounded, shave of hair on head, local anesthesia and consisted in the carving of the wound of soft tissues, trepanation of bone to undamaged/uninjured solid cerebral shell, removal of contents of wound canal (bone fragments, blood clots, available foreign bodies, etc.), and also in the careful cessation of hemorrhage. Hemostasis during the damage of venous sinuses was realized in the adequate/approaching cases by stitching on the defect of the wall of sinus or with the aid of the small piece of the muscle of that applied to this defect. During the damage of small/fine cerebral vessels hemorrhage they stopped with the aid of warm physiological solution or peroxide of hydrogen.

Anechoic suture barely was applied. Wounds conducted under the bandages, moistened by the emulsion of streptocide or sulfidine. In rare cases wound they powdered by streptocide and conducted under dry aseptic bandage. Upon the extensive destruction of brain into wound canal they started the cut out from glove rubber strip which was driven out with the first dressing. During perfecting of segmental

wounds the skin "navigation bridge" between wounds they usually sewed.

After intervention on the substance of brain the wounded were found on a strict bed regime and were evacuated during the uncomplicated course not earlier than 2 1/2-3 weeks from the moment of process/operation.

Lethality among those wounded the skull was low and it depended mainly on the severity of injury. In particular, among dead persons from severe injuries of skull and brain about half it perished in time from 12 to 24 hours from the moment of wound, i.e., into the nearest hours after entry into the specialized hospitals. Among the infectious complications, which caused death of wounded, in the first place stood purulent leptomeningitis.

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The treatment of those wounded in the skull to the hospital basis of front had during present offensive operation also its peculiarities associated with operational-tactical circumstances.

GBF was as far as possible approximated to working parts. Into its composition entered the foremost receiving-sorting base basic

hospital to base and finally the rear therapeutic basis of front.

Railroad main pipelines little were utilized for the evacuation of wounded on GBF, since enemy destroyed many sectors of the routes/paths: therefore the basic forms/species of transport for those wounded into skull proved to be medical motor vehicles and ambulance aircraft.

The therapeutic installations of front after the reception/procedure of wounded with the penetration of the defense of enemy soon began to be moved forward, behind the advancing/attacking units. In particular, the receiving-sorting basis of front was relocated into two nearby ones city, freed by our units, then into the freed large/coarse city and finally it became part of the structure of interarmy hospital base. The latter began to function during the advance of our troops/forces to the niemen. During that combat process/operation occurred the practice of the approach of front line therapeutic installations to army KhPPG and reception/procedure from them on the spot of wounded. Thus, as a result of "covering" by front line hospitals of army KhPPG the latter received the possibility to advance further forward, and wounded were transmitted on the spot from army base to front line. After receiving-sorting base advanced also the basic hospital basis of front, "covering" foremost therapeutic installations.

On main motor road was arranged/located one additional distribution point, which regulated the evacuation of those wounded the skull from the foremost army specialized hospitals in designation/purpose into the appropriate hospitals of front.

Those wounded into skull, that require in primary processing, entered the receiving-sorting basis of front to 2 - 3rd day after wound, and to basic hospital base - to 3 - 8th day from the moment of injury.

1. In composition of interarmy hospital base was specialized evacuation hospital of front which took on the spot of remaining wounded from army KhPPG. In front line evacuation hospital worked neuro-surgical group of one of the evacuation points and there was separation/section for those wounded into skull. X-ray apparatus in this evacuation hospital for a while did not work due to the absence of electric power, but therefore the unit of those wounded into skull was processed without roentgenological examination/inspection.

Among entered those wounded into skull 45.20/o composed wounded with the damage of bones and 54.80/o - wounded the soft tissues skulls. Furthermore, entered several men with closed injury of skull.

The periods of the entry of wounded in proportion to the distance of front line gradually grew/rose, after achieving toward the end of the combat process/operation of 12-15 days from the moment of wound.

The operational activity of this specialized evacuation hospital in essence was characterized by production in the primary processing in wounded the skull with damage bones. As a result within the studied period it was operated by 28.30/c of such wounded. The unit of those wounded the skull was operated, furthermore, apropos of early infectious complications.

2. Those wounded for skull were headed both from specialized evacuation hospital, and from nearest army KhPPG in those arranged/located deeper than three specialized hospitals of another evacuation point.

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Evacuation according to designation/purpose was facilitated by the dispatcher work of distribution points, advanced on all routes. In specialized hospitals of evacuation point worked the neuro-surgical groups of ORMU. The first of them worked in one evacuation hospital, another was divided and attached for reinforcing to two evacuation hospitals.

Those wounded into skull, that entered these front line specialized evacuation hospitals, were distributed to group with the damage of bones (53.10/c) and to the group of those wounded the soft tissues of skull (46.9c/c).

A considerable number of entered wounded was already processed. Surgical interventions in these hospitals were undertaken in 8.40/c all of those entered, moreover wounded into skull with damage bones it was operated by 15.00/o, and wounded soft tissues -2.20/o. The unit of these process/operations was produced apropos of early complications or it bore the character/nature of reworkings. Lethality among those operated composed 9.7c/c.

It recovered within the period of the combat process/operation 15.10/o of those wounded into the soft tissues of skull.

For further treatment in the specialized hospitals remained the wounded the skull with period treatments not more than 60 days to recovery or wounded with infectious complications from the side of brain or its shells.

It is evacuated to the rear therapeutic basis of front 70.00/o

all of those wounded the skull, mainly with the damage of bones. Evacuation from evacuation point was realized by railroad - on army medical and passenger trains. In route/path was conducted medical observation of wounded, and they all were provided with hot food.

A considerable number of those wounded the skull was evacuated into the rear by aircraft transport for which at airfields were created special evacuation points.

3. Rear therapeutic basis of front had neuro-surgical separation/section in one of hospitals where constantly worked doctor- specialist. Besides those wounded the skull which composed in this hospital 30.00/o into hospital they entered also wounded the person and the jaws of eye ENT organs, neck, spine, and also into large/coarse joints and thigh.

Focuses attention the high severity entered of those wounded into the skull: with the damage of bones arrived 90.20/o and of those wounded in soft tissues - 9.80/o. This confirms the correctness of direction those of more heavily wounded in rear hospital base and abandonments easily wounded the skull, the subjects to treatment within shorter periods, in the therapeutic installations of army area or on the approximate to it advanced bases of front.

This specialized evacuation hospital carried out in essence clinical work. Toward the end of the combat process/operation wounded the skull with complications continued treatment in this hospital, together with convalescents by easily wounded, and all others, requiring the prolonged treatment or which lost temporarily ability to work, they were evacuated into the rear.

Thus, in spite of the complicated character/nature of the combat operations of the troops/forces, which were begun with the penetration of the defense of the enemy, rapid advance with combat forward and forcing of large/coarse river lines and ending by combat on the niemen with the capture of bridgehead/beachhead on his western shore, the medical aid by that wounded the skull was provided in all periods of field process/operation because of skillful maneuver with the army and front line specialized therapeutic agencies.

Should be especially noted the positive role of distribution points which ensured the direction of those wounded the skull strictly according to designation/purpose.

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Rendering to the medical aid by that wounded the skull during combat process/operation "Vistula-Oder".

The beginning of 1945 was marked by the new victories of the Soviet Armed Forces in their struggle with the Fascist-German troops/forces.

Supreme Commander-in-Chief I. V. Stalin in his order on 23 February, 1945, gave the following characteristics to these combat operations: "during January of the present year the Red Army attacked the enemy unprecedented in force impact at entire front from Baltic to Carpathians. It forced open for elongation/extent 1200 kilometers Germans' powerful/thick defense, which they created over a number of years. In the course of offensive the Red Army by rapid and skillful activities threw back the enemy far to west. The Soviet troops/forces with persistent combat moved from the boundaries of eastern prussia to the lower course of the vistula - to 270 kilometers, from bridgehead/beachhead on the vistula south of Warsaw to lower coursing of river Oder - to 570 kilometers from Sandmir bridgehead/beachhead f the depth of German Silesia - to 480 kilometers". "As a result the Red Army completely freed Poland and significant part of the territory of Czechoslovakia, occupied Budapest and derived from the wars of the latter/last ally of Germany into Europe-Hungary, it mastered greater part of eastern prussia and German Silesia and was opened to itself road into Brandenburg, into Pomerania, to the routes of approach of

Berlin" 1.

FOOTNOTE 1. Order of the supreme Commander-in-Chief on 23 February, 1945, No 5, Moscow. ENDFOOTNOTE.

The proper subject of the medical aid by that wounded into skull was the grandiose offensive operation, realized by the Soviet troops/forces during January 1945 from bridgehead/beachhead on the Vistula south of Warsaw to river Oder, which notes comrade Stalin in his order.

One of the armies, which was being located on main direction, on 14 January broke through from southern bridgehead/beachhead on the western shore of the Vistula the lasting and deeply distributed in depth defense of enemy. To the issue of day the advance units of this army moved out to operational scope and began rapid advance forward. The unit of the divisions of army followed in the second echelon, and one of them widened the gap to the north.

Blocking the ganglia/nodes of resistance and eliminating Varga's attempts to pass into counteroffensive, army freed from enemy the territory and Poland cities, surrounded large/coarse hostile garrison in one of the great cities and to the issue on 28 January it moved out to a Polish-German boundary where the enemy it showed/rendered

bitter resistance, relying on the previously prepared positions and natural barriers/obstacles in the form of the system of lakes and rivers. On 30 January the defense of enemy was broken through, and after the rout of the hostile garrisons in two cities on 4 February army moved out to river Oder.

Within 22 days of combat (from 14 January through 4 February) the combat route/path of army was 470-600 km. during the individual days of unit they advanced on 30-40 km.

Was by this time eliminated the fortified area of enemy in one of the German cities, and also was begun assault crossing river Oder and combat for bridgehead/beachhead on its western shore. To 10 February the bridgehead/beachhead was expanded, and army, after being fastened on the western shore of Oder, began to be prepared for strikes/shocks on enemy.

The provision with the medical aid of wounded in this combat process/operation presented considerable difficulties, especially as this type of process/operation on its scales and growing rates/tempo was carried out by the medical workers of this army for the first time.

Before the offensive of division they were completely manned by medical cadres. There was, furthermore, reserve number of aidmen and hygiene instructors in each company.

First aid by wounded on the field of battle within entire period of combat process/operation was shown/rendered by aidmen and hygiene instructors into 65.80/o of cases, feldshers and doctors - into 8.50/o of cases. The percentage of self- and mutual assistance composed 25.7. These data characterize further progress in the medical service of wounded on the field of battle.

To the predominant number of wounded (96.30/o) first aid was shown/rendered to 1 hour (it is thinner/less frequent to 2 hours) from the moment of wound and only 3.70/o of wounded - more than 2 hours. Research and carrying out of wounded occurred in flat terrain with small forests under conditions of winter with thaws and small precipitation.

The methods of the carrying out of wounded from the field of combat to BMP were the following: on stretchers it is carried out by 23.50/o of wounded, on panchos - 9.40/o, on drag harrows - 1.00/o, on canine harnesses - 8.60/o, on horses - 14.40/o, on motor transport -

0.30/o. Furthermore, with the aid of those escorting/tracking it reached BMP 42.80/o of wounded.

In the period of the penetration of the defense of enemy the carrying out wounded from the field of combat on bridgehead/beachhead on the western shore of the Vistula was realized by all possible methods within very short periods. The transport of the medical companies of regiments was intensified due to army horse- medical company. Furthermore, each medical company had 3-4 canine harnesses (Fig. 19). PMP were closely moved to front/leading territory and intensified by the composition of convoluted DMP, which allowed them in short periods and in the necessary volume to render medical aid to wounded.

In the period of the rapid advance of army the medical service of regiments followed uninterruptedly from their of units. Wounded they rapidly delivered from the field of combat to PMP, or the latter, advancing forward, were approached the places of the cover of wounded and they exerted them the necessary aid.

Completely particular conditions on rendering of first aid by wounded and their carrying out from the firing lines were formed during the bitter street fightings upon the elimination of large/coarse hostile garrison in Polish city Poznan. The fact is

that after enclosing of this city basic parts of the army continued their rapid advance forward, while one of her corps jointly with adjacent army obtained mission to break down resistance of enemy garrison. In urban suburbs and in city itself were deployed persistent street fightings on short distances. For our units it was repeatedly necessary to force river Varta, which flowed/occurred/lasted through the city, to block and to encircle the garrisons of numerous forts, and also frequently to perform by individual assault teams. The most furious fighting were deployed during mastery of ancient fortress (Citadels), fastened/strengthened by enemy and equipped with contemporary military technology. Combat conducted by day and by night. The carrying out of wounded from combat zones was conducted in certain cases only with onset of dark, since enemy shot through streets, areas and approaches to individual houses. The periods of the carrying out of wounded were sometimes late due to the difficulty of the delivery/procurement of these wounded on FMP. There were the cases when in one house the unit of the floors was still occupied with enemy, while others they were already recaptured by our soldiers. This phase of combat was characterized by the great severity of wounds. Among all those wounded the skull the group with the damage of bones and brain was about 75.0c/c.

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Fig. 19. Export of those wounded skull from field of combat on canine harnesses. From the picture of the military medical museum VM of the USSR. (Artist N. G. Popcv).

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Focused also attention the vastness of the destruction of skull and brain as a result of shots from close distance. Enemy conducted continuous mortar fire/light, were applied garnets, explosive bullets and Faust-patron. For the provision of wounded with modern medical aid were created the special medical groups, which escorted/tracked our assault detachments. PMP were arranged/located in immediate proximity of area of combat, which gave its positive results.

In final phase of combat on leaving of army to Oder, assault crossing of river and during nowls for bridgeheads/beachheads on its western shore the delivery/proctrement of wounded on PMP was connected with the series/row of difficulties, since German-facist command element ordered to blow up dam on Oder. As a result this area of combat and dispositicn BMP it was flooded by water and oppressed by the fragments of ice. During this period the unit of wounded in skull underwent supplementary injury by ice floes and to chilling in water. Were urgently accepted measures for the export of wounded to the eastern shore of river by motor boats, boats, rafts, etc. With

the crossing of wounded through Oder the enemy conducted aviation bombings and shellings. Exploded ice flows impeded the movement of rafts. In connection with this the unit of those wounded the skull was delivered to the eastern shore 12-24 hours after wound.

During an entire combat process/operation the periods of the delivery/procurement of wounded on PMP were the following: entered to 1 hour from the moment of wound 33.70/o of wounded, from 1 to 2 hours - 28.70/o, from 2 to 4 hours - 18.30/o, from 4 to 6 hours - 11.00/o, from 6 to 12 hours - 6.50/o, it is more than 12 hours - 1.40/c of wounded.

It should be noted that a basic number of wounded entered from BMP and only 3.60/o of them were delivered directly from the field of combat. The delivery/procurement of wounded on PMP was realized on stretchers (0.70/o), on cape-tents (1.00/o), on drag harrows (0.10/o), on canine harnesses (2.90/o), on horses (63.50/o) and on medical motor transport (3.10/o). Thus, the horse form/species of transport was basic. Furthermore, independently with those escorting/tracking it arrived on PMP 28.70/c of wounded.

Among delivered wounded by 32.30/o they were found in heavy condition, 38.00/o - in the condition of average/mean severity and 29.70/o - in satisfactory condition.

According to the form/species of the wounding shell the wounds were distributed to bullet ones (41.30/o) and fragmentation ones (58.70/o). Of a number of latter 7.40/o comprised the wounds by the fragments of grenades, mainly during combat upon the elimination of enemy garrison in Pozhari.

On PMP of those wounded the skull they inspected and bandaged. Heavy to wounded were introduced the substances, stimulating cardiovascular and respiratory/breathing activity, and also hypertonic solutions of glucose or sodium chloride with the sharply pronounced hypertension phenomena. With preventive target those wounded the skull received sulfanilamides.

The evacuation of those wounded the skull on DMP was realized most frequently via motor transport. During the combat process/operation sometimes had the place the "covering" of PMP by advancing DMP.

Deployment and work DMP during that combat operation had the series/row of special features/peculiarities.

In the beginning of combat process/operation during penetration

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the defenses of enemy DMF were convoluted, reinforcing by its personnel PMP. Wounded they guided from EMP and units directly in KhPPG of the first line.

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In period the pursuits of enemy during individual days DMP had to advance on 30-40 km in order not to be detached away from its divisions. As a result of this within the time of combat operation the majority DMP relieved its location on 20-22 times, passing to 600 km.

Those DMP, which followed the divisions of the second echelon of army, advanced more slowly, receiving wounded during the final cleaning of the territory of Poland from enemy and upon his elimination of those surrounded by us the ganglia/nodes of resistance. Therefore DMF most frequently worked several days at one place, then they evacuated or transmitted wounded on the spot for arrived KhPPG, and they themselves in full strength were moved forward.

Other working conditions were on DMF whose divisions rapidly advanced forward, pursuing enemy, encircling and blocking the ganglia/nodes of his defense. At this time DMF they were divided into 2-3 groups in order to treat and to service the operated and

nontransportable wounded and at the same time to advance forward, without blowing away from the troops/forces, being deployed at new place for processing the entered wounded.

In such cases by day was frequently conducted processing wounded, and by night occurred redislocation DMP forward, to the previously outlined points/pcsts.

Quarters/premises, in which were deployed DMP, were most diverse.

During the advance forward of DMP is left the group of medical workers headed by doctor for service of the nontransportable wounded. The specially isolated operations groups of the medical department of army arrived to the locations of these groups and accepted from them wounded. After this the workers of DMP followed to their therapeutic installations and again they were included in their work.

For provision the delivery/procurement of wounded on DMP all routes/paths of entrance were thoroughly designated by pointers and furthermore, on crossroads were put out duty aidmen with the bandages of Red Cross. New location of DMP each time was quickly communicated on PMP, furthermore, DMP followed strictly on the march routes of divisions. All these measures ensured the rapid delivery/procurement

of wounded on DMP. In a number of cases practiced the abandonment of the groups of wounded in the populated areas under the observation of the isolated workers of PMP prior to the arrival there of DMF. During combat with forcing Oder and on its western shore of wounded they delivered to motor boats and rafts to some advanced to coast of DMP.

For entire combat process/operation on DMF entered the wounded within the following periods from the moment of the wound: to 1 hour - 1.7c/o of wounded, from 1 to 2 hours - 5.40/c, from 2 to 4 hours - 28.70/o, from 4 to 6 hours - 25.00/o, from 6 to 12 hours - 32.60/o, it is more than 12 hours - only 6.60/o of wounded. As can be seen from these data, the majority of those wounded into skull entered in time from 4 to 8 hours from the moment of wound.

If we consider all those wounded into skull on army, then on DMP of them entered 81.00/c, since at the very beginning of combat DMP they were convoluted. A great number of those wounded into skull entered on DMP during street fightings upon the elimination of hostile garrison in Poznan. These entered wounded into skull had heaviest damages.

Those wounded the skull were distributed over all DMP to the group with the damage of bones, which composed 40o/o, and the group of those wounded the soft tissues of skull, that composed 60.00/o.

On DMP surgical intervention with the wounds of skull with the damage of bones was conducted only from vital readings.

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As a result in the group of those heavily wounded the skull it was operated altogether only by 0.50/c of wounded. This operability should be considered insufficient, since on autopsy in some killed unoperated wounded were discovered great intracranial hematomas.

Wounded the soft tissues of skull it was operated on DMP 8.00/c. With this DMP, which followed the divisions of the second echelon of army, operated more than DMP, rapidly advancing forward. In particular, one of DMP operated 33.50/c those wounded the soft tissues of skull. Of fatalities among them it was not.

Within entire period of combat process/operation on DMP recovered 13.20/c wounded the soft tissues of skull. By those recovered on DMP, without direction for examination/inspection into specialized KhPPG, acknowledged only those wounded in which was not the signs/criteria of jolt or concussion of brain, or the obtained surface wounds only of skin of head. The unit of the wounded after

the healing of wound for a while remained on DMP for aid to personnel on the care of those heavily wounded into skull. On all DMP healing of those easily wounded the skull is approximately/exemplarily identical percentage, with exception of one, that kept after recovery a considerable number of those wounded the soft tissues, from which recovered 36.00/o.

Almost all wounded the skull traversed the medical dressing room, where by it was produced shave of hair and dress/lavatory of the periphery of wound, sometimes were removed the visible metallic or bone fragments, and is also produced the lubrication of skin on the periphery of wound by the solution of iodine and the dusting of wound by the powder of streptocide. The application of aseptic dressing with a wadded-gauze cylinder usually was conducted by the extensive penetrating wounds of brain.

On DMP widely was applied the intravenous introduction of hypertonic solutions with purpose of dehydration. Antishock measures it was required to take only into 1.30/c among those entered with the isolated/insulated wounds of skull.

It is evacuated in KnPPG by 82.80/o of wounded the skull with damage bones. In latter/last phase of combat entered on DMP heavily wounded the skull still remained on the spot in view of their

incapacity to be transported. In army therapeutic installations it was evacuated by 76.6% of those wounded the soft tissues, 8.2% of them toward the end of the studied period still continued treatment on DMP.

The evacuation of wounded in KhPPG was realized by motor transport during permanent medical observation of them in route.

The treatment of those wounded the skull in surgical field mobile hospitals during this combat process/operation must be examined on individual periods taking into account tactical operation circumstances.

With the penetration of the defense of enemy from bridgehead/beachhead on western shore. The villages specialized KhPPG were arranged/located on bridgehead/beachhead and in army area. In army area was advanced also the front line specialized hospital. Furthermore, was one additional army specialized by KhPPG, which was being found in the concluded condition and ready to move forward. During this period of combat process/operation therapeutic installations were arranged/located more frequently in mud huts and tents.

In bridgehead/beachhead specialized KhPPG and evacuation point

they were arranged/located not far from each other.

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The available neuro-surgical group of ORMU worked mainly at evacuation point and guided for hospitalization into this KhFFG of altogether only several those wounded into skull, that were being located in nontransportable condition. Thus, basic work of the neuro-surgical group of ORMU on lodgement area was the classification of those wounded the skull.

Among all wounded, who passed through the evacuation point, wounded the skull there were 13.00/c. However, among them the easily wounded the soft tissues skulls were only 26.80/c, basic group (73.20/o) constituted wounded the skull with the damage of bones.

Thus, already in the first stages was realized evacuation according to designation/purpose. In particular, to the evacuation points where worked the neuro-surgical group of ORMU, was directed is a considerable number of those wounded the skull, predominantly with heavy damages. In the medical dressing room of the evacuation point of those wounded the skull they inspected, by it was conducted dress/lavatory of wound and, by the appropriate readings, was carried out medicinal/medicamentous therapy.

At evacuation point and in specialized KhPPG, besides several those wounded the skull, as a result of their heavy condition, was left also a small number of easily wounded, obtained very surface wounds integuments of head. The latter into 2.50/o of cases with respect to all that wounded the soft tissues of skull, passes through the evacuation point, recovered after 5-6 days. The unit of the heavily wounded was operated.

The majority of those wounded the skull was evacuated from bridgehead/beachhead into the approximate specialized evacuation hospital of front. Evacuation was carried out through the vistula on ice mainly by motor transport and it is considerably less frequent - on horse- medical vehicles.

In proportion to the advance of our troops/forces forward into the freed/released cities arrived and were deployed in them different KhPPG. Two neuro-surgical groups of ORMU were moved by "sand bars". Such "sand bars" there were several.

1. During liberation of the first of cities was there advanced army specialized KhPPG for those wounded into head, that was being located on initial position of army in convluted condition. In

hospital worked the neuro-surgical, ocular and maxillofacial group of reinforcing. KhPPG deployed in this city sorting separation/section, medical dressing room, operating room and wards for wounded. There was also an X-ray room.

Wounded the skull was diverted special separation/section (Fig. 18). The planned work of hospital was somewhat violated by aviation bombardment of city by enemy. Those wounded into skull came usually on the 1-2nd day from the moment of wound.

The rapidity of the advance of our troops/forces and the rout of enemy's main forces on his initial defensive lines caused the fact that a quantity of wounded generally and wounded the skull was in particular during this period of combat process/operation small.

Among those wounded into skull, that entered into specialized KhPPG, the group of those easily wounded the soft tissues composed 40.30/o, and the group of wounded with the damage of the bones of skull - 59.70/o. In 37.70/o of latter had the penetrating damages of skull and brain, also, in 22.00/o - nonpenetrating wounds with the damage of the bones of skull.

It is operated in this KhPPG by 69.20/o of those wounded the skull with the damage of bones, moreover from a number of wounded

with the penetrating damages of brain it was operated by 66.70/o, and from a number of wounded with nonpenetrating damages - 71.40/o.

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The wounded the soft tissues skulls were operated into 15.40/o of cases. For further treatment left only heavy or post-operation wounded. To the termination of the operating cycle of this hospital it was evacuated by 70.00/o all entered of these wounded into skull.

2. During liberation of following city was there advanced group of hospitals, also, in number their specialized hospital for those wounded skull, breast and stomach. This KhPEG was situated in the good building which made it possible to deploy all subunits of hospital. For those wounded the skull were isolated small wards.

A quantity entered into this hospital of those wounded the skull was also small; among them heavily wounded with damage bones there was somewhat less than easily wounded the soft tissues.

In this hospital surgical interventions were produced in 77.30/o of wounded with the damage of the bones of skull. It should be noted that the primary processing is produced in all wounded with the penetrating wounds of brain and more than in half wounded with the

nonpenetrating wounds of skull. From those wounded the soft tissues of skull it was operated by 35.40/c. Soon in this city arrived the specialized hospital of the front to which were transmitted on the spot all wounded into skull.

3. After transmission of wounded army specialized hospital was moved into following freed city where it was situated in quarters/premises of hospital, victim from military activities. In 24 hrs for the workers of hospital it was possible to lead building into the proper form/species, to fix heating and to deploy all necessary subunits, including operating room and X-ray room.



Fig. 18. Separation/section for those wounded the skull in specialized KhPPG (from the collection of Military medical museum VM of the USSR).

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A quantity entered of those wounded into skull was small. Wounded with the damage of bones composed 40.90/o all of those wounded the skull; inoperable in this group it proved to be 11.20/o.

To operational intervention it underwent by 88.80/o of wounded with the damage of bones and 15.70/o wounded the soft tissues of

skull. Should be noted use/application in a number of cases of anechoic suture after processing of the wounds of skull and brain.

All wounded the skull were transmitted to that arrived on 1 February in this city to front line SEG.

4. In following freed city arrived KhPEG from army hospital base, which was being arranged/located in the beginning of combat process/operation in convoluted condition on eastern shore of Vistula.

Hospital was deployed in quarters/premises of hospital, school and theater. In this hospital proved to be the medical aid by that wounded in combat for mastery of enemy's large/coarse fortress. Focused attention the very heavy condition entered of those wounded into skull. The primary processing of the wounds of skull and brain was produced in 88.0% of all wounded into skull with damage bones. In other words, all wounded the skull by which the primary processing was not contrasted on the severity of condition, were operated in this hospital. Lethality among those operated composed 8.90%. Among those wounded the soft tissues it was operated by 50.00%; lethality among those operated in this group it was not noted.

5. During combat in territory of Germany on leaving of army to

Oder medical aid by that wounded skull is exerted KhPPG, which arrived from eastern shore of Vistula.

Hospital was deployed in small city in buildings of hospital, archive and other quarters/premises.

A quantity entered of those wounded into skull was small. Among them 46.40/o composed wounded with the damage of bones and 53.60/o - those wounded the soft tissues.

Neuro-surgical group within 4 days of work performed the primary processing of wounds in 51.80/o of wounded the skull with damage bones and in 48.20/o those wounded the soft tissues of skull. On the average, thus, was operated half all entered those wounded into skull.

6. On arrival into another German city, which is located not far off from Oder, neuro-surgical group was attached one of KhPPG, where already entered those wounded into skull. This hospital was expanded in two buildings of sanatorium.

In it it entered wounded the skull more than into preceding/previous KhPPG. Among them those wounded the skull with the damage of bones composed 39.90/c, and those wounded the soft tissues

- 60.10/o.

Neuro-surgical separation/section had medical dressing room and operating room, but is not produced the roentgenological examination/inspection of wounded, since X-ray apparatus arrived only through several days.

The periods of the entry of those wounded the skull with assault crossing of Oder and in combat for bridgehead/beachhead on its western shore are characterized in this hospital by the following data: during the period up to 24 hrs from the moment of wound entered 48.50/o of wounded, from 1 to 2 days - 24.7c/c, from 2 to 3 days - 8.60/o, in time more than 3 days arrived 18.2c/o of wounded. If one considers that the neuro-surgical group of CRMU arrived in the hospital through several days after its deployment, then it will become understandably, why only in 18.30/o of wounded surgical interventions with the wounds of skull were produced during the periods up to 3 days from the moment of wound.

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Within always of the work of hospital to surgical interventions it underwent by 70.7c/c wounded the skull with damage of bones and 54.80/o wounded the soft tissues of skull. The primary processing of

the wounds of skull and brain was into 3/4 cases produced under local anesthesia and into 1/4 cases under narcosis.

By that wounded the skull with the damage of bones in the postoperative period into 45.00/o of cases is produced the blood transfusion. The late periods of processing, and also the cases of early purulent leptomeningitis caused the need of conducting energetic sulfanilamide therapy in post-operation period. Lethality among the operated wounded the skull with damage bones composed 11.60/o.

From this hospital of those wounded the skull they did not evacuate, and toward the end of the combat process/operation they remained on the spot.

The total performance characteristic of all hospitals of army during this combat process/operation briefly can be represented the following data: in KhPPG it entered with DMP 62.5c/o of those wounded the skull and it is direct from units - 37.50/o. So considerable a number of wounded, directed in hospital, passing DMP, is explained, as already mentioned, by the fact that the latter at the very beginning of combat process/operation were concluded, and wounded they entered directly into evacuation hospitals and KhPPG.

Among all those entered into hospitals the bullet wounds of skull are noted in 25.9c/o, fragmentation - in 72.7o/o; in 1.4o/o of wounded the form/species of the wounding shell was not established/installed. In the group of the fragmentation wounds of skull predominated the wounds by the fragments of mines (36.3o/o) and artillery shells (23.5c/c). At the same time, is noted a comparatively high percentage of wounds by the fragments of aircraft bombs (6.5) and hand grenades (6.3). A great number of wounds of skull by bullets and fragments of the hand grenades was encountered during street fightings in Poznan with the taking of enemy's powerful/thick fortress.

Entered in KhPPG wounded the skull were distributed over obtained damage bones (46.3o/c) and wounded the soft tissues of skull (53.7o/o). It is characteristic that in the group of wounded the skull with damage bones the bullet wounds were encountered almost 2 times more frequently than among those wounded the soft tissues.

Speaking about the treatment of those wounded the skull, one should, first of all, note that the indicators of the operational activity of all KhPPG of army require certain explanation. This is explained by the fact that at the very beginning of combat process/operation in army KhPPG produced surgical interventions with wounds the skulls only in the single cases and only from vital

readings. At this time the sufficiently great percentage all of those wounded the skull for combat process/operation was evacuated for processing into the approximate front line specialized evacuation hospital. Operability of those wounded the skull in army KhPPG did not exceed during this period 3.00/o. During the rapid advance of our troops/forces and in combat on Cder operational intervention in different specialized KhPPG are produced by that almost all requiring the processing by that wounded the skull with the damage of bones. Operability at this time oscillated from 69.2 to 88.80/c.

Therefore average/mean operability of wounded the skull with damage bones in specialized KhPPG for entire combat process/operation composes altogether only 32.90/c. Lethality among those operated was equal to 7.20/o.

The wounded the soft tissues skulls were operated into 33.00/c of cases, in this case 2/5 processing was produced by neurosurgeons.

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It should be noted that in GIB, where was processed the majority of those wounded soft tissue of skull, were used extensively secondary sutures. Lethality among those wounded the soft tissues of skull is noted into 0.30/o. This they were, as show the protocols of

autopsies, the cases of the severe closed injury of brain with the simultaneous wound of soft tissues skulls.

By the specialized aid during this combat process/operation it is encompassed by 69.3c/c all of those wounded the skull. In the group of wounded the skull with damage bones the specialized aid was shown/rendered 81.0c/o of wounded, and among those easily wounded the soft tissues - 53.1c/o.

These data should be estimated as the considerable achievement of the medical service of army. It is necessary in this case to consider those difficulties which were caused by the diverse character/nature of the combat operations of our troops/forces, and the complexity of the redislocation of hospitals in the cases of interruptions in the supply with fuel. A considerable number of wounded the skull with damage bones was evacuated or transmitted on the spot for the front line specialized hospitals. From a total number of those wounded the soft tissues of skull evacuated on GBF of altogether only 30.2c/c. Remaining wounded the skull were left for further treatment in the therapeutic installations of army rear.

Lethality among all those wounded into skull proved to be low and approximately/exemplarily identical both in the specialized hospitals and in KhPPG of general-surgical profile/specialty. Usually

lethality in the hospitals of general-surgical profile/specialty is relatively higher, since these KhPPG leave in themselves that only heaviest, nontransportable wounded the skull. During the dismantled combat process/operation in connection with the approximation/approach of the specialized aid to the troops/forces the unit of those obtained the extremely heavy wounds of skull entered also into foremost specialized KhPPG.

In the group of dead persons the severity of injury served as the reason for death in 79.10% of cases, and infectious complications from the side of brain and its shells - into 20.90%. Among complications was encountered mainly purulent leptomeningitis, it is twice less frequent as - the meningoencephalitis and still is twice less frequent as - the early abscess of brain.

The treatment of those wounded the skull on the hospital basis of front was realized in the therapeutic installations of evacuation points.

In the beginning of combat process/operation those wounded into skull entered the specialized hospitals of the first evacuation point. With the rapid advance of army were forward sent the specialized hospitals of the second evacuation point, and then one additional evacuation point.

1. With penetration of defense of enemy from bridgehead/beachhead on western shore of Vistula evacuation point situated one specialized evacuation hospital in immediate proximity of bridgehead/beachhead, but other hospitals - somewhat deeper in army and front line area.

From the bridgehead/beachhead of those wounded the skull they evacuated through the Vistula on ice. On both shores of the Vistula in crossings were organized receiving-heating points/posts. On bridgehead/beachhead this point/post was organized by the forces of convoluted KhPPG, on eastern shore - by forces of front line SEG.

The advanced by forward front specialized hospital worked at this place of 27 days. In essence those wounded into skull entered the first 4-5 days of combat process/operation.

Those wounded into skull entered not finished, but with produced dress/lavatory of wounds.

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When entry began somewhat to be decreased, from bridgehead/beachhead

began to arrive those wounded the later periods, but with the split or cut all over wounds of soft tissues.

All wounded were passed through the medical dressing room, where they inspected neurosurgeon and neuropathologist; in the necessary cases was conducted X-ray examination.

Taking into account the possibility of the considerable entry of wounded, the first time in this hospital they operated those only most heavily wounded the skull. During the first week of work it was explained that a quantity wounded entering the skull began gradually to be decreased. With the decrease of the entry of wounded increased surgical activity. Within always of work in this hospital it was operated by 11.20/o all of those wounded the skull; in the group of wounded the skull with damage bones it was operated by 16.00/c and in the group of those wounded the soft tissues of skull - 9.60/o.

It is evacuated into deeper arranged/located specialized hospitals of front 77.1c/o all of those wounded the skull.

In all hospitals of this evacuation point it was operated by 28.40/o of wounded the skull with damage bones.

Besides the primary processing of wounds, the unit of

interventions was produced apropos of complications or it bore the character/nature of reworkings. Lethality among those operated composed 11.20/o.

The evacuation of those wounded the skull of the advanced forward specialized evacuation hospital into deeper arranged/located hospitals was realized mainly by motor transport and less frequent by aircraft transport. Evacuation to the rear hospital basis of front was conducted both by railroad and on ambulance aircraft.

2. In period of advance of our troops/forces into second freed city on 3rd day of combat process/operation arrived group of hospitals of another evacuation point among which there was specialized hospital for those wounded into skull. The work of this hospital flowed/occurred/lasted without a special effort, since a quantity of the wounded, accepted from army by KhEPG and entered subsequently, was small.

In this hospital it was operated by 65.1c/o of wounded with the penetrating damages of skull and brain. Lethality among those operated composed 2.30/c.

3. In phase of combat in Pcznan taking of enemy's fastened/strengthened fortress in those freed our troops/forces of

cities, arranged/located not far off from place of combat, advanced therapeutic installations one additional evacuation point, which on the spot accepted wounded from army of KhPPG and was formed hospital basis of front.

Furthermore, evacuation point situated the unit of its hospitals in immediate proximity of Poznan which fulfilled in essence the receiving-sorting functions. Those wounded for skull were headed from this receiving-sorting base by railroad by auto- and aircraft transport for the basic therapeutic basis of front.

SEG of evacuation point had railroad evacuee reception center and air reception. Into the specialized hospital entered the wounded not only with the taking of a city-fortress, but also during combat on leaving of army to Oder. Those wounded the skull with the damage of bones composed 32.0o/c all entered, and slightly wounded into soft tissues skulls - 68.0o/c.

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Their significant part was processed in army of KhPPG; therefore the percentage of surgical interventions among all entered those wounded into skull composed 4.6, and only in the group of wounded the skull with damage bones - 14.3. Surgical interventions frequently bore the

character/nature of reworking of wounds.

In this hospital recovered 2.50/o wounded the soft tissues of skull and, furthermore, it was transferred in GLR by 69.40/o of convalescents easily wounded the skull.

Wounded the skull with the damage of bones were almost all evacuated to the rear basis of front.

After supplying result said, it should be noted that during the grandiose offensive operation, which was deployed between rivers by the Vistula and Oder, in spite of the great complexity of combat and medical-tactical circumstances, for the medical service of army it was possible to organize the highly skilled aid by that wounded the skull because of skillful maneuver by the specialized agencies of army and approximation/approach of front line hospitals.

Rendering to the medical aid by that wounded the skull during "Berlin process/operation".

The troops/forces of Soviet Army applied in the spring of 1945 latter/last decisive strike/shock on the Fascist-German aggressors and forced enemy to capitulate.

Comrade Stalin in the order on 1 May 1945 wrote:

"They left into the past and will not return more the heavy times, when the Red Army was repelled from the hostile troops/forces in the environs of Moscow and Leningrad, in the environs of Grcznyy and Stalingrad. Now our victorious troops/forces rout the armed forces of the enemy in the center of Germany, far beyond Berlin, on river Elba.

In short period are freed Poland, Hungary, large part of Czechoslovakia, significant part of Austria, capital Austria- Vienna.

The Red Army mastered in this case eastern Prussia - locus/nest of German imperialism, Pomerania, greater by the unit of Brandenburg and by the main areas of the capital of Germany-Berlin, after erecting above Berlin the banner of victory" ... "The bright victories, gained by the Soviet troops/forces in the Great Patriotic War, they showed the Herculean power of the Red Army and her high military skill. Our native land in the course of war obtained first-class regular army, capable of being located the great socialist conquests of our people and of ensuring the state interests of the Soviet Union" ... "The world war, unleashed by German imperialists, approaches toward the end. Downfall of Hitler Germany - affair of the nearest future. Hitler bosses, who was conceited

themselves by the lords of peace/world, proved to be in the broken trough" <sup>1</sup>.

FOOTNOTE <sup>1</sup>. Order of the supreme commander-in-chief on 1 May, 1945, No 20, Moscow. ENDFOOTNOTE.

The combat operations of the army in question, which was included in the Soviet troops/forces, which carried out mission in the rout of enemy in the environs of Berlin and output/yield to ~~the~~ envelop period from 16 April through 5 May 1945.

This army, having begun offensive from bridgehead/beachhead on the western shore of Oder, in most cruel combat overcame the first line of the defense of enemy, and also the subsequent numerous defensive line. which by the continuous system of strengthenings stretched to Berlin itself. Berlin was actually also enemy's giant fortress.

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In defense system the enemy used extensively the constructed previously engineering zones and ganglia/nodes of resistance, after situating them in numerous cities, populated areas, suburbs, in area

of forests/scaffolding, swamps/marshes, lakes and canals, it tightened for defense the great number of the troops/forces, having urgently moved them from Western Front, and to limits it aerated defensive areas weapons.

By the special features/peculiarities of the dismantled combat process/operation, besides that noted above, was furious fighting at close distance and maneuver units along front.

This army of the beginning on 16 April the penetration of the deeply distributed in depth powerful/thick defense of the enemy from bridgehead/beachhead on the western shore of Oder and, conducting furious fighting, slowly advanced, gradually increasing strike/shock.

After moving with combat to the southern suburbs of Berlin, army obtained order to guide strike/shock on southwest in order to finish enclosing the grouping of the enemy southeast of Berlin. After persistent combat this task was successfully carried out in period from 23 to 29 April. The subsequent 6 days of process/operation are characterized by the rapid advance of army to the West. On 5 May 1945 army jointly with other Soviet troops/forces it moved out by wide front to Elba, having victoriously routed the Fascist-German aggressors.

Aid to wounded on battlefield proved to be within early periods - to 1 hour from the moment of wound in 91.0c/o of wounded and from 1 to 3 hours in 9.0o/o.

In 42.5o/o of cases aid by wounded rendered the aidmen, into 25.8o/o - medical instructors, into 6.7o/o - feldshers and into 1.9o/o - the doctors; into 23.1c/o of cases occurred self- and mutual assistance.

These data tell about further approximation/approach and acceleration of the medical aid by wounded on the field of battle. All medical workers, who rendered aid, were completely provided with antishock fluid/liquid which they gave to wounded directly on the field of battle.

The carrying out of wounded from the field of combat was realized into 27.8o/c of cases on stretchers, into 3.9o/o - on cape-tents, into 6.4c/c - on hands, into 11.2c/o - on canine harnesses and into 8.9c/o of cases - on the horses; independently and with the aid of those escorting/tracking it moved out from the field of combat 41.8o/o of wounded.

The delivery/procurement of wounded on BNF in the individual periods of combat process/operation was conjugated/combined with need

cross the zones of intense fire, especially with the penetration of the defense of enemy. In the middle of the combat process/operation when enemy's main forces were routed, wounded they evacuated from the field of combat and delivered to BMP on horse- medical vehicles.

The threats of freezing among those wounded the skull during this combat process/operation it was not, since the temperature of air oscillated from +7° to +12°. However, in spring time with small sediments it was required to accept the number of the necessary measures for warning/prevention of catarrhal diseases. Wounded, transportable on horse- medical vehicles, thoroughly they concealed and warmed.

On BMP were delivered to 58.10/o of wounded for the first hour from the moment of wound, 30.90/c - in time from 1 to 2 hours and 11.00/o - in time more than 2 hours.

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After examination/inspection the bandages on head, its bandaging if necessary and introduction heavy to the wounded of the substances, which stimulate cardiovascular and respiratory/breathing activity, wounded into skull rapidly evacuated on PMP. The ambulance transport of regiments was intensified by the substances of army horse-medical

company and by the detachment of sledge dogs. The evacuation of wounded occurred on flat terrain with the dense net/system of lakes and small forests. Locality is crossed by the dense net/system of country and highways. The significant part of the roads is asphalted. With penetration the defenses of the enemy of road were damaged by artillery shells, mines and aircraft bombs. In the course of further advance of the army depthward of Germany the condition of roads proved to be satisfactory.

On initial position the unit of PMP was arranged/located on bridgehead/beachhead in mud huts and dugouts, in immediate proximity of front/leading territory. Another unit of PMP was placed in habitable houses of one of the cities. On measure the advances of the army forward of PMP frequently were deployed in the well maintained and equipped buildings.

For entire combat process/operation on PMP entered 26.9c/o heavily wounded into skull. 29.8c/o - in the condition of average/mean severity and 43.3o/c - in satisfactory condition.

The absolute majority of easily wounded entered to 1 hour from the moment of wound.

From a number of heavily wounded were delivered on PMP 35.2o/o

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during the period up to 1 hour from the moment of wound, 31.40/o - from 1 to 2 hours, 19.80/o - from 2 to 4 hours, 8.40/o - from 4 to 6 hours and 5.20/o - in time, of somewhat exceeding 6 hours from the moment wounds. The unit of the easily wounded (10.20/c) entered on PMP directly from the field of combat, passing BMP.



Fig. 20. Intravenous introduction wounded to the skull of the hypertonic solution of glucose on EMP (from the collection of Military medical museum VM of the USSR).

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Those wounded the skull they delivered to PMP by the different methods: on stretchers it was delivered to 1.00/c of wounded, on cape-tents - 1.50/o, on hands - 0.10/c, on canine harnesses - 1.10/o, on horses - 55.90/o and on motor vehicles - 5.40/o; on foot with the aid of those escorting/tracking or it was independently on PMP 35.00/o of slightly wounded.

For more rapid rendering to the qualified aid wounded PMP they were intensified by special brigades with DMP. In connection with this on PMP, besides the examination/inspection of bandages and bandaging, was conducted dressing of wounds and their dress/lavatory. It is heavy to those wounded the skull, besides the substances, which improve cardiovascular and respiratory/breathing activity, intravenously introduced hypertonic solutions glucoses or sodium chloride and in the presence of readings transfused the blood or they introduced antishock solutions (Fig. 20). All PMP had wards for wounded, who were being found in the condition of shock. One should add that during this combat process/operation, just as in preceding/previous, wounded the skull with the damage of bones, beginning with PMP, were received with preventive target sulfanilamides. Particular attention turned also to the documentation of the condition of wounded, which made it possible subsequently to judge about the dynamics of the violations, caused by the wound of skull and brain.

Among passed through PMP those wounded the skull bullet wounds are noted in 28.00% of wounded; into this number enter 0.60% of heaviest wounds by Faust-patron. Fragmentation wounds were observed in 72.00% of wounded, the wounds by the fragments of the hand grenades composing 4.00%.

The evacuation of wounded on DMP and in KhPPG of the first line was realized due to transport means of divisions, into 74.00/o of cases - on motor transport and into 24.00/o - on medical vehicles (mainly easily wounded); only 2.00/o of wounded were evacuated on reverse empty car. The nontransportable wounded were left on PMP in view of the dangers, connected with transportation, also in connection with the fact that advancing DMP rapidly arrived to the place of deployment of PMP.

Division medical aid stations in the initial position of army were arranged/located on the eastern shore of Oder.

The evacuation of wounded from bridgehead/beachhead was realized through Oder on special crossings and on boats and was conducted under the artillery fire of enemy.

During the first two days of combat after penetration the defenses of enemy of DMP were found in the convulsed condition, and wounded they guided with PMP directly in KhPPG of the first line which were approximated to the eastern shore of river and they were accommodated in rural type construction and mud huts. Then DMP rapidly were relocated to the bridgehead/beachhead where were by this time annihilated several defensive lines of enemy, and they accepted with PMP the nontransportable wounded. During the advance of our

troops/forces of delay DMP from units it was not observed. DMP were shared in the routes/paths usually into two echelons, one of which serviced nontransportable wounded to the approach of following not far off KhPPG of the first line, and another, composing basic part DMP, accepted wounded from units it exerted them the qualified medical aid.

In the beginning of combat, taking into account entire complexity of the crossing of wounded through Oder, the medical department of army sent, as already mentioned, special surgical brigades of DMP to bridghead/beachhead for reinforcing PMP.

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These brigades, besides classification and taking of urgent therapeutic measures for struggle with shock, blood loss and phenomena of the increased intracranial pressure, performed also urgent process/operations from vital readings.

In further course of combat process/operation the volume of surgical measures on DMP increased.

Within entire period of Berlin process/operation on DMP of this army entered 79.00/o of all wounded, and the others were directed

directly in KhPPG of the first line.

The periods of the delivery/procurement of wounded on DMP were following: to 1 hour from the moment of wound arrived 7.1c/o of wounded, from 1 to 2 hours - 9.1c/o, from 2 to 4 hours - 26.0c/o, from 4 to 6 hours - 24.0c/o, from 6 to 12 hours - 20.8c/o, from 12 to 18 hours - 9.0c/o and it is later than 18 hours - 4.0c/o of wounded. Thus, two thirds all wounded entered on DMP to 6 hours from the moment of wound, which indicates further progress in the affair of the timely of the export of wounded with foremost stages.

Those wounded the skull were distributed over DMP to two groups: wounded with the damage of bones (35.7c/o) and wounded the soft tissues of skull (64.3c/o). The heaviest wounds of skull are noted with the penetration of the first lines of the defense of enemy. The distribution of those wounded the skull according to the form/species of the wounding shell detects the same laws as on PMP. Is focused attention, that among entered in DMP those wounded into skull the obtained multiple wounds of the skull and other organs/controls composed 34.2c/o.

That all wounded the skull were produced on DMP the dressings of wounds and shave of hair in the periphery of wounds. Was widely carried out also dehydration also of sulfanil therapy. Shock with the

isolated/insulated wounds of skull is revealed in 1.60/o of wounded. When the multiple wounds of extremities and body are present, they underwent primary processing.

With the wounds of skull surgical interventions on cerebral substance were produced on DMP of altogether only in 0.30/o of wounded, besides it is exclusive from vital readings. It should be noted that in these all cases were discovered and removed extensive hematomas. Lethality among the operated in group wounded the skull with damage bones composed 3.60/c.

On all DMP there were operated 14.5c/o wounded the soft tissues of skull. On individual DMP the percentage of operability of this group of wounded achieved 34.2-44.0. On these specialized KhPPG and GLR, the primary processing of the wounds of the soft tissues of skull, produced on DMP, is acknowledged full-valued.

Of lethalties among operated those wounded the soft tissues of skull it was not observed.

From a number of those wounded the soft tissues of skull it recovered on DMP 15.90/c, it is evacuated into army area 78.10/o and it is left for further treatment 6.00/o, in connection with the expected within the next few days recovery.

Of all that wounded the skull with the damage of the bones of those locating on DMP, 85.80/o were evacuated strictly through designation/purpose into the specialized KhFFG armies. In this case the wounds of skull and brain were protected from traumatization in route/path by wadded-gauze "boubliks". Remaining wounded, in view of their heavy condition were left on DMP. Lethality among them was still lower than in the preceding combat process/operation, which, it is doubtless, was the consequence of energetic therapeutic measures not only on DMP, but also on PMF.

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Evacuation into specialized KhPPG was conducted along good roads by permanent medical observation of wounded in route/path.

Army during Berlin process/operation had three specialized hospitals for those wounded the skull.

The first of them was located near from Cder among KhPPG of the first line and was rendered specialized aid by that wounded the skull, delivered from bridgehead/beachhead.

With the second it was located in 14 km from the first and was fulfilled the function of specialized KhFPG in army area.

The third army evacuation hospital was arranged/located in the rear GBA and had special separation/section for neuro-surgical wounded.

With the penetration of the defense of the enemy of the majority of those wounded into skull, that entered from bridgehead/beachhead, it was directed along by the instructions of arranged/located on crossing on the eastern shore of Gder distribution point strictly according to designation/purpose to first specialized KhPPG.

In this hospital worked the neurosurgical, maxillofacial and ocular groups of ORMU. Was arranged/located this KhFPG in scaffolding/forest, in tents and barracks. Neuro-surgical separation/section had a sufficient quantity of cots, a great surgical dressing, operating and X-ray apparatus. Led by work experienced neurosurgeon.

Those wounded the skull composed 37.80/c with respect to all arrived in hospital wounded. The large part of those wounded into skull entered during the first 6 days of combat process/operation, moreover at first the unit of the wounded entered from PMP, and then

they all entered with DME.

When neuro-surgical separation/section proved to be loaded, the medical department of army gave instruction to hospitalize in this KhPPG only obtained the very heavy wounds of skull, and all transportable after the corresponding examination/inspection and conservative measures to urgently evacuate for processing into the second and third specialized hospitals.

From this period in first KhPPG remained for further treatment of approximately 1/6 all entered those wounded into skull, since further transportation could impair their condition.

Taking into account the considerable loading of neuro-surgical separation section, to the latter to help on the care of those wounded the skull it was additionally attached two doctors (one of them neurosurgeon), nurses and aidmen, who had experiment/experience for care of neuro-surgical wounded.

Among the entered wounded the easily wounded the soft tissues skulls composed 32.20/o, and those wounded the skull with the damage of bones - 67.80/o. Into a number of latter enter the obtained penetrating wounds of skull and brain (47.00/o) and the obtained nonpenetrating wounds with the damage of the bones of skull

(20.80/o). Focused attention considerable number (22.00/o) of the combined and multiple wounds of skull, orbit, of sinuses of nose, ear, persons and jaws.

It is necessary to note that during this combat process/operation the liberation/excretion of the specialized hospital into area of disposition of DMP and KhPPG of the first line had beneficial effect on the decrease of a number of ethanes of evacuations through which passed those wounded the skull, and it also shortened the periods, which passed from the moment of wound to entry of wounded into specialized KhPPG.

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In particular, among all those wounded the skull, in passing by one stage, it arrived directly with PMP 18.70/o, in passing by two therapeutic installations (PMP and DMP) - 80.60/o and in passing by three therapeutic installations (PMP, DMP and adjacent KhPPG of the first line) - altogether only 1.30/o of wounded. In this case the latter were related to those those obtained the multiple wounds of the skull and other organs/organs relatively which to distribution point it was difficult to solve without detailed examination/inspection, which of these multiple wounds was most heavy.

The periods of the entry or wounded into this specialized KhPPG were sharply abbreviated/reduced. To 24 hrs from the moment of wound entered 64.70/o of wounded (with this 28.00/o of wounded it arrived for the 2-3-4th hour after wound, of them in half had the penetrating wounds of skull and brain), in time from 1 to 2 days arrived 30.60/o and later than 2 days - 4.70/o of those wounded in skull.

Surgical interventions on skull in connection with the early periods of entry could be produced after certain rest of wounded, in essence to the 1-2nd day after wound.

Among obtained the wounds of skull with the damage of bones the primary processing was produced in 86.50/o of wounded, i.e., virtually in all wounded, which surgical intervention was not contraindicated.

All easily wounded the soft tissues skulls traversed the medical dressing room, they were inspected by specialists and they were directed in GLR. The primary processing of the wounds of the soft tissues of skull was conducted in this stressed operating cycle only by the extensive wound of integuments or the exposure of bone in 18.20/o all easily of those wounded the skull.

Within entire operating cycle of this specialized hospital in the initial position of army after the necessary period of hospitalization it was evacuated by 88.3c/o of those wounded into the skull; of them more than 3/4 were directed to the specialized hospitals of army, and about 1/4 - on GBF.

The second specialized KhPPG of army accepted those wounded the head and the extremities.

In hospital also worked the neuro-surgical, ocular, maxillofacial and X-ray groups of GRMU. Furthermore, was the otolaryngologist.

In this hospital from all arrived 22.1c/c comprised those wounded the skull. The majority of those wounded into skull entered after filling of first specialized KhPPG, of them more than half arrived with dress/lavatory of wounds, but without working of the marrow unit of the wound canal.

Those wounded the skull with the damage of bones composed 52.1o/o, while those wounded the soft tissues - 47.9o/o. Focuses attention the relative increase of the specific gravity/weight of

those easily wounded into skull, that entered into this hospital, in comparison with the group of those wounded the soft tissues in the first hospital (comprised in it less than third). This characterizes the correctness of the principles, accepted with the classification of wounded in first specialized KhFPG, which evacuated without processing those of more easily wounded the skull.

Among all entered those wounded into skull to surgical intervention it was subjected to 55.20/o; from a number of those wounded in skull with the damage of the bones of process/operation they were produced in 66.90/o of wounded, while among those wounded into soft tissues - in 40.30/o. After process/operation widely it was carried out dehydration and sulfanil amide therapy.

In a number of cases after processing of the wound of skull and brain successfully was used anechoic suture. Among those easily wounded the soft tissues of skull the process/operation more than into 1/4 cases was completed by anechoic suture.

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Lethality among those operated proved to be below than in foremost specialized KhFPG, where entered the obtained heavier wounds. Among the operated wounded the skull with damage bones died

3.90/o. Of lethalties in the group of those wounded into soft tissues it was not noted.

During entire work of this hospital the evacuation of those wounded into skull occurred from second specialized KhPPG only according to designation/purpose in two directions - into army evacuation hospital and into the approximate front line evacuation hospital.

The army specialized evacuation hospital accepted those mainly already processed wounded the skull from those arranged/located ahead specialized KhPPG, and also unit and unfinished wounded during the redislocation of the neuro-surgical groups of CRMU from these hospitals.

The army specialized evacuation hospital was expanded in place, well fitted out for reception/procedure and treatment of wounded. In the neuro-surgical separation/section of this hospital constantly it worked doctor specialist and, furthermore, to it it was attached the neuro-surgical group of front line CRMU.

Among all entered wounded the obtained wounds skulls composed 15.50/o. These wounded into 52.80/o of cases had the light damages of soft tissues, also, into 47.20/o - heavier wounds with the damage of

the bones of skull.

Surgical interventions were produced only in 10.50/o all arrived of those wounded in skull. In a number of cases were produced reworkings, and also were laid secondary sutures. Lethality among those operated proved to be negligible.

The army specialized evacuation hospital evacuated wounded also in two to directions: with short periods to recovery - into army GLR, and with the more lasting periods of treatment - on GBF.

Thus, in the period of the penetration of the defensive lines of enemy the evacuation of those wounded the skull from lodgement area was realized into specialized KhPPG, located in army area. When this KhPPG proved loaded, then in it they began to accept those only heavily wounded, and all transportable wounded the skull they guided for processing into second specialized KhPPG. From there the unit of the wounded, after the necessary period of post-operation hospitalization, was directed to the specialized army evacuation hospital or in approximate front line SEG. From the army specialized evacuation hospital they evacuated beyond the limits of the army of those only those wounded into skull, which required in prolonged treatment. Consequently, the evacuation of those wounded the skull according to designation/purpose was strictly sustained.

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Those wounded the soft tissues skulls guided in GLR in essence after preliminary examination/inspection in the specialized hospitals. All over army it is noted altogether only of 4 cases of direction in GLR of wounded the skull with damage bones.

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In proportion to the advance of army forward, on the 9th day of combat process/operation, into one of the populated areas in enemy's territory was advanced the group of hospitals from the reserve of the medical department of army. Among these therapeutic installations was isolated the specialized hospital for those wounded in head, breast and stomach. Simultaneously in this KhPPG arrived the neuro-surgical, ocular, maxillofacial and otolaryngological groups of ORMU from second specialized KhPPG of army. Post-operation wounded the skull were left in this hospital under the observation of a doctor-neurosurgeon and other medical personnel, familiar with care of those wounded the skull.

In arrival the specialized hospital was deployed in the former soldier barracks - standard wooden houses. For those wounded the skull was isolated individual quarters/premises.

Among all wounded, who entered into this hospital, wounded the skull composed 22.60/o. Among those wounded the skull half composed those easily wounded the soft tissues and half - those wounded the

skull with the damage of bones.

Surgical interventions were produced in 46.70/o all of those wounded into the skull; the percentage of operability wounded with the damage of the bones of skull composed 70.1, and wounded the soft tissues - 25.9. Lethal outcomes the operated easily wounded did not have, but among the operated wounded the skull with damage bones they composed 3.90/o.

The large part of those wounded the skull was left on the spot for further treatment, and only 31.80/o were evacuated by motor transport on GBA.

During combat operations on the elimination of the surrounded grouping of the enemy in the city, arranged/located not far off from the South outskirts of Berlin, was directed the second group of hospitals. Among them there was KnPPG for those wounded the head, the breast and the stomach.

In this specialized hospital arrived the neuro-surgical group of ORMU from the foremost hospital, which was being arranged/located in Oder, after leaving post-operation wounded the skull under observation of neurosurgeon and trained personnel.

The group of those wounded the skull composed 28.00/o of all entered wounded. Easily wounded the soft tissues of skull there were 61.80/o, and wounded the skull with damage bones - 38.20/o.

Operational activity in this hospital was expressed in the primary processing of wounds in 54.60/o all of those wounded the skull. It is operated from a number of wounded the skull with damage bones 51.00/o, and among those wounded the soft tissues - 56.60/o.

The unit of the wounded for processing was evacuated to the approximate foremost hospital basis of front.

After the elimination of the surrounded grouping of enemy and with further rapid advance to the West a quantity of those wounded the skull was very small, since army no longer met organized resistance of enemy.

For entire the period of combat process/operation, from the moment of the penetration of the defense of enemy to the emergence of army by wide front to Elba, total work of all KhPPG is characterized by the following data:

1. A quantity of those wounded the skull, entered into all KhPPG armies, in absolute expression was more than in the

preceding/previous combat process/operation.

2. Wounded with damage of bones of skull composed 52.0o/c, and easily wounded soft tissues - 48.0o/o. Among the wounded the skull with damage bones of more than half obtained the penetrating wounds the skulls and brain. Thus, the wounds of skull during Berlin process/operation were also very heavy.

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3. Focused attention on arbitrary distribution of wounds of skull according to localization, characteristic for offensive combat: wounds of frontal area were noted into 31.1c/c of cases, sincipital - into 23.7o/o, temporal - into 23.0o/o, postcranial - in 9.2o/c, two and more than areas - into 13.0c/o cases.

4. To surgical intervention it underwent by 64.8o/o of those wounded skull with damage of bones, moreover almost all process/operations were produced by specialist-neurosurgeons. In the group of wounded with the penetrating damages of skull and brain it was operated by 84.3o/c. During processing the wounds of the brain of the damage of the venous sinuses of solid cerebral shell are noted in 7.1o/o of wounded, damage to average/mean tunicary artery or its large/coarse branches - in 5.5o/o and the wounds of cerebral

ventricles - in 2.30/o. lethality among those operated composed 6.00/o.

5. Those wounded soft tissues were operated into 31.10/o cases. Of lethalties among them it was not.

6. Within period of combat process/operation recovered 18.60/c of those wounded soft tissues, mainly among those directed in GLR, and 68.10/o remained in army area in connection with short periods of treatment to recovery; it is evacuated on GBF by 13.30/o wounded.

7. From number of wounded skull with damage bones 43.90/c were evacuated on GVF hospital trains, auto- or air transport. The others were hospitalized for further treatment on the spot in connection with short periods after process/operation or as a result of heavy condition.

8. Envelopment by specialized aid of wounded skull with damage bones achieved in this combat process/operation 99.00/o. From a number of those wounded the soft tissues of skull it was treated in specialized hospitals 70.00/o.

So high an envelopment of those wounded into skull by the specialized aid finds its explanation in that that in army it worked

three neuro-surgical groups of ORMU, and also there were several hospitals where constantly worked neurosurgeons and trained personnel. Great role during combat process/operation played distribution points, which realized an evacuation of those wounded into skull strictly according to designation/purpose.

The treatment of those wounded the skull in front line area occurred to four hospital bases. There was an advanced base of front, main sorting-evacuation base, therapeutic base and rear basis of front.

1. Foremost (head) base had three specialized hospitals for those wounded skull. Hospitals were equipped by the appropriate armament; in each of them worked the neurosurgeons. Into these hospitals entered the obtained heaviest wounds into skull. Head base left in itself and it treated nontransportable those wounded the skull, and also easily wounded the soft tissues.

From this army those wounded into skull entered into one of that specialized of evacuation hospital basis of front. This hospital was advanced forward to the territory of army and it was deployed in the quarters/premises, fitted out for the needs of therapeutic installation.

The evacuation of wounded from the army hospitals occurred on military medical trains, by aircraft transport, and on good main pipelines - also by motor transport. Those wounded the skull they transported mainly on aircraft.

Those wounded the skull composed 42.50/o all entered into this the hospital of wounded. Focuses attention the thoroughness of the classification of wounded in the army before their direction on GBF. Those wounded the skull with the damage of bones composed 85.00/o, while those wounded the soft tissues - 15.00/c. Among those entered in 15.00/o are noted the multiple wounds only of skull.

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The majorities of wounded was produced processing, with exception of the delivered on aircraft tonics with DMP and partially from hospitals. The periods of the entry of the unfinished wounded, in the significant part of evacuated by air, composed 5-6 hours from the moment of wound. The minority unfinished of those wounded the skull was delivered by motor transport to 2-3- and day after wound. Surgical interventions on skull it was required to produce only in 16.40/o of wounded the skull with damage bones and in 3.30/o those wounded soft tissue of skull.

Those wounded the skull with the damage of bones were evacuated to the following basis of front into 79.50/o of cases and leave fixed into 20.50/o.

From a number of those easily wounded the soft tissues it recovered within studied period 38.10/o and it was left for further treatment 61.90/o. Of the evacuations of them further into front line area from this hospital it was not carried out, lethality among them it was not noted.

From other specialized hospitals of the head basis of front in connection with need to advance were forward evacuated not only wounded the skull with the damage of bones, but also the unit of those wounded the soft tissues of skull.

2. It is sorting - evacuation basis of front contained two specialized hospitals for those wounded skull.

In quantitative sense here it entered within the studied period considerably less those wounded into skull than to head base.

Those wounded the skull with the damage of bones composed 69.00/o (among other things 42.00/o with the penetrating wounds). It is characteristic that in a number of penetrating wounds of skull and

brain are lighter the tangents, wounds are noted only in 8.40/o of wounded, while heavier blind, the wounds of brain were in 83.90/o and through - in 7.70/o.

93.00/o of those wounded in skull, that arrived to a sorting-evacuation basis of front, were processed in foremost therapeutic installaticns; therefore basic measure in the specialized hospitals was conservative therapy and attendance. Surgical interventions were produced in 8.50/o of those wounded into skull with damage to the bones; this were mainly reworkings, sequestrotomies, and also process/operations apropos of the abscesses of brain.

In the group of those wounded the soft tissues of skull it was operated by 14.60/o, mainly with purpose of imposition on the wound of secondary sutures.

Complications from the side of brain and its shells are noted with the penetrating wounds into 13.80/o cases. Among them the early abscesses of the brain constituted 2.90/o, purulent meningitides - 2.30/o, the meningoccephalites - 2.60/o and the "malignant" protrusions of brain - 6.00/o.

Within the period of combat process/operation in the specialized

hospitals occurred the following movement of wounded: from a number of wounded the skull with damage bones recovered 0.30/o, it is evacuated to the therapeutic basis of front 51.10/o, there remained on cot 46.50/o and died 2.10/o. Among those wounded the soft tissues recovered 1.40/o, evacuated by 43.10/o it remained for further treatment in connection with short periods to recovery 55.50/o.

3. So-called therapeutic basis of front had one sufficiently large/coarse specialized hospital for those wounded head.

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Among entered those wounded into skull those wounded the soft tissues composed third, and with the damage of bones - two thirds.

To surgical interventions it underwent by 12.60/o of all wounded. Process/operations in wounded the skull with damage bones (produced in 13.00/o) here also mainly the character/nature of reworkings, sequestrotomies, decompressive trepanations (with the jamming of the pedicle of protrusion), and also autopsies of abscesses of brain. Lettality in the group of those operated composed 1.30/o. The wounded the soft tissues skulls were operated into 12.30/o of cases with purpose of the imposition of secondary sutures or plastic occlusion defects after the carving of those ulcerating

Rubtsov soft tissues. Several wounded were operated apropos of osteomyelitis, which developed after the extensive scalped wounds of the soft tissues of skull. Of fatalities among those operated it was not.

The large part all of those wounded into skull remained in this hospital for further treatment. Among those wounded the soft tissues of skull it recovered toward the end of this period 10.40/o.

4. Rear basis of front had several specialized hospitals for those wounded head.

However, taking into account that in essence those wounded into skull entered to the rear base after the beginning of combat process/operation, the performance characteristic of these specialized hospitals be brought will not be, since the Great Patriotic War was by this time victorious completed.

Thus, based on the example of this army is sufficiently vividly revealed/detected further creative development of the ordered system of the specialized treatment of those wounded the skull in the form of that placed as the basis of the work of the principle of evacuation of these wounded strictly according to designation/purpose, maximum envelopment by the specialized aid

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wounded the skull with the damage of bones and greater unit easily of those wounded in soft tissues, and also conducting of rational treatment in all therapeutic installations of army and front on the foundation of the uniform Soviet military medical doctrine of the Soviet Armed Forces.

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chapter VI.

MEDICAL AID BY THAT WOUNDED THE SKULL IN THE STAGES OF EVACUATION.

A. Treatment of those wounded the skull and the brain in the stages of evacuation.

Medical aid by that wounded the skull in army area.

SHORT CLINICAL CHARACTERISTICS OF THE WOUNDS OF SKULL AND BRAIN IN AN ARMY AREA.

Delivered from the field of combat to PMF and DMP those wounded the skull are varied and complicated group, of different severity of condition and to clinical characteristics.

Together with the easily wounded in whom there were only surface damages of soft tissues of skull without any signs/criteria of jolt or contusion of brain, on BME, FMP and DMP entered the wounded with heavy damages, up to the extensive destruction of skull and brain, frequently incompatible with life.

The clinical picture of the wounds of skull and brain in the course of first hour and twenty-four hours from the moment of wound is extremely variable. The experiment/experience of the Great Patriotic War convinces that of the initial period of wounds can occur the considerable oscillations/vibrations in the clinical symptomatology of the condition of those wounded the skull.

This diversity, complexity and rapid mutability/variability of the clinical picture of initial period are explained to a considerable extent by the condition of the soldiers before wound, and also by different mechanisms, which appear with the wound of skull. It is there be no doubt that the general condition of organism, its nervous system, which depends on the character/nature of combat operations (defense, offensive), the durations of combat period, conditions for existence of organism, etc., determine the sometimes clinical course of the initial period of wound to not smaller degree, than very character/nature of the wound of skull.

Upon consideration of the character/nature of the wound of skull and brain one should remember about direction and force of the wounding shells, their value and form, and also about the mechanism of activity.

The wounding shells, after depositing different character/nature the direct destruction of the integuments of skull, bones and substances of brain, can also produce at the moment of injury a sharp the intracranial pressure increase and serve as the reason for the developing soon heavy disorders roof and fluid circulation, that lead to hemorrhages, edema, bloating of brain, etc.

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Appearing in different time, in one or the other sequence and being different according to the degree of manifestation, these moments caused that "randomness" in clinical characteristics of the wounds of skull, which served as the object/subject of a deep and thorough study in the period of the Great Patriotic War and to which first it paid attention to N. N. Burdenko.

The presence of the associated and multiple wounds of other organs/controls and systems which just as frequently were observed in the last war, even more made heavier the condition of those obtained the wounds of skull and brain.

Medical aid in army area, as is known, it proves to be in range

of fire of enemy. During some studied combat process/operations of PMP frequently they were arranged/located in immediate proximity of front/leading territory, and DMP - at a distance of several kilometers from PMP. The time of the entry of wounded on PMP and DMP in the overwhelming majority oscillated from 2-4 to 6 hours. The complicated conditions for the work of the army therapeutic installations where, together with the character/nature of combat operations, conditions of locality, season and need for advance following by the troops/forces, are absent also the possibilities of the detailed clinical examination/inspection of those wounded the skull (there is no neurosurgeons, neuropathologists, X-ray apparatuses, possibility of prolonged hospitalization, etc.), is set itself before the workers of army therapeutic installations the series/row of the crucial tasks in classification and necessary treatment of those wounded in skull whose decision/solution had to be rapid and precise, since on this depended further fate of wounded.

For those wounded into skull, that entered into army therapeutic installations in initial period, were characteristic the disorders of the activity of brain as a result of the direct activity of the wounding shell and those destruction which it produced. The presence of the associated wounds frequently caused the development of shock.

In army therapeutic installations the significant part of those

wounded into skull entered the unconscious condition when contact with them was impossible, and conditions for prolonged observation of the dynamics of the process were absent.

Therefore the basic question which should have been under these conditions solved, was the determination of the possibility of further evacuation of that wounded the skull from designation/purpose. At the same time it was necessary to come to light/detect/expose among wounded the skull found in nontransportable condition. In the latter/last cases, after conforming to the possibilities of this therapeutic installation, appeared tasks in the removal of wounded from nontransportable condition.

FIRST AID BY THAT WOUNDED THE SKULL AND THEIR CARRYING OUT FROM THE FIELD OF COMBAT.

One of the most essential tasks of medical service in war is timely rendering to wounded soldier on the field of battle of the qualified first aid.

As show the materials of the Great Patriotic War, whereas first aid on the field of battle in all periods of war proved to be to the overwhelming majority of wounded, the periods of rendering to this aid, and also order/formation its renderings were different both in

the different stages of war and in different periods one and the same of combat process/operation.

First aid to injured into skull consisted in the application of gauze dressing on wound and the most rapid possible carrying out of wounded from the field of combat.

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Depending on medical-tactical conditions, and also on the character/nature of wound, initial bandage laid first the aidmen, stretcher bearers, medical instructors and fieldshers, then wounded soldier itself or his comrades - in order of self- and mutual assistance. The application of dressing by aidmen and by fieldshers occurred considerably more frequently than by way of self- and mutual assistance.

In different periods of war, depending on conditions, aidmen's quantity in working parts changed. Thus, for instance, during the blockade break-through of Leningrad at first aidmen it was completely sufficiently, there were even auxiliary aidmen in each platoon and even in some separations/sections. However, toward the end of combat process/operation in connection with considerable losses among aidmen the position/situation with rendering of first aid on the field of

battle became more stressed. The same position/situation was created also during Orel-Kursk battle when in connection with aidmen's great loss/depreciation rendering of first aid was necessary to realize to a considerable extent in order/formation self- and mutual assistance. However, in the later periods of war, for example, in combat for the liberation of Belorussia and especially during combat process/operation the "Vistula - Oder" and Berlin process/operation, in spite of the rapid advance of the troops/forces and furious fighting, rendering of first aid by way of self- and mutual assistance noticeably it decreased, and at the same time, significantly increased rendering of first aid on the field of battle by aidmen, medical instructors and by feldshers. This illustrates the following data of the given above diagram (Fig. 21).

For the application of dressing was applied usually one or two first aid kits, which was completely sufficiently for initial sew the wound of skull from contamination. During the extensive damages of skull and brain were used the great special gauze wadded bandages, used also usually, also, with the wounds of stomach or chest.

A gauze-wadded bandage laid directly on wound without any preliminary dress/lavatory wounds and by several revolutions of bandage they fortified on head.

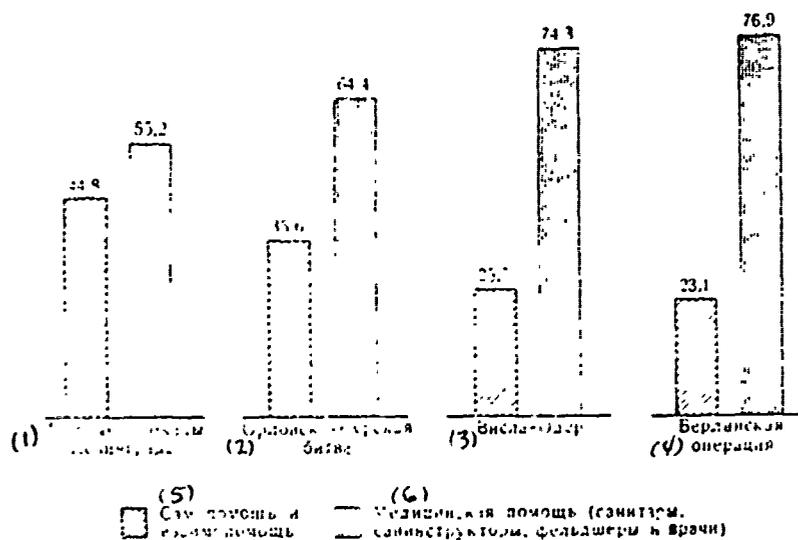


Fig. 21. Character/nature of rendering of first aid on the field of battle in different combat process/operations (in percentages).

Key: (1). Blockade break-through of Leningrad. (2). Orel- Kursk battle. (3). Vistula-Oder. (4). Berlin process/operation. (5). Self-help and mutual assistance. (6). Medical aid (aidmen, medical instructors, feldshers and doctors).

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Already from the very beginning of war by all medical commanders, and also surgeons and by neurosurgeons was explained the exceptionally important value of the periods of rendering of first

aid to that wounded the skull. Therefore, although periods of rendering aid on the field of battle depended to a certain extent on conditions and character/nature of combat process/operations, nevertheless to the overwhelming majority of those wounded into skull first aid was shown/rendered in time which should be recognized the completely satisfactory ones. This illustrate the data of the following diagram (Fig. 22).

In spite of the severe conditions for combat process/operation during the blockade break-through of Leningrad, 70.00% of wounded first aid was shown/rendered for the first hour after wound. Even during extremely intense street fightings in Stalingrad and Poznan when approach to wounded, and sometimes also the detection of wounded they were extremely hindered/dampened, the organization of rendering of first aid stood in the center of the attention of the medical service of companies and battalions and to the overwhelming majority of those wounded the skull it was shown/rendered within the shortest periods. Together with this it is necessary to keep in mind that the timely rendering of first aid to that wounded into skull and brain can be impeded as a result of the fact that the obtained heaviest damages are found into the first hours after injury in unconscious condition and therefore they cannot make itself known by any signal or call to aid. To avoid delay in rendering of first aid was necessary the organization of special searches/scannings on the field

of battle of heavily wounded, especially wounded the skull. As showed the experiment/experience of war, great value for the export of wounded from the field of combat acquired the use/application of canine harnesses and the organization of the special "mopping-up" of the field of combat with purpose of the research of those heavily wounded the skull.

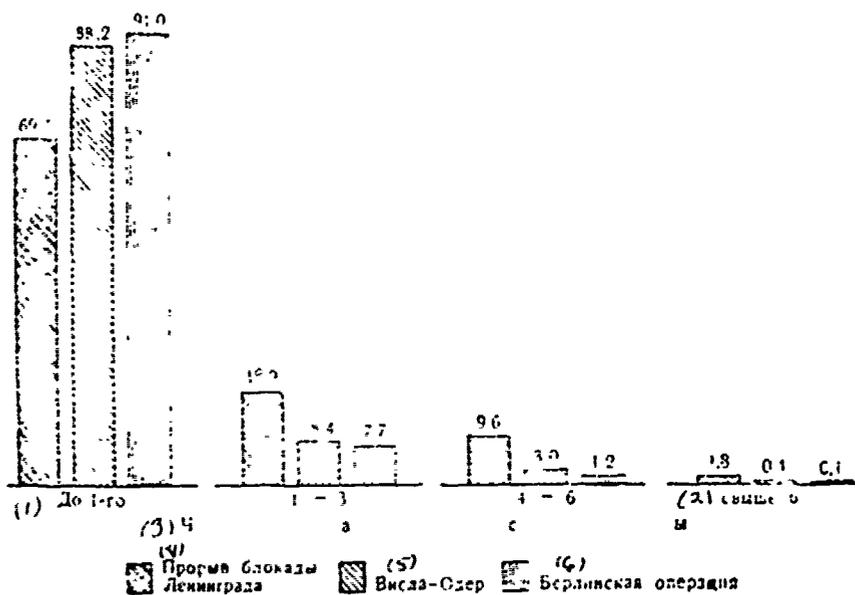


Fig. 22. Periods of rendering of first aid on the field of battle in different combat process/operations (in percentages).

Key: (1). To the 1st. (2). It is more than 6. (3). hours. (4). Blockade break-through of Leningrad. (5). Vistula- Oder. (6). Berlin process/operation.

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During the Great Patriotic War the carrying out of those wounded the skull from the field of combat was realized by different methods, depending on combat circumstances, presence of one or the other transport means, distance to BME or PMP and finally from the season

and presence of water obstacles. For the carrying out of wounded applied stretchers, travci, the ponchos, overcoats, ski installations, canine harnesses, vehicles and even motor vehicles.

The carrying out of wounded from the field of combat was conjugated/combined with the greatest difficulties during street fightings in Stalingrad. This is caused by the presence of the strongly developed system of the fastened/strengthened weapon emplacements of enemy, dugouts and fastened/strengthened basements of buildings. The same conditions were also in Poznan where combat occurred and by day, and by night. Is noted a series/row of the cases when, in spite of the nearness of the lying/horizontal wounded, to it could not be approached to onset of dark.

In spite of this, in furious fighting in Stalingrad and in Poznan the carrying out of heavily wounded from the field of combat in the majority of the cases was realized in short periods - from 30 minutes to 3 hours, and only sometimes it was held up to 6-12 hours. To this comparatively short period of carrying out from the field of combat and delivery/procurement to BMP contributed, naturally, approximation/approach BMP almost right up to the front line.

With the crossings through great river lines the transportation of wounded occurred on the specially constructed rafts and sometimes

on rubber boats (Fig. 25), and under winter conditions - on ice with the aid of travois and light sleighs with the widened runners. To the selection of the method of carrying out and export of those wounded the skull from the field of combat medical service focused particular attention, and everything was directed toward that so that this part one aid would be realized as more cautious as possible and so that the head of wounded would undergo the smallest possible traumatization during his transportation to the place of rendering to medical aid. On the basis of the experiment/experience of war it is possible to assert that the most sparing form/species of the initial transportation of wounded the skull from field combat is nevertheless its carrying out to stretchers by hand (Fig. 26).

#### MEDICAL AID BY THAT WOUNDED THE SKULL ON BMP AND PMP.

The delivery/procurement of those wounded the skull on BMP and PMP along the broken roads of army area, in spite of the difficult conditions for combat process/operations and frequently heavy medical-tactical circumstances, it occurred nevertheless in the overwhelming majority of the cases in short periods. About 70.00/o of wounded were delivered on PMP for the first 4 hours after wound. If one takes into account the unfavorable conditions of locomotion in the direct nearness of front line, and also the frequent myalgias/anemones of roads and the activity of the aviation of enemy,

then these periods should be recognized completely timely ones.

The following diagram characterizes the periods of the delivery/procurement of wounded on PMP (Fig. 23).

From this diagram it is possible to establish that the delivery/procurement of most heavy ones - horizontal/lying - wounded on PMP, in spite of the difficulty of offensive combat, steadily it was accelerated. In process/operation "Vistula-Oder" and Berlin process/operation 80.7c/c and 86.40/o of heavily wounded were delivered on PMP for the first 4 hours after wound and altogether only 3.3 - 1.00/o of wounded they entered after 8-10 hours. This extremely important fact characterizes correct formulating of evacuation in army area, which ensures further successes of the treatment of wounded both in the army ones and in army therapeutic installations. Such early periods of the delivery/procurement of heavily wounded, it is doubtless, were one of the basic conditions, ensuring the success of the treatment of those wounded the skull during the Great Patriotic War.

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Fig. 25. Crossing of wounded through Vistula. From the picture of the military medical museum VM of the USSR. (Artist N. G. Meshcheryakov).

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Fig. 26. Delivery/procurement of that wounded of skull on stretchers on P.P. From the picture of the military medical museum VM of the USSR. (Artist N. G. Kozlov).

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However, one ought not to consider that in all periods of combat

process/operations the delivery/procurement of wounded on PMP was possible within also early periods. Depending on many conditions and, in particular, from the resisting force of enemy and intensity of fire/light, the periods of the delivery/procurement of wounded sometimes were lengthened. In this respect as an example should be given the fact from combat process/operation "Vistula-Oder" during assault crossing of river Oder and capturing the bridgehead/beachhead on hostile shore. In connection with the fact that the enemy, after exploding dams in the upper course of river, flooded/ignited some sectors of bridgehead/beachhead, the crossing through separated and oppressed by ice floes Oder proved to be sharply difficult. Therefore the delivery/procurement of wounded on PMP in certain cases was held up to 2-3 days.

The first medical aid by that wounded the skull proved to be on PMP, its volume frequently depending on combat and medical-tactical circumstances. In the overwhelming majority of the cases this aid was limited only to the supervision of the already superimposed bandages with purpose of detection and correction of defects in the defense of wound. If it was necessary and allowed circumstances, bandage they removed/took and replaced to new, were introduced the substances, improving cardiovascular and respiratory/breathing activity, and also is produced dehydration.

It is necessary to consider that the conditions for work at PMP in the different periods of war were different. Thus, for instance, at the end of 1941, during the rout of Germans on by Moscow, work on some PMP occurred in the very stressed circumstances. This position/situation is caused by one hand, on the nearness of their disposition to the line of fire, and on the other hand - by absence of living quarters under conditions of severe winter and by insufficient turnover of transport. Due to the difficulties of evacuation sometimes on some PMP and with the blockade break-through of Leningrad. As a result of the difficulties of the evacuation of wounded on DMP along the broken by tanks and guns roads, and also on the shot through by enemy crossings through Neva, always it was not most systematic possible and it is even to unload PMP.

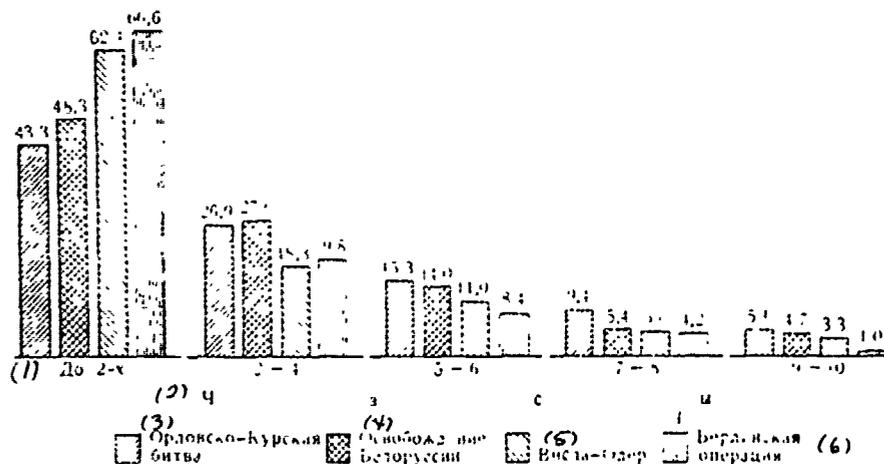


Fig. 23. Times for delivery of lying wounded to PMP during various combat operations (in o/o).

Key: (1). up to 2. (2). h. (3). Orlov-Kursk battle. (4).

Liberation of Belorussia. (5). Visla-Oder. (6). Berlin operation.

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Otherwise was formed the circumstances in the later periods of war, especially during rapid offensive operations. For example, in final combat for the liberation of Belorussia, in order to ensure the fastest delivery/procurement of wounded from the field of combat to DMP, immediately after assault crossing of the Niemen to bridgehead/beachhead on western shore with DMP were directed special groups in the composition of surgeon, nurses and aidmen. Such groups deployed surgical dressing, sorting and evacuation tent and had at

their disposal of means for evacuation of wounded. After being situated in 2-2.5 km from line of fire, they provided urgent first aid and rapid evacuation of wounded (Fig. 28).

On PMP was processed the periphery of wounds by antiseptics, they drove out the free at wound fragments, they shaved off hair around wound, they laid aseptic bandaging, they gave sulfanilamides, they introduced cardiovascular substances, morphine, lobeline, and also antitetanus serum.

During combat process/operation "VISA -Oder" in connection with the rapid advance of the units forward (on the average on 30-35 km in a 24 hours period) of PMP frequently it was necessary to be deployed only for rendering to minimum medical aid. Nontransportable wounded after this left on the spot in the populated area under the observation of fieldsher and aidman to the approach of transport with DMP.

This maneuverability of PMP had, it is doubtless, positive value for timely rendering to the first aid, known prophylaxis of wound complications and realization of the rules/hardspikes of the transportation of those heavily wounded into skull and brain.

Furthermore, reinforcing of PMP by personnel of convoluted DMP

allowed PMP easy to manage its work. During this process/operation it was not one case of the disengagement of medical service from its units. During this process/operation in intense combat which it was necessary to conduct armies during the Liberation of Poznan, PMP were arranged/located in immediate proximity of area of combat.

On PMP were carried out also antishock measures. One should, however, emphasize that to resort to these measures it was necessary very rarely, since shock in the present value of this word with the wounds of the skull and brain, not complicated by the wound of stomach, chest or other departments of body, was encountered extremely rarely. This was noted by the majority of the surgeons and neurosurgeons and found its repulsing and in these maps/charts/cards of the deepened characteristics. Judging by the latter, shock with the wounds of the soft tissues of skull was observed into 0.50/o, with the nonpenetrating wounds of skull with the damage of bones - into 1.20/o and with those penetrating - into 6.10/o. It is necessary to note that in the first months of war in some doctors was observed the tendency to estimate loss of consciousness, soporic or comatose condition with the wounds of skull and brain as shock, which from the point of view of contemporary concept about shock is incorrect. Nevertheless this did not bring and it could not lead to any complications. Conversely which suppresses the majority of the antishock measures which usually were applied in such cases,

antishock fluids/liquids, blood transfusion, glucose, ephedrine, cardiovascular means, it is doubtless, is exerted favorable effect. One should only consider that with such wounds of the skulls and brain, which were escorted/tracked by the damage of the vessels of considerable diameter, the blood pressure increase, attacking after the introduction of antishock substances, can cause the renewal of hemorrhage.

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Fig. 28. Mud hut PMP. From the diorama of the military medical museum VM of the USSR. (Artist N. G. Yakovlev.)

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In cold season in EMP especially considerable attention focused on the heating of that wounded into skull and creation for it calmest circumstances. With heating, of course, was considered the condition of consciousness, with the darkened consciousness was observed

particular care during the use/application of heaters.

The cessation of hemorrhage from the vessels of shells and substance of brain practiced on PMP extremely rarely. The reason for this was the fact that the strong hemorrhage with the wound of large vessel was incompatible with life, and such wounded, as showed pathoanatomical data, perished usually on the field of battle or on routes/paths to PMP. However, the hemorrhage of their vessels of small diameter to the time of the arrival of wounded on PMP usually ceased independently and did not require particular measures. In the same rare cases when was developed the syndrome of growing epidural or intra-cerebral hematoma, correct diagnosis under conditions of PMP was usually impossible, since was required the observation of clinical picture in dynamics and its neurologic evaluation.

Within the time of war were recorded only the single cases of the wound of the postcranial and temporal arteries, with which was required the dressing of vessel on PMP.

Thus, on PMP, as a rule, no surgical interventions on skull and brain it was conducted.

The important side of work of PMP in the relation to wounded into skull consisted in the fact that here began the initial

classification of wounded, which had as a goal to establish/install the first priority of their evacuation.

All wounded the skull and the brain, with exception only of clearly nontransportable ones, they evacuated without delay on DMP or in KhPPG, depending on medical-tactical conditions. On PMP remained only the found in condition agonies or in heavy comatose condition, with the sharp violation of respiratory/breathing and cardiovascular activity.

As show the given below periods the entries of wounded on DMP, evacuation with PMP, as a rule, occurred without particular delays and during war progressively was improved.

For evacuation with PMP was utilized horse and (somewhat less frequent) truck transport. Although the latter/last form/species of transport profitably differs in terms of the possibility to rapidly deliver wounded, nevertheless with the transportation of those wounded the skull and the brain along the broken roads of army area it is by no means accomplished. Were recorded the individual cases of deterioration in the condition of those wounded the skull as result of the unfavorable conditions of transportation.

CONDITIONS FOR WORK OF DMP IN DIFFERENT COMBAT PROCESS/OPERATIONS.

During the Great Patriotic War DMP were those medical installations, in which began the rendering to surgical aid, and for some wounded and specialized.

During the Great Patriotic War, depending on the character/nature of combat operations also in proportion to the acquisition of work experience, were changed, naturally, the conditions, and also the volume of work of DMP.

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During the rout of Germans in the environs of Moscow for workers MSB it was necessary in progress of combat to overcome the series/row of difficulties in order to attain full of deployment of DMP, to shorten the periods of rendering to the medical aid by wounded, to sort out the flow of wounded within DMP, to increase the volume of surgical work and to fix the timely evacuation of wounded on GBA.

During Stalingrad battle especially severe conditions for work of DMP were formed in the period of defensive actions in city. At first DMP forced were to guide toward the right shore of Volga only operations groups for rendering to urgent surgical aid by wounded.

Through 3-4 weeks, as a result of a change in the operational-tactical circumstances, the volume of the work of these groups became still less, since to leave in the city of wounded it became impossibility. The basic task of these groups of DMP was the organization of the evacuation of wounded to the left shore of Volga. At the end of October in city were left only evacuation groups. All wounded urgently directed to left shore on DMF and in KhPPG. In second half November, in connection with the forthcoming ice formation and an improvement in the operational-tactical circumstances, into city were again directed surgical groups of DMP. The latter organized in the dugouts of operating rooms, medical dressing rooms, wards for wounded produced more complicated surgical interventions. When was established/installed the crossing through Volga on ice, DMP accepted to themselves already all the care of the wounded, who entered from city.

In the time of the blockade break-through of Leningrad it was necessary to deploy DMF, utilizing for these purposes trenches, in view of the great destruction of the buildings, produced by enemy.

Under very difficult conditions passed the work of DMP in the period of an Orel-Kursk battle. During this period the series/row DMF underwent shellings and frequent air raids of enemy. Some DMF forced were, in connection with the requirements of operational-tactical

circumstances, on 10-14 times to be relocated and to be granulated to 2-3 echelons.

During combat process/operation on the liberation of Belorussia certain DMP in the period of the pursuit of the routed enemy it was necessary to advance on 25-30 km in a 24 hours period in order not to fall behind our troops/forces, after being relocated in July 1944 on 12-20 times, and also to be granulated by several groups.

It should be noted that this frequent redislocation of DMP unavoidable time of mobile warfare. However, if in the beginning of the Great Patriotic War the need for frequent redislocation and distributions DMP caused series/row of difficulties as a result of insufficient work experience under military field conditions, then subsequently these difficulties were overcome and they were not reflected especially in surgical work of DMP.

During combat process/operation "a-<sup>visla</sup> ~~vistula~~-Oder", with the penetration of the defensive line of the enemy, some DMP were found in the convoluted condition, reinforcing by its personnel of PMP. The evacuation of wounded during this period occurred directly with PMP in KhPPG of the first line, to evacuation points and even into the approximate to army area front line evacuation hospitals. Subsequently, during the rapid offensive of our troops/forces, of DMP

on route/path in 500-600 km they relieved their deployment to 20-22 times. Especially difficult working conditions were formed for some therapeutic installations of army area with the exercise of bridge-head strengthening on the western shore of river Oder, when enemy, after exploding dams on river, flooded/ignited area of the disposition of these therapeutic installations.

During latter/last, Berlin process/operation with penetration the defenses of the enemy DMP were found in the convcluted condition, since wounded of the units they guided into approximate KhPPG of the first line.

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After penetration the defenses of the enemy DMP followed their units, after being divided into two echelons. The first echelon moved directly after the troops/forces, the second it remained on the spot, servicing nontransportable wounded prior to special army medical brigades' arrival.

Thus, during the Great Patriotic War maneuver by the therapeutic installations of army and army rear, depending on different character/nature of the combat operations of troops/forces and special features/peculiarities of operational-tactical circumstances,

created conditions for the uninterrupted care of wounded.

Hence evident also which, independent of the character/nature of combat process/operations during the Great Patriotic War, work of DMP consisted mainly in maximally early rendering to urgent surgical aid by that wounded the skull.

The periods of the entry of wounded on DMP depended first of all on medical-tactical conditions, from the period of removal of wounded from the field of combat, from extent and condition of the roads of evacuation and from transport means.

However, independent of these conditions, in view of the requirements of the uniform military medical doctrine of Soviet army, tendency to draw nearer surgical aid the moment of wound and unremitting putting into action of the corresponding organizational measures, heavily wounded, including wounded the skull, arrived on DMP in all stages wars within maximally short periods. An example can be the represented diagram (Fig. 24).

As can be seen from this diagram, even during most difficult in a medical-tactical sense offensive combat operations 1943-1945 from 52.0 to 66.00/o of those heavily wounded into skull they came on DMP into the first 6 hours after wound and from 87.0 to 93.40/o of

wounded - into the first 12 hours.

The specific gravity/weight of those wounded the skull and the brain on DMP. If we accept the percentage of wounded the skull among a total quantity wounded during rout Germans in the environs of Moscow for 100, then a change of the specific gravity/weight wounded into skull to DMP in different combat process/operations will be the following.

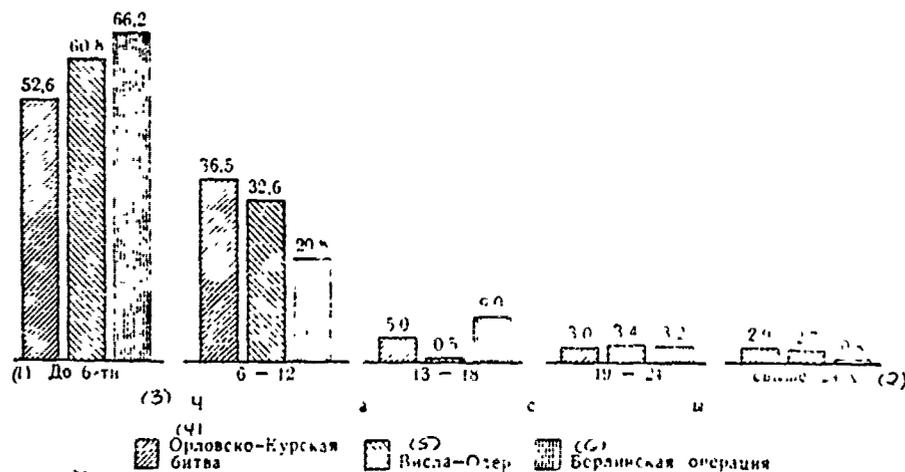


Fig. 24. Periods of the delivery/procurement horizontal/lying of those wounded the skull on DMF in different combat process/operations (in percent).

Key: (1). To 6. (2). it is more than 24. (3). hours. (4). Orel- Kursk battle. (5). Viska.-Oder. (6). Berlin process/operation.

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Change of the specific gravity/weight of those wounded into skull among all wounded, who entered on DMP into different combat process/operations.

(As 100 accept the ratio of wounded the skull to a total quantity wounded during rout of Germans in the environs of Moscow).

Rout of the Germans in the environs of Moscow ... 100.0.

Stalingrad battle ... 86.4.

Blockade break-through of Leningrad ... 255.4.

Orel- Kursk battle ... 192.0.

Liberation of Belorussia ... 188.3.

Visla - Oder ... 207.6.

Berlin process/operation ... 188.3.

As can be seen from the given data, a quantity of those wounded the skull, that enter on DMP, it was changed depending on the character/nature of combat operations. In defensive actions as, for example, in the period of Stalingrad battle, it was considerably less. At the same time in all combat operations, which bore offensive character/nature, a quantity of those wounded the skull exceeded average numbers.

Those wounded into skull and brain entered on DMP in general/common/total order/formation, and only with DMP began the specialization of medical aid, which required the development/detection of the character/nature of wound itself and determination of its severity.

The relationship/ratio between a quantity of those wounded the skull with the damage of bones and obtained wound soft tissues of skull is evident from the given data (Fig. 7).

During the first two process/operations - the rout of the Germans in the environs of Moscow and Stalingrad battle - a quantity of wounded with the damage of the bones of skull was almost triply less than a quantity of obtained wounds soft tissues of skull. During

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Leningrad and especially Belorussian process/operation a quantity of wounds of skull with the damage of bones almost achieved a quantity of wounds of the soft tissues of skull. In latter/last two combat process/operations again predominated the wounds of soft tissues.

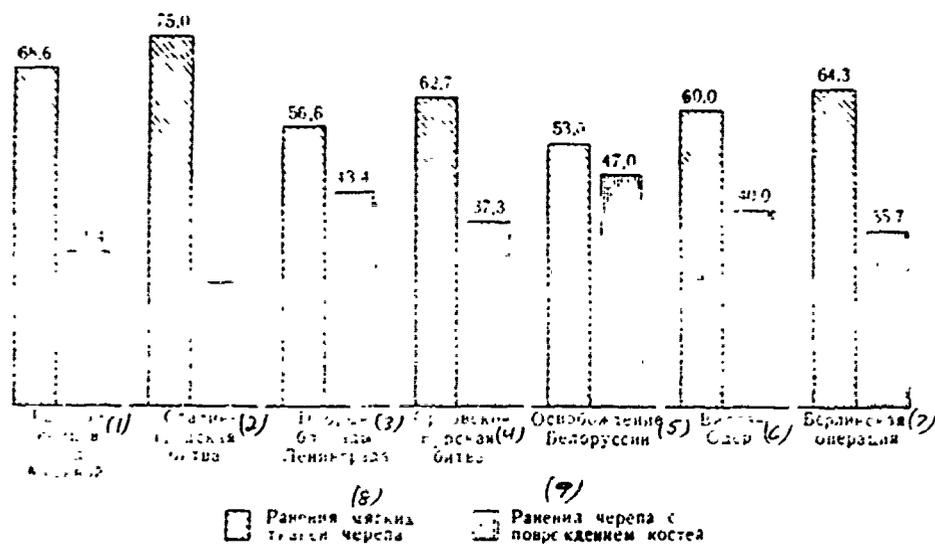


Fig. 7. Distribution of the character/nature of the wounds of skull in different combat process/operations (on these DMP in percentages).

Key: (1). Rout of the Germans in the environs of Moscow. (2). Stalingrad battle. (3). Blockade break-through of Leningrad. (4). Orel- Kursk battle. (5). Liberation of Belorussia. (6). Vistula-Oder. (7). Berlin process/operation. (8). Wounds of soft tissues of skull. (9). Wounds of skull with damage of bones.

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CLINICAL CHARACTERISTICS CLASSIFICATION AND TREATMENT OF THOSE WOUNDED THE SKULL ON DMP.

Those delivered from the field of combat to DMP wounded the skull are different in the severity of wound and in clinical picture group.

Besides easily wounded, on DMF were delivered such wounded, in as during comparatively light damage of skull were developed the heavy, sometimes threatening lives, the phenomena of jolt, contusion or compression of brain.

The wounds of skull and brain were themselves diverse pictures - from the damages, during which the wounded were in total consciousness and satisfactory condition, to such, with whom it was almost no hopes for recovery.

To be dismantled/selected at the complexity of these all clinical manifestations of wound under conditions DMP in the absence of the X-ray machine and specialists of the neuropathologists and neurosurgeons, naturally, was very difficultly, especially as the clinical picture of the wounds of skull and brain in the course of first hours and twenty-four hours from the moment of wound was extremely variable.

The experiment/experience of great patriotic war it showed that in initial period can occur the considerable oscillations/vibrations

in the condition of those wounded the skull. Sometimes during the insignificant small-splintered mine damage of the soft tissues when wounded independently came into therapeutic installation, suddenly attacked/advanced the heavy picture of deterioration, consciousness sharply was darkened, deteriorated cardiovascular and respiratory/breathing activity, appeared somnolency, sometimes were developed paralyses. In contrast to this in other cases delivered in heavy, almost soporic condition wounded soon came into consciousness, correctly he reacted to that surrounding and did not detect the rough signs/criteria of the damage of central nervous system.

The basic question which was subject to permission under conditions of DMP, was the determination of the possibility of further evacuation of that wounded the skull which would not pronounce disastrous on the course of the process, and the development/detection of those wounded who required urgent surgical intervention on skull and brain.

As showed the experiment/experience of the wars, wounded the skull and the brain into DMP they were subdivided into three basic groups: 1) completely nontransportable wounded in view of their heavy condition, 2) wounded, temporarily nontransportable, requiring surgical intervention on DMP or taking of conservative measures, and 3) wounded, subjects of evacuation into the therapeutic installations

of army rear.

The numerical ratios between these groups oscillated and depended on the series/row of conditions, but on the average latter/last group in most of the cases composed not less than 3/4 all those wounded the skull. <sup>P</sup> Nontransportable wounded. The greatest unit of this group composed wounded, who entered in agonizing or close to it condition, with the heavy damages of brain. Among them some were from clear to those determined with the examination/inspection of wound by the extensive decomposition of the substance of brain, with fallout into the wound of the impregnated with the blood brain tissue, frequently bleeding. In some of these cases the actual sizes of the decomposition of brain were camouflaged with surface blood clots and contaminated, agglutinated/glued hair.

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In other wounded the outwardly nappy form/species of wound, on the contrary, did not correspond to the severity of decomposition and in section only established/installed present sizes/dimensions, character/nature and localization damages, most frequently in the form of extensive hemorrhage with the simultaneous decomposition of the hanger-on departments of brain.

Heaviest condition the perforating bullet wounds of skull and brain with the predominantly basal disposition of wound canal, and also blind-end wounds by large/coarse fragments either small-splintered wounds with the damage of the vital departments of brain - a hanger-on unit of cerebral ventricles.

During some combat process/operations, especially when predominated the street fightings (as, for example, in Stalingrad, Poznan, Berlin), on DMF was delivered a considerable quantity of those wounded the skull with the simultaneous nonbullet depressed and fragmentary breaks of the bones of skull. The severity of the condition of such wounded it was complicated by the supplementary closed injury.

Nontransportable in the majority of the cases proved to be also the obtained multiple wounds of skull, stomach, chest and thighs. In a number of such cases it was difficultly establish/install, what wound caused the basic severity of condition.

The clinical symptoms of nontransportability of those wounded into skull stored/added up from a deep disorder of consciousness, frequently to its total loss (when wounded do not react even to strong external stimulations), and the signs/criteria of the heavy violation of the activity of the barrel of brain. From them were

especially vividly expressed the disorders of pulse in the form of its sharp weakening and frequency increase and violation of respiration to the degree of noisy, wheezing, sometimes bubbling, relieved by type Cheyne-Stokes and Kussmaul. Almost always this condition was combined with the violation of ingestion, sharp general/common/total sweating and frequently involuntary urination; in a number of cases was noted abundant vomiting.

The focus signs/criteria of the damage/defeat of cerebral hemispheres, in view of heavy general condition and sharp manifestation of general cerebral symptoms, are less than arrested the attention of the doctors of DMK.

Temporarily nontransportable. More than difficulties appeared during evaluation of the second category of wounded - temporarily nontransportable. Among them it was necessary to separate those requiring urgent, urgent surgical intervention and group more heavily wounded by which there was shown for first time burst the conservative treatment. In the group of temporarily nontransportable ones and requiring in urgent surgical intervention entered the wounded with intracranial hemorrhage, or and by subdural or intra-cerebral hematoma. It is necessary to note that intracranial hematomas fairly often (as showed autopsies - into 11.90/o) they were encountered also in the agonizing heavily wounded. However, their to

recognize during agony was already impossible, as it was not possible and to save such wounded.

The diagnosis of intracranial hematomas under conditions of DMP presented considerable difficulties. They were escorted/tracked either by the characteristic form/species of the exsanguination of wounded or by the clear external signs/criteria of hemorrhage. Therefore it was necessary to be based on the indirect signs/criteria of this complication, becoming apparent by the symptoms of the rapidly growing intracranial pressure.

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The latter include:

1) the rapidly progressive deterioration in any functions of brain, most frequently in the form of rapidly growing mono- or hemiparesis;

2) the shift/relief of comparative prosperity in the wounded by extremely heavy condition with deterioration pulse, respiration, ingestion and violation of consciousness, appearance of somnolency or, on the contrary, the restlessness/anxiety; sometimes appeared vomiting, involuntary urination;

3) the onset of local ones or less frequent, general/common/total epileptic fits.

For epidural and, less frequent, subdural hematomas is sufficiently characteristic was characteristic the so-called bright gap/interval after wound. With intra-cerebral hematomas this gap/interval usually was not observed, since hematoma was formed at the moment of wound.

Subdural hematomas in the sense of development are similar to epidural, differing from them only in terms of the admixture/impurity of the blood in cerebro-spinal fluid and in terms of the pronounced symptoms from the side of the shells of brain.

The symptoms of the compression of brain occurred with all hematomas, although with intra-cerebral ones they became apparent to a lesser degree. Frequently with subdural hemorrhages the blood spills on space under shell, without forming compact cluster.

It is necessary to bear in mind, that intracranial hematomas were encountered not only in heavily wounded, but also in those finding in a comparatively nappy condition. They were observed even

with some nonpenetrating wounds of skull and sometimes only with the wounds of soft tissues. In the similar cases the diagnosis of this complication presented even greater difficulties and was based only on dynamics of symptoms. The identification of hematomas in a number of cases helped the expansion of pupil on the side of hemorrhage.

Another group of temporarily nontransportable ones composed wounded, who were being found in the condition of psycho-motor excitation, caused most frequently in this period by sub-arachnoidal hemorrhage. This was a comparatively small group of wounded.

Still less frequent on DMP were observed wounded with epileptic fits. Sometimes this complication of clinical picture obuslovlivalos6 on intra-cerebral large-size hematomas.

Wounded, subjects of evacuation into army therapeutic installations. The latter/last and greatest group of those wounded the skull composed the subjects of evacuation into army therapeutic installations. Clinical characteristics of these wounded is very diverse and to a certain extent variable, depending on the decrease of some symptoms and development/detection of others. On the whole it stored/added up from those expressed to one degree or another general cerebral and focus signs/criteria of damage/defeat. In a number of cases the clinical symptoms of the damage/defeat of brain to the time

of the entry of wounded on DMP already were absent. The basic criterion of the possibility of further evacuation with DMP has the clear consciousness of wounded and the absence it of the signs/criteria of psychc-motor excitation or nonarrested hemorrhage.

With particularly unfavorable medical-tactical circumstances from this rule/handspike made the retreats.

In particular, were not subject to evacuation, in view of the light wound, which obtained the surface damage of soft tissues skulls without the exposure of bone and without the signs/criteria of contusion or brain concussion. Unit of them remained, if allowed tactical situation, for recovery on DMP.

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Readings to surgical intervention on skull and brain under conditions DMP. Since the beginning of the Great Patriotic War were clear instructions of GVSU of Soviet army, limiting readings to the trepanation of skull under conditions of DMP only by the cases of the threatening life wounded intracranial hemorrhages and of intracranial pressure increase. However, in the first months of war in the unit of the medical commanders and surgeons of army area were still fresh in the memory of the installation of the first world war and war with

White Finns, that required as early as possible to operate those wounded in skull and brain, and therefore surgical interventions on skull in a number of cases were conducted under conditions of DMP. However, the experiment/experience of war soon convinced of this full/total/complete irrationalities tactics. The fact is that surgical intervention on skull and brain under conditions DMP without X-ray and neurologic research frequently proved to be difficult and always not full-valued. On DMP frequently it is not possible to create the necessary circumstances for the prolonged hospitalization of the operated wounded, frequently not attained for medical-tactical reasons. However, transportation along the heavy roads of army area those wounded the skull and the brain more easily transferred to process/operation, than after surgical intervention. Finally, surgical intervention on skull and brain, produced in some wounded auto were nonradical, in a number of cases the reason for further severe complications.

Because of this during the first year of war it was already established/installed, which to operate wounded in skull and brain on DMP follows only from the vital readings which are in actuality encountered comparatively rarely.

Thus, subsequently those wounded the skull and the brain on DMP, as a rule, they did not operate. Only sometimes it was necessary to

solve a question, is required surgical intervention on DMP from vital readings or it is possible to plot before the entry of wounded into army therapeutic installations.

It was completely clearly established/installed, that surgical intervention on skull and brain on DMP virtually was justified by hemorrhage first in the form of extra ones either subdural or intra-cerebral hematoma, then of the arterial barrels of the integuments of skull.

Surgical intervention in such cases was conducted urgently, if only condition wounded this was allowed.

During the decision/solution of a question about the urgency of surgical intervention was considered also the character/nature and localization of wound. If wound canal is passed near from the basis of brain to temporal or postcranial area, then surgical intervention with suspicion to intracranial hematoma was conducted without delay, since delay in such cases rapidly led to the irreversible conditions. Only urgent and radical surgical intervention with the **distance/separation of blood clots, as showed the** experiment/experience of war, to save from among these severely wounded patients.

At the DMP repeatedly were observed cases of extradural hemorrhage from branches of the middle cerebral artery, leading to an extremely severe condition. In spite of extraneous trepanation, it was possible to save only part of these wounded. However, on autopsy in them was detected, besides hematoma, sharp edema of the barrel of brain.

In a number of cases it was difficultly solve, serious condition of wounded is caused by intracranial hematoma or on acute traumatic edema of the barrel of brain. In the latter/last cases, as showed the experiment/experience of war, one should enter dependence on the general condition of wounded. If the condition of wounded hopeless and is observed the build-up/growth of symptoms, then must be urgently produced decomprssion trepanation.

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On DMP frequently it was necessary to also solve the problem about surgical intervention with the wounds of the skull and brain, combined with the heavy wounds of stomach, chest or extremities.

Problem in this case they solved, on the basis, first of all, of the general condition of victim. If in clinical picture predominated the phenomena of shock, then similar wounded they ejected from the condition of shock and then produced surgical interventions on stomach, organs/controls of chest or on extremities. The penetrating wound of stomach, open pneumothorax or open bullet break of thigh, as showed the experiment/experience of war, in all cases were primary in the sense of their surgical processing under conditions of DMP. Only

after this was conducted the primary processing of the wound of skull and brain, if to this there were timely readings and if the condition of wounded made it possible this to make.

Urgent was also surgical intervention with the wound of the soft integuments of skull, which was being escorted/tracked by hemorrhage from postcranial or temporal artery. Such wounds were encountered comparatively rarely; however always should be had them in the form, since the not stationary in time hemorrhage from these vessels can bring to the exsanguination of wounded or to serious complications in the form of the scaling of the integuments of skull and education of considerable subaponeurctic, intermuscular or subperiosteal hematomas with the subsequent festering.

Operability of those wounded the skull and the brain on DMP. For the illustration of the evolution of surgical tactics with the wounds of skull and brain on DMP is given the diagram (Fig. 29).

Since surgical work is one of the most important sections of entire activity at DMP, then is expedient to examine this unit of the rendering to the medical aid by that wounded the skull separately on each combat process/operation.

During the rout of the Germans in the environs of Moscow, as a

result of the severe conditions for work DMP, what has already been indicated in the preceding/previous chapter, surgical work on them was reduced most frequently to the dressings of those wounded the skull and conservative measures. At the same time on some DMP they exhibited particular activity in the relation to wounded the skull and the brain.

The primary processing of the wounds of skull and brain was conducted on individual DMP considerably more frequently than this allowed conditions and it was required by vital readings. On the whole during this combat process/operation on DMP it was operated by 30.00/o of those wounded into skull and brain, moreover all these process/operations were conducted without x-ray examination.

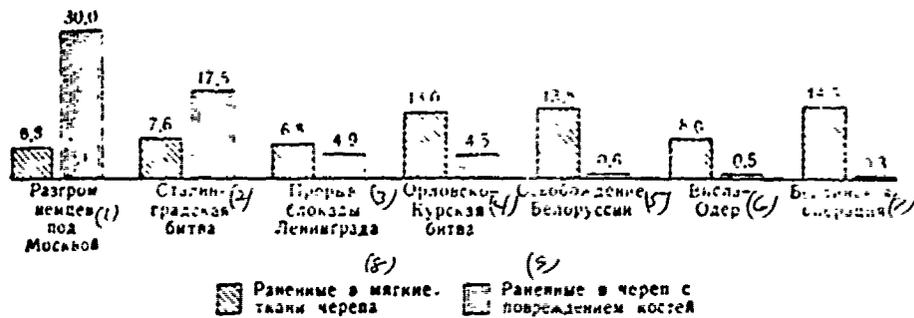


Fig. 29. Operability of those wounded the skull on DMP in different combat process/operations (in percentages).

Key: (1). Rout of the Germans in the environs of Moscow. (2). Stalingrad battle. (3). Blockade break-through of Leningrad. (4). Orel- Kursk battle. (5). Liberation of Belorussia. (6). Vistula-Oder. (7). Berlin process/operation. (8). Wounded soft. tissues skulls. (9). Wounded skull with damage of bones.

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During this period the wars for some surgeons of DMP of reading to urgent surgical intervention were still insufficiently clear and at the same time greatly widely were treated vital readings to process/operation with the wounds of skull. As a result of small work experience under battlefield conditions doctors still completely not assimilated also contraindications to process/operation. The primary

processing of the wounds of skull and brain sometimes proved to be produced nonradical.

Among the errors, which were being allowed/assumed by individual surgeons during processing of the wounds of skull and which required of urgent elimination, should be noted the following: the wide carving of skin wound in the form of the so-called five-kopek coins, the insufficient autopsy of wound canal, the autopsy of solid cerebral shell without sufficient to that readings, etc.

In the period of Stalingrad battle the volume of surgical work of DMP was determined by tactical conditions. Frequently combat situation was such, that on DMP was rendered only urgent surgical aid. Sometimes and it it was necessary to narrow and to be limited only to the cessation of hemorrhage. During an improvement in the operational-tactical circumstances the volume of surgical work on DMP was expanded. For example toward the end of the combat process/operation, during November 1942, when was established/installed permanent crossing Volga on ice, surgical work on DMP was carried out fully.

Here it is necessary to mention fact, that also during Stalingrad battle the readings to surgical intervention on skull and brain on some DMP were still expanded, which to a certain extent was

determined by the forced delay of wounded.

From a number of located on DMP undergoing medical treatment wounded with the damage of the bones of skull and brain it was operated by 17.50/o, with the wound of soft tissues - 7.60/o. Thus the percent operability was still high, although lower than during the time of rout of Germans near Moscow.

During the blockade break-through of Leningrad the volume of surgical work of DMP in the relation to wounded the skull and the brain in comparison with the preceding/previous combat process/operations was already considerably abbreviated/reduced. Wounded with the damage of the bones of skull were operated on DMP into 4.90/o of cases, which indicates already the more correct tactics of the surgeons of army area. Judging by the experiment/experience of war, should be this percentage operated on DMP of those wounded the skull recognized nevertheless more highly how this is dictated by actually/really vital readings.

Operability of wounded with the damage of the soft tissues of skull was still insufficient.

In the period of an Orel-Kursk battle surgical work on DMP in the relation to the wounds of skull and brain substantially did not

differ from the preceding/previous combat process/operation. From total number located undergoing medical treatment on DMP of those wounded into skull and brain it was operated by 4.50/o. It should be pointed out that operability with the wounds of the soft tissues of skull noticeably increased and achieved 13.00/o.

In the period of combat process/operation the "liberation of Belorussia" surgical interventions with the wounds of skull with the damage of the bones of skull were undertaken on DMP only from vital readings. Of the trepanations of skull on DMP it was made altogether only in 0.60/o of those wounded the skull and the brain. operability with the wounds of the soft tissues of skull was sufficiently high and it was expressed into 13.80/o. Doubtless this tactics, together with the curtailment of the excessive carving of soft tissues and exposure of bone, contributed to the more rapid healing of the wounds of soft tissues and more precisely formulated diagnosis in the cases of the penetrating wound of skull.

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During the combat process/operations of "Vistula-Oder" and Berlin operability of wounded with the damage of the bones of skull and brain on DMP was very low and it was expressed altogether only into 0.5 and 0.30/o. It is possible to say that the virtually wounded

with the damage of bones skulls were operated on DMP only from vital readings.

Primary processing with the wounds of the soft tissues of skull during these combat process/operations was conducted sufficiently frequently (8.0 and 14.50/o).

The given data show, as during war progressively was reduced a quantity of those wounded the skull and the brain, that were undergoing process/operations on DMP. They testify, thus, about the evolution of surgical tactics and are the proof of an improvement in the urgent surgical aid obtained heaviest wounds into skull and brain. Although some surgeons during war voiced opinion, that the percentage into 0.3-0.6 those wounded the skull and the brain, operated on DMP from vital readings, is too low, nevertheless the experiment/experience of war and further analysis of surgical activity in army and front line therapeutic installations showed that the given above tactics completely itself justified. At the same time, grew/rose the percentage of those operated on DMP of those easily wounded the soft tissues of skull, which contributed to their more rapid recovery. Subsequently these wounded they guided into the army therapeutic installations where with it is produced the appropriate roentgenological, neuro-surgical and neurologic supervision.

Special features/peculiarities of operational interventions on skull and brain on DMP. During the Great Patriotic War was manufactured uniform procedure and surgical intervention technique on skull and brain whose general/common/total principles were presented in the preceding/previous volume. The process/operations, which were being conducted on DMP, differed in terms of the series/row of the special features/peculiarities which ~~obuslevlivalis6~~ *were conditioned by* the absence of precise data about the character/nature of wound, about the presence in wound of foreign bodies and about the direction of wound canal, and also by insufficiency or by full/tctal/complete absence of the neurologic comparison of the condition of wounded and character/nature of wound. It was necessary, furthermore, to consider the lowered/reduced resistivity of the organism of wounded to surgical intervention as a result of early periods after wound and finally the insufficiency of special neuro-surgical equipment with operating room.

During processing of skin wound always it was necessary to bear in mind the possibility of repeated intervention in the therapeutic installations of army or front rear. Therefore splitting up or carving of skin wound was conducted in such a way that the newly formed operating wound could be connected into future supplementary

section/cut or into uniform skin graft/flap, if in the future arises the need for shutting extensive bone defect.

With the formation of the trepanation opening was considered, first of all, the need for the cessation of hemorrhage and distance/separation of hematoma; therefore the sizes/dimensions of bone defect had in these cases secondary value.

The searches/scannings of foreign bodies in the depth of the substance of brain "blindly", due to the absence of x-ray examination were not conducted, and process/operation was limited to the cautious distance/separation only of the visible and superficially arranged/located fragments of bone or metal.

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For cleaning destroyed substance of brain from wound cerebral canal it was necessary to avoid hemorrhage he limited to frequently only to independent liberation/excretion from the wound of so-called cerebral detrite or to washing of wound without the use/application of straining of wounded, coughing jerks/impulses, but that it is more without the mechanical cleaning of wound with the aid of instruments.

For the same targets, for warning/preventing of hemorrhage and

retention/preservation/maintaining of the tender joints between the shells of brain, in the majority of the cases it was necessary to abstain, also, from the carving of the territories of the defect of hard cerebral shell.

Hemorrhage from the arterial vessels of solid cerebral shell or brain core was necessary to stop by the imposition of the cleaving arcund silk sutures. Hemorrhage from veins and sinuses of solid cerebral shell in the majority of the cases stopped by muscular plastic surgery and it is considerably less frequent - by gauze tamponade. Use/application the latter even with the wounds of the posterior departments of the longitudinal and transverse sinus taking into account of the condition for work DMP, was necessary to consider it in a number of cases permissible. Conducted/supplied under bone above the damaged sinus gauze tampon is left in wound, without changing during 6-10-14 days. From the sewing of muscular tampon to the damaged sinus, and also from sewing up or dressing of the latter on DMP it was necessary to abstain and to resort to this only in view of emergency. This tactics was dictated by the fact that during these all manipulations appeared the supplementary venous hemorrhage, to manage which under conditions of DMP was very difficultly.

Hemorrhage from the depth of the wound of brain usually ceased with the aid of the delicate gauze tampon, moistened by peroxide of

hydrogen, conducted/supplied as far as possible to the bottom of wound canal and left in wound, according to facts, on 1-2-3 days.

Each surgical intervention on skull and brain concluded with the dusting of wound by sulfanilamides and by imposition on wound of gauze bandage. Series/row of DMP applied the sound-recording sulfanilamide emulsions. From the imposition of the guides of sutures to skin under conditions of DMP it was necessary usually to abstain.

Among those wounded into skull and brain entered DMP and the transferred the closed injury skulls, without the violation of the integrity of external integuments. As showed the materials of war, only 1.80/o of them were found at this time in heavy condition with the picture of contusion or compression of brain, in all others had injury light or average/mean severity.

The experiment/experience of war showed that the severity of the condition of the first, comparatively small, the group of damages was caused into some cases by the depressed break of the bones of arch/summary or basis of skull, and in others - by presence of intracranial hematoma. In connection with this completely logically arose the question about most efficient aid in such cases.

During war it was proved that surgical intervention in the form

of decompression trepanation it was to be applied on DMP only when there were obvious doubtless signs/criteria of the progressive compression of brain by intracranial hematoma. The nevertheless remaining cases of the closed damage of skull successfully were treated by the conservative methods, directed, first of all, toward a decrease in intracranial pressure and struggle with the phenomena of shock.

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From the dehydrating substances widest use during war obtained the hypertonic solution of glucose and sodium chloride.

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By all wounded, which remained on DMP as a result of nontransportability, they introduced into vein on 75-50 cm<sup>3</sup> 40o/o solution of glucose or 20 cm<sup>3</sup> 15o/o solution of sodium chloride. Glucose was frequently introduced simultaneously with 40o/o urotropin - from 5 to 10 cm<sup>3</sup>. In many instances under the effect of this treatment the condition of wounded noticeably was improved.

Was applied also, as has already been indicated above, and the blood transfusion as the antishock and general strengthening

substance. Especially favorable results were obtained with the drop blood transfusion. Any complications during wounds and closed damages of skull and brain in this case it was not noted.

Widely they were applied from readings of the substances, stimulating cardiovascular activity (caffeine and camphor) and different stimulators (ephedrine, phenamine, etc.).

With mental excitation or epileptic fits favorable effect was obtained from the use/application of a luminal. In certain cases of the especially expressed excitation and frequent fits it was necessary to apply hexenal.

Results of the treatment of those wounded the skull on DMP during different combat process/operations. By itself is understood that about the results of treatment in the first stages of evacuation with such heavy wounds as the wounds of the skull and of brain, it is necessary to speak only very relatively. The fact is that the basic criterion of these results (quantity of recoveries) can concern on DMP only of the unit of the lightest group of those wounded the soft tissues of skull and completely does not characterize, thus, the results of the treatment all of those wounded the skull. On the other hand, a quantity of lethal outcomes on DMP in the heaviest group of wounded also by no means exhausts all subsequent issues and gives

only very relative representation about the results of treatment.

Only with the stipulations indicated it is possible to lead some data on different combat process/operations about recovery and lethality on DMP of those wounded into skull, since their comparison presents nevertheless known value for judgment about effect on the results of the treatment both of the varied conditions for a medical-tactical circumstances and changing the surgical installations in different by year wars.

Relative to the recovery of wounded the skull in report materials corresponding combat process/operations are following data.

During first two combat operations certain unit of the wounded with the damage of the cones of skull was acknowledged by that recovered without direction in neurologic research in KhPPG. During the rout of the Germans in the environs of Moscow a quantity of these wounded composed 1.60/c, into Stalingrad battle - 0.40/o. The reasons for the errors indicated consisted, on one hand, in deficiencies in the identification of the condition of wounded, and on the other hand - they depended on deficiencies in the neuro-surgical aid.

Another position/situation was created with the recovery of those wounded the soft tissues of skull.

During the rout of the Germans in the environs of Moscow and the blockade break-through of Leningrad the percentage of recovery on DMP of wounded with the damage of the soft tissues of skull was equal altogether only 1.3 and 1.6. This comparatively low percentage can be explained by the nearness to the front of large cities, to which these wounded were evacuated. In contrast to this during an Orel-Kursk battle the percentage of the recovery of those wounded the soft tissues of skull at DMP sharply increased and achieved 19.3.

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So/such high this percentage was during combat process/operation "a vistula-Oder" (13.2). Taking into account that the considerable quantity those wounded the skull can be correctly predicted only after neu -surgical and x-ray examination which on DMP cannot be fulfilled was, the latter recognized recovered only most easily wounded, without the signs/criteria of brain concussion, leaving them on the spot for care of other wounded and at the same time realizing a sufficiently prolonged medical supervision after them. During the decision/solution of a question about the recovery of wounded always one should remember that during war were noted several cases when the so-called wounds of the soft tissues of skull in actuality proved to

be penetrating, and some of them and complicated by intracranial abscess.

Taking into account everything said, it is possible to come to the conclusion/derivation that during the Great Patriotic War the treatment on DMP of those wounded the soft tissues of skull progressively was improved.

The percentage of lethality among wounded the skull and the brain in army therapeutic installations from the time of rout Germans in the environs of Moscow in 1941 in the subsequent combat process/operations progressively was decreased, and to the time of latter/last combat operation 1945 it was lowered almost three times.

Taking into account that the percentage of lethal outcomes depends on the condition entered of those wounded into skull, as this was during battle in the environs of Moscow in 1941 there are, however, all all bases consider that in the progressive descent in the lethality on DMP during the Great Patriotic War great role played also a change of the surgical tactics toward the limitation of operability of those wounded into skull and brain only by vital readings.

**EVACUATION OF THOSE WOUNDED A SKULL FROM ARMY AREA.**

Both with PMP and with DMP they evacuated all those requiring further treatment of the transportable wounded. They did not evacuate only found in the condition of agony, coma and sopor, or wounded with epileptic fits or in the condition of psycho-motor excitation. Evacuations were not subject also all requiring the urgent process/operation.

For the purpose of the decrease of transport traumatization during the first year of war used extensively immobilizing the head of bandage from the splints of Cramer or with dycto or pasteboard gaskets. Subsequently from these bandages it was necessary to refuse, since they themselves did not justify. Furthermore, when the wound of skull was not escorted/tracked by the heavy violations of the functions of central nervous system, this "immobilization" bandage was useless and caused many inconveniences to wounded in route/path. However, in the cases of the heavy damage/defeat of brain the wounded underwent the danger in asphyxia by emetic masses, since his to place sideways in the presence of this bandage was not impossible.

It should be noted that completeness and speed of evacuation in the known circumstances of extent and condition of roads, and also from form/species and quantity of transport. However, as is evident

of the given below numbers, in spite of frequently difficult conditions the evacuation of wounded from the therapeutic installations of immediate rear was carried out in always of war completely satisfactorily.

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For the evacuation of those wounded the skull and the brain in the beginning of war they used predominantly medical motor transport, horse transport or by "empties." In second half war in some combat process/operations (Orel- Kursk battle and Belcrussian process/operation) for the evacuation of those most heavily wounded the skull into army therapeutic installations they were adopted the aircraft transport, which proved to be most suitable for this purpose.

Data about the evacuation of those wounded the skull and the brain with DMP are given on diagram (Fig. 30).

The given data show that a quantity of evacuated with DMP wounded the skull with damage ones always increased, after achieving in last year of war 85.80/o. At the same time, during war was decreased the percentage of evacuation into the army therapeutic installations of those wounded the soft tissues of skull. In last

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year of war from this group it was evacuated only 78.10/o; others, most easily wounded left were on DMP they recovered in army area.

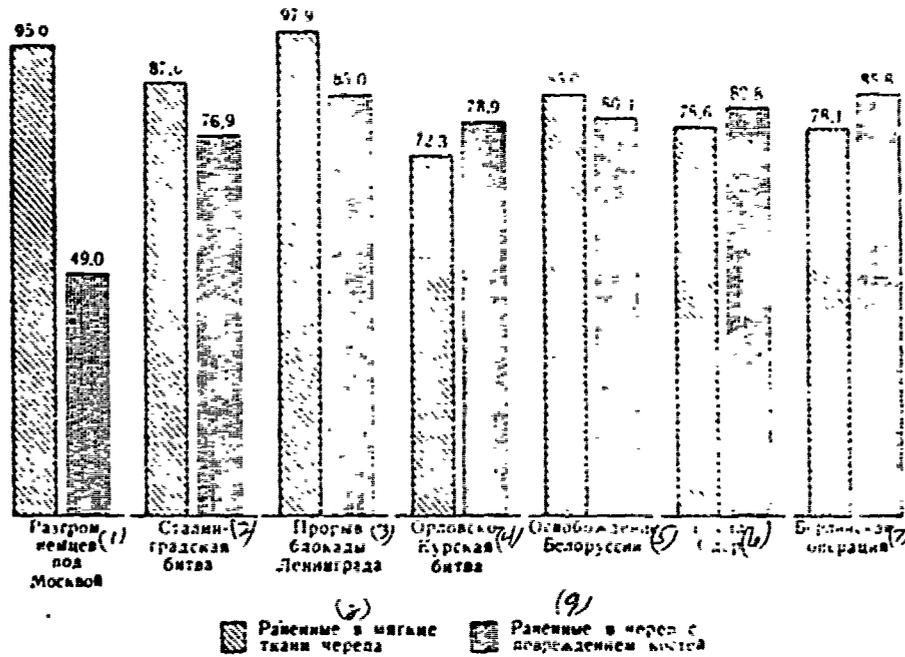


Fig. 30. Evacuation of those wounded the skull with DMP in different combat process/operations (in percentages to each group).

Key: (1). Rout of the Germans in the environs of Moscow. (2). Stalingrad battle. (3). Blockade break-through of Leningrad. (4). Orel- Kursk battle. (5). Liberation of Belorussia. (6). Vistula-Oder. (7). Berlin process/operation. (8). Wounded soft tissues skulls. (9). Wounded skull with damage of bones.

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Medical aid by that wounded the skull on GBA.

Short clinical characteristics of those obtained the wounds of skull and brain and the examination/inspection of these wounded.

In army therapeutic installations those wounded into skull entered usually soon after wound. Heaviest group among them, with the penetrating wounds of skull and brain, was hospitalized in army KhFFG frequently on several weeks in connection with non-transportability in view of of the seriousness of their condition or after produced surgical interventions. Therefore in army therapeutic installations was located the significant part of those wounded the skull and the head brain not only in initial period of the course of injury, but also in the period of early reactions and complications. These facts was to be considered during the organization of the specialized aid by that wounded the skull.

As is known, into the first hours and frequently also days from

the moment of the injuries, wounded into skull were located in different therapeutic installations of immediate rear, and also in route/path into specialized army KhPPG.

So/such inherent in the initial period of the wounds of skull and brain diversity, complexity and rapid mutability/variability of the clinical picture, observed in the therapeutic installations of immediate rear, were relieved by the frequently even heavier condition of wounded after entry into specialized KhPPG due to appearance in the unit of them of the heavy disorders of circulation, that led sometimes to the development of edema and bloating of brain. By this time also appeared the phenomena of cerebral hypotension during the massive escape of cerebro-spinal fluid in the cases of the wounds of the ventricles of brain.

The continuous intracranial hemorrhage under the effect of the unfavorable conditions of transportation sometimes led to the education of massive hematomas and the compression of brain.

Thus, the dissemination of edema and bloating of brain to its hangover unit, and also phenomena of the compression of brain or, on the contrary, cerebral hypotensions caused heavy clinical picture in the unit of those entered army KhPPG, wounded the skull, evacuated in satisfactory condition from the therapeutic installations of

immediate rear.

However, the considerable group of the wounded, who were being located in army therapeutic installations without consciousness, emerged from this heavy condition for the first hours and day entered the army hospitals already into clear or somewhat stunned consciousness in satisfactory general condition.

Consequently, together with the wounded, in whom there were sharply pronounced general cerebral and hangover symptoms, in army specialized KhPPG began to predominate the wounded, publishing or who left this heavy condition.

One should also note among those entered from army therapeutic installations obtained the severe closed injury of skull with the breaks of bones or with the phenomena of the damage of brain and its shells. The experiment/experience of war shows that those with the severe closed injury of skull, who are subject to treatment in specialized KhPPG, were the very small percentage those all obtained the closed injury of skull.

In army KhPPG attention is drawn to the appearance in the wounded into skull early infectious complications from the side of brain and its shells, unit from which was developed sharply and

violently, and unit - gradually, involving into the zone of infectious focus all new and new departments of brain.

In army therapeutic installations it was necessary to observe the "lightning" forms of meningitis, which appeared to the 2-3rd day after wound and led in the significant part of the cases to lethal outcomes. Were encountered also acute/sharp purulent and anaerobic encephalitides, rapidly and diffuse damaging brain tissue.

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At the same time, attention is drawn to the early festering of wound canal which in a number of cases after timely primary processing gave no subsequent complications, but in the unit of the observations it led to the development of the early abscesses of brain or meningoencephalites, with the advent of "malignant" protrusions of brain.

The development of the which associate wound different complications of which the first place occupied pneumonia, also often made the condition worse of those wounded the skull and impeded the decision/solution of a question about readings to the primary processing of wound.

Thus, the complexity of clinical picture and the appearance of different complications, which appear in the initial and early period of the course of the wounds of skull and brain, required for the purpose of prophylaxis, timely development/detection and treatment of their joint operation of surgeon and neuropathologist in specialized army KhPPG.

Clinical investigation of that wounded the skull in army therapeutic installations stored/added up from the examination/inspection of wound and x-ray and neurologic examination. One examination/inspection of wound could not give idea about depth and character/nature of the damage/defeat of cerebral substance. To all are well known the cases when with the small wound of skin integuments was heavy damage/defeat of brain, which required urgent surgical aid, which could be established/installed only during the neurologic research of wounded. However, one neurologic research, even more thoroughly but without the examination/inspection of wound, without taking into account surgical symptomatology, also cannot give a precise representation about the severity of wound. During evaluation of the general condition of wounded the neuropathologist must not be limited only by neurologic research, disregarding the wound of brain. The examination/inspection of wound makes it possible for neuropathologist to more rightly decipher the observed by it neurologic symptomatology.

The basic tasks which stood before the neuropathologist in army area and on the basis of what were developed the readings to surgical intervention, this to establish/install depth, volume and character/nature of intracranial damage/defeat. But these tasks could not be solved without the examination/inspection of wound and without taking into account the direction of wound canal. Only combination of the surgical study of wound, roentgenological data and neurologic research gave representation about character/nature and depth of the damage/defeat of the substance of brain.

The experiment/experience of war showed that most advisable is the primary neurologic research of wounded in medical dressing room specialized KhPPG with the simultaneous examination/inspection of wound.

However, ophthalmological research in initial period has small value. The observed here changes from the side of eyeground do not affect the decision/solution of a question about readings to surgical intervention. In the period of early complications ophthalmological research acquires greater value. With the late complications to data obtained during the research of eyeground, must be sometimes diverted the decisive role in the establishment of diagnosis.

Characteristic ones for those wounded into skull, that entered the army hospitals, should be counted the predominance in them of the symptoms of suppression and fallout from the side of the central nervous system above the symptoms of stimulation and excitation.

Wounded with general cerebral symptoms required close attention and permanent observation. These symptoms, being sometimes at first little expressed, then gave the picture of the heavy disorders, requiring in a number of cases of urgent surgical intervention.

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In other observations initial heavy picture for the next hours was smoothed, especially because of granting to the wounded of rest.

Not smaller role, than change in the common cerebral symptomatology, played changes in the focus symptoms - the degree of the manifestation of the latter was found in direct connection with character/nature and localization of the obtained wound.

As it is shown, the primary meaning of neurologic analysis consisted in the determination of character/nature and depth of the

damage/defeat of the substance of brain. And here the establishment of the symptoms of the damage/defeat of the barrel of brain had great, and the sometimes and decisive importance in the sense of both prognosis and use/application of one or the other therapeutic measures, including operational ones. The hanger-on symptomatology, observed in army hospitals, was expressed in the disorder of respiratory/breathing and cardiovascular activity, comatose condition, violation of ingestion, change from the side of pupils, sometimes from full/total/complete by loss it is pupil reaction to light, by paresis - paralyzes of look, tonic spasms of the type of decerebration rigidity, appearance of bilateral pathological reflexes, and also - in it is different the combination of these symptoms.

The most important task during hanger-on violations was the establishment of their primary or secondary character/nature. If there was direct damage of hanger-on departments of brain, then such wounded, as a rule, perished either immediately after wound, or soon after it. Any surgical intervention in such cases proved to be unsuccessful. Completely another position/situation was, when the symptoms of the damage/defeat of barrel were secondary. In such cases it was very importantly come to light/detect/expose the reasons, which caused them. It is extremely important to establish/install the period, which passed from the moment of wound to the appearance of

hanger-on symptoms. If with the heavy penetrating wounds of skull frequently it was possible to note those or other symptoms from the side of the barrel of brain, which attacked/advanced as a result of edema after certain time after wound, then the appearance of hanger-on violations either immediately after wound or into the nearest hours after it she indicated usually the presence of epidural, subdural or intra-cerebral hemorrhage. Therefore the early appearance of hanger-on symptoms during the identification of the hemorrhages, which require immediate surgical intervention, should be attached much importance.

Most frequently in the army hospitals were encountered subdural hematomas, which appeared during the damage of the vessels of soft cerebral shell and vessels of brain, which sometimes served as a cause of death of wounded in specialized KhFFG. By the difficulty of clinical diagnosis is explained the considerable percentage of undiagnosed intravitaly hematomas. Hemorrhage after wound soon produced sharp deterioration in the condition of wounded, loss of consciousness, vomiting, cyanosis, build-up/growth of focus symptoms against the background of the expressed meningeal phenomena. All these general cerebral and focus symptoms cannot be considered characteristic only for hematomas. The intracranial pressure increase on the level with hematoma can arise, also, as a result of reason, nothing in common with the hemorrhage of that having. Basic in the

diagnosis of hemorrhages must be not one or the other clinical picture, but time, past from the moment of wound to appearance of this clinical picture. Primary attention must be here turned to the speed of appearance and build-up/growth both of general/common/total and focus cerebral symptoms.

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Everything said is related also to the cases of the closed injury of skull with which occurred the growing compression of brain as a result of hemorrhage both of the vessels of shells and from the vessels of brain.

Focus symptoms with the wound of skull and brain in army therapeutic installations in the majority of the cases can be revealed and correspond to basic stricken area. The latter with the bullet wounds of skull and brain in turn, corresponds to the place of the direct application/appendix of injury. Focus symptomatology, depending on damage to one or the other area of brain, was presented earlier (see Vol. 4). One should emphasize that is here important the determination of the basic symptoms, which make it possible to establish/install local diagnosis in the hospitals of army rear. The elaboration of symptoms, the determination of one or the other micro-symptomatology, sometimes so important with diseases central

nervous a system, have smaller significance with the wounds of skull and brain in battlefield condition. Here already very disposition of wound it indicated usually the localization of focus.

With the penetrating wounds of skull tunicary symptoms to a certain degree almost constantly were observed in the army hospitals. Here had a value not so much their establishment, as dynamics of their development.

With the primary examination/inspection of wound hardly ever it was possible to answer a question, what is in this case wound - penetrating or nonpenetrating. Especially this concerns blind-end wounds by small/fine fragments, and also blunt wounds with small perforated breaks. If during the extensive damages of the bones of skull and substance of brain a question about depth and character/nature of damage/defeat was more or less clear, then otherwise proceeded affair with fairly often encountered wounds by small/fine metallic fragments. The majority of these wounds did not produce rough damage of bone and sometimes they were treated as the wounds of soft tissues. Chalk metallic fragments can penetrate the brain at great depth, sometimes passing into contradictory/opposite hemisphere, piercing the ventricle, arranged/located on the course of wound canal, but without producing, however, clear general cerebral and focus symptomatology because of small sizes/dimensions of

fragment. Only x-ray examination gave the possibility to determine by metallic fragment in the depth of the substance of brain. The comparison of the roentgenological data about the location of metallic fragment with the disposition of inlet gave representation about course of wound canal in brain tissue. However, even in these cases sometimes was observed the series/row of the symptoms, which spoke about the presence of the penetrating wound: the discharge from the wound of cerebral substance, the escape of the cerebro-spinal fluid, sometimes transparent/hyaline, but more frequent than colored pink as a result of the admixture/impurity of the blood, and finally determined by rule of thumb subcutaneous pulsation of brain in the area of wound. Each of these symptoms was observed either individually or in combination with others.

In the presence of the considerable damages of the bones of skull and solid cerebral shell on the day of wound usually was detected the damaged substance of brain, and sometimes also protrusion of the brain (description of wounds see Vol. 4).

X-ray examination is the necessary composite/compound component part of the composite examination/inspection in army specialized KhPPG with the penetrating wounds of skull.

The experiment/experience of war, when at first individual surgeons performed the primary processings of the wounds of skull and brain on DMP, it showed that the unit of these process/operations proved to be nonradical and it required further repeated interventions, in view of the fact that basic intra-cerebral focus with bone fragments remained unfinished. It is logical that, without having roentgenological data, surgeons could not precisely judge about presence and disposition of foreign bodies in the substance of brain.

The experiment/experience of the Great Patriotic War showed that on field x-ray apparatus it is possible to obtain sufficiently high quality of the x-ray photograph of skull, those completely satisfying surgeon during primary processing. One should in this case emphasize that the basic method of x-ray examination in army therapeutic installations is the x-ray analysis.

Some roentgenologists' attempts to replace the x-ray analysis of skull with fluoroscopy with the subsequent sketching of the disposition of foreign bodies should be recognized unsuccessful ones, since they not only gave a precise representation either about the disposition of foreign bodies or about their quantity, but also they confused surgeon. Only the x-ray photographs of skull in two

projections gave sufficiently clear representation about character of the damage of the bones of skull, about presence and disposition of foreign bodies. Comparatively rarely it was necessary to resort to the special pilings of wounded for the production of aiming x-ray photographs. However, sometimes the fluoroscopy of skull made it possible to specify localization of the foreign body, arranged/located either under bone or out of the area of skull.

For the productive and purposeful work of x-ray separation/section is necessary intimate and daily contact between the surgeon and the roentgenologist. It is necessary to recognize as unsuitable this situation, when wounded of the sorting separation/section they directly guide into the x-ray room to photograph. In these cases is conducted the formal research, which little gives to surgeon, and to roentgenologist. In this case the roentgenologist cannot produce the purposeful and comprehensive x-ray examination, which is necessary for full-valued conclusion. Experiment/experience showed that most correct is the direction of those wounded the skull from sorting separation/section directly into medical dressing room, where they will inspect neuropathologist and surgeon. Obtained data will bring in into the history of disease/sickness/illness/malady with which wounded in the case of necessity they guide into the x-ray room. Roentgenologist becomes acquainted with the history of disease/sickness/illness/malady and on

the basis of it plans the plan/layout of x-ray examination (ordinary photographs, special pilings, fluoroscopy, etc.). Not one wounded must not leave the x-ray room as long as investigation will not be completed; is undesirable such situation, when the need for supplementary research is revealed/detected after wounded already left the x-ray room. This upsets the operation of operational unit and introduces the disorganization, intolerant under conditions of the entry of a great quantity of wounded into specialized KhPPG. Experiment/experience showed that for a trouble-free operation both the x-ray room and the bandaging unit/block it is necessary the X-ray room to place in immediate proximity to the bandaging unit/block, after reducing to minimum the distance between them. During tent disposition it is expedient to place tent with x-ray apparatus next to the tents of the bandaging unit/block, and in the case of disposition KhPPG in quarters/premises - in one building. This provides the permanent and so/such necessary direct contact between the surgeon and the roentgenologist, it will not traumatize wounded by transference up to distant distance and does not require stretcher bearers' great quantity.

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One should remember that after the great entry of wounded to direction into the X-ray room are subject first of all the most heavy

of them with the penetrating wounds skulls. With blind-end wounds with small inlets is necessary the X-ray analysis. The group of wounded with nonpenetrating damages to bone and wounds of soft tissues in the presence of readings to X-ray analysis must be directed to the X-ray room only after is completed the roentgenological examination/inspection of wounded with the penetrating damages.

The obtained the severe closed injury skulls with suspicion to the damage of the bones of arch/summary are also subject to necessary X-ray analysis.

Thus, only the combined work of surgeon, neuropathologist and roentgenologist makes it possible to establish/install character/nature, depth and vastness of the damage of the substance of brain and to manufacture readings and sequence of primary processing in the army specialized hospitals.

Periods of entry and envelopment by the specialized aid of those wounded the skull in different combat process/operations.

On the experiment/experience of the Great Patriotic War clearly it is possible to see, as with conducting of the series/row of organizational measures progressively increased the entry of wounded

in army specialized KhPPG within earlier periods. The absolute majority of wounded entered army specialized KhPPG into 48 aces' firsts after wound, i.e., in time, most favorable for the primary processing of the wounds of skull and brain. The periods of the delivery/procurement of wounded into specialized KhPPG of army rear depend on sanitary-tactical conditions, on extent and condition of evacuation routes and on transport means.

In particular, during the blockade break-through of Leningrad wounded entered specialized KhPPG more frequent the second and third day.

During the liberation of Belorussia those wounded into skull entered in the beginning of combat process/operation into army specialized KhPPG in the first 24 hours after the wound; but subsequently, in connection with the advance of army forward, the distance between DMP and specialized hospital considerably increased and the periods of the entry of wounded were lengthened. However, 66.30/o of those wounded into skull entered into specialized KhPPG for the first 24 hours after wound. One should add that in 54.70/o of wounded the primary processing was produced also in first 24 hours after wound. Approximately/exemplarily the same position/situation is noted during combat process/operation "Vistula-Oder". During Berlin process/operation into specialized KhPPG entered to 24 hours after

wound by 64.70/o, and during 1-2 days 30.60/o more of wounded. Thus, in Berlin process/operation 95.30/o of those wounded into skull they entered into specialized KhPPG for the first 48 hours after wound.

Together with of this, in the course Great Patriotic War progressively grew/rose the envelopment by the specialized aid of wounded the skull and the head brain, and absolute majority wounded the skull with damage bones began to enter specialized KhPPG, where they underwent detailed examination/inspection and where was conducted the surgical processing of wounds.

The following data show envelopment by the specialized aid in KhPPG of wounded the skull with damage bones on different combat process/operations (Fig. 31).

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If during the rout of the Germans of odes by Moscow those wounded the skull and the brain in essence entered the army hospitals of general-surgical profile/specialty, then already in Stalingrad process/operation a considerable number of wounded the skull with damage bones was directed to those intended for these wounded KhPPG. During the blockade break-through of Leningrad the envelopment by the specialized aid achieved 52.30/c, which is explained by the special

feature/peculiarity of medical-tactical conditions during this combat process/operation. The powerful/thick hospital basis of front was arranged/located in Leningrad near from the army hospitals. Therefore a considerable number of wounded the skull with damage bones, completely transportable, was headed on GBF, passing specialized army KhPPG. During an Orel-Kursk battle already 90.00% of wounded the skull with damage bones entered into specialized KhPPG. Envelopment by the specialized aid of wounded the skull with damage bones in the period of the liberation of Belcrussia was characterized by 85.90%, in process/operation "Vistula-Oder" - 81.00%. This is explained by the fact that during these combat process/operations the troops/forces, after breaking through the defense of the enemy, began to rapidly advance forward; as a result in individual periods the unit of those wounded the skull entered directly into advanced forward KhPPG of general-surgical profile/specialty. High envelopment by the specialized aid of those wounded the skull in these two combat process/operations, taking into account the difficulties, connected with the rapid advance of our troops/forces forward, should be considered the as doubtless achievement of the medical service of army. During Berlin process/operation all wounded the skull with the damage of bones were encompassed by the specialized aid, except the single wounded, who, as a result of their heavy condition, were nontransportable and were not subject to evacuation with DMP.

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As a result the military medical service of the Red Army attained such position/situation, that from second half war virtually all wounded into skull with the damage of bones received neuro-surgical aid in army specialized KhPPG.

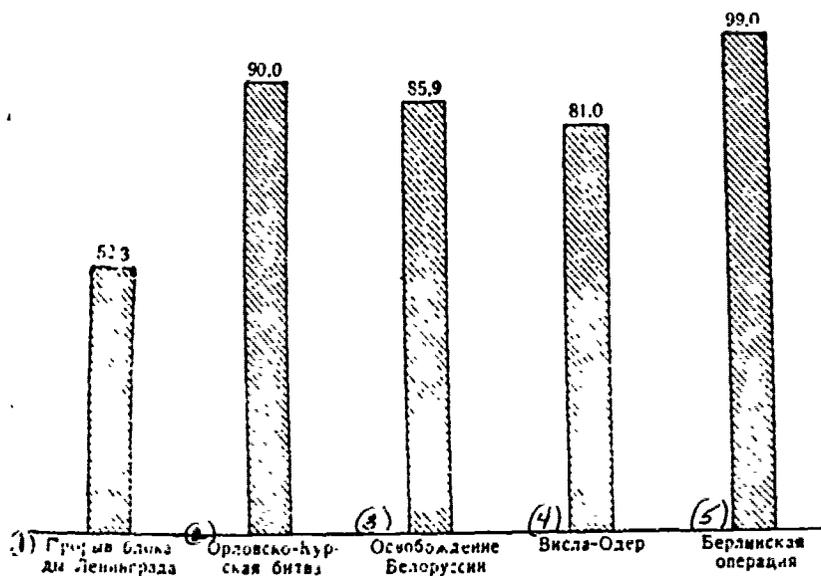


Fig. 31. Envelopment by the specialized aid of wounded the skull with damage bones in different combat process/operations (in percentages).

Key: (1). Blockade break-through of Leningrad. (2). Orel-Kursk battle. (3). Liberation of Belorussia. (4). Vistula-Oder. (5). Berlin process/operation.

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Readings and contraindications to the primary processing of the wounds of skull and brain.

Readings and contraindications to primary processing are developed on the basis of those data which were obtained upon

surgical, neurologic and roentgenological examination/inspection of wounded moreover is considered the place where is conducted intervention, the period, which passed from the time of wound, and, naturally, is considered in this case a medical-tactical circumstances.

The absolute majority of those wounded the skull and the brain is subject to primary surgical processing, with exception of those cases when there are contraindications to surgical intervention. Surgeon's task it is on the basis the data, obtained upon the examination/inspection, to take away those wounded, by which operational intervention is counter-indicative. Here are related the wounded who were delivered into army specialized KhPPG in the agonic condition, when any surgical intervention is already aimless. Those wounded the skull and the brain, delivered in the condition of shock, it is first to derive from this condition and after this to only subject to primary processing. If the wounds of skull are combined with the heavy wounds of stomach, breast, with the open breaks of thighs, then surgical intervention must be first of all produced apropos of the heavy combined wounds, and then apropos of the wound of skull and brain, if for the latter there are no urgent readings. The following group includes the wounded, in whom during neurologic research are established/installed gross hanger-on violations. In these cases, if there is direct damage of hanger-on departments of

brain, operational intervention does not give results, since such wounded, as a rule, perish soon after wound. But if hanger-on violations are secondary, then it is necessary to explain how they are caused. When hanger-on symptomatology developed as a result of the growing compression as a result of hemorrhage, surgical intervention is vitally necessary. But if hanger-on violations are caused by edema of the hanger-on department of brain, to more rationally utilize entire complex of the conservative therapy, directed to struggle with this terrible complication, first of all dehydration therapy, and then, after the reverse development of hanger-on phenomena, to perform the surgical processing of wound. Finally, there can be single wounded with developing pneumonia, etc., when in view of the general heavy condition of wounded primary processing it is necessary to plct.

All remaining wounded the skull and the brain are subject to primary processing, moreover must be established/installed the specific sequence of their direction into operating room. On the urgency of the direction of wounded into operating room their I can break into three groups. The first group includes the wounded, who require special surgical intervention apropos of external or internal hemorrhage or suspicion to it both with the penetrating wounds and of the cases of the closed injury of skull. The second group includes the wounded with the picture of the expressed the intracranial

pressure increase, liquorheas, by discharge of the substance of brain, its protrusion.

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Here must be referred wounded with the early purulent complications which should be without delay treated, because the existence of the focus, from which enters the infection, makes ineffective any therapy, until is removed the source of infection. Process/operation in these cases must ensure free outflow from the wound of brain. The third group includes all remaining wounded with the penetrating damages. Here, other conditions being equal, it is necessary to consider the period, which passed from the moment of wound. Wounded with later periods are subject to surgical intervention in first place.

To the primary perfecting of the nonpenetrating wounds of skull one should begin only after conducting of the primary processing of all requiring it wounded with the penetrating wounds of skull.

It is necessary to indicate that the period from the moment of the entry of wounded into specialized army KhPPG to primary processing must not be the period of passive waiting. During this time were applied all measures for an improvement in the condition of

wounded. Where this was shown, was carried out dehydration therapy, were applied the substances, improving cardiovascular activity, was conducted the blood transfusion and were created all conditions for the provision to wounded of full/tctal/complete rest before forthcoming surgical interventicn.

From all that presented it is evident that in the time of the Great Patriotic War in army specialized KhPPG placed wide readings to primary processing with wounds the skulls and brain, rejecting it only the clearly hopeless cases. Neither sizes/dimensions of bone damages nor massiveness of the deccomposition of brain tissue were contraindication to surgical processing.

If under conditions of peacetime the comparison of the clinical data, obtained upon examination/inspection, determines surgeon's conduct in the manufacture of readings to operational intervention, then under military field conditions during the manufacture of readings to surgical interventicn it is necessary to consider another series/row of the moments, connected with the special features/peculiarities of a medical-tactical circumstances.

The experiment/experience of war showed that the percentage of operability of those wounded the skull and the head brain in army specialized KhPPG steadily grew/rose, moreover in some neurosurgeons

all requiring the primary processing underwent by it in army area. It is necessary to particularly emphasize the vast value of operational-tactical circumstances. So, in period between battles surgical activity of specialized KhPPG army area was very high, whereas in the period of combat operations it somewhat was reduced due to great sorting-evacuation work. Therefore the percentage of operability with the wounds of skull and brain in army specialized KhPPG in essence was determined by medical-tactical conditions. It is necessary to note, however, that, in spite of the appeared difficulties during rapid offensive operations, the percentage of operability of those wounded the skull progressively grew/rose.

In the studied combat process/operations which were characterized by especially heavy situation conditions, operability in specialized KhPPG among wounded the skull with damage bones was represented on the following below diagram (Fig. 32).

Analysis the given data shows that during the blockade break-through of Leningrad in specialized KhPPG it was operated by 17.30/o of wounded the skull with damage bones. This is explained by the fact that in the time of this combat operation the powerful/thick hospital basis of front was arranged/located near from GBA and it was connected with it with a good highway, which allowed/assumed the wide evacuation of wounded into front line hospitals upon consideration to

the great overloading of army specialized KhPPG.

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Under these conditions surgical aid was rendered on GBA only most heavy to wounded. During Orel-Kursk battle the percentage of operability in specialized KhPPG rose to 25.0. Taking into account a great quantity of the wounded, directed in specialized KhPPG, the unit of those wounded the skull after their entry immediately they evacuated on aircraft into front line hospital. The presence of powerful/thick aeromedical service, and also short evacuation route made it possible to evacuate not finished a considerable quantity of those completely transportable wounded the skull. During further combat process/operations the percentage of operability sharply increased and oscillated from 70.5 to 86.5. Taking into account rapid rate/tempo of offensive operations and connected with this difficulties, this percentage of operability should be recognized as sufficiently high.

In the studied combat process/operations surgical interventions were conducted also in the cases of the severe closed injury of skull apropos of intracranial hemorrhage and compression syndrome, caused by the depressed breaks.

Are still more demonstrative comparative data about a quantity of wounded the skull with damage bones, operated in specialized KhPPG and in KhPPG of general-surgical profile/specialty, in the studied combat process/operations (table 4).

From table 4 it is evident that in the time of Stalingrad battle 55.30/o of those wounded the skull were operated in KhPPG of general-surgical profile/specialty and 44.7c/c - in so-called specialized KhPPG. Beginning from the blockade break-through of Leningrad and in all subsequent combat process/operations, position/situation sharply changed. All surgical interventions on perfecting of the wounds of skull and brain were conducted mainly in specialized KhPPG, but in KhPPG of general-surgical profile/specialty surgical interventions were undertaken only from vital readings, which virtually occurred in the single cases.

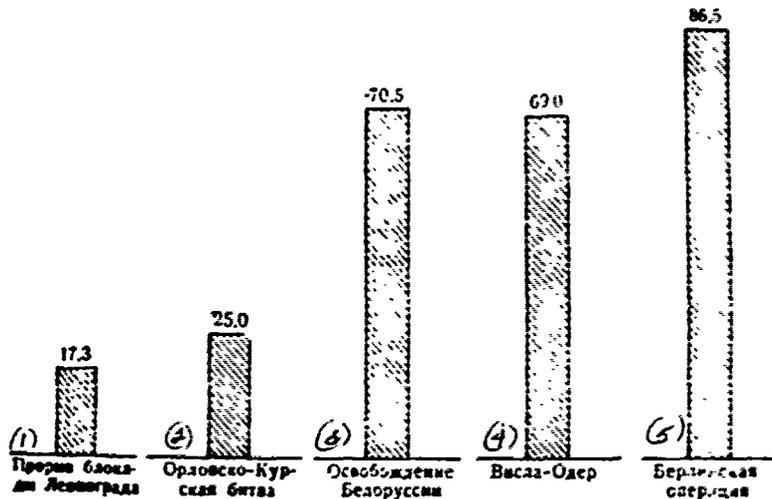


Fig. 32. operability of wounded the skull with damage bones in army specialized KhPPG into different combat process/operations (in percentages).

Key: (1). Blockade break-through of Leningrad. (2). Orel-Kursk battle. (3). Liberation of Belorussia. (4). Vistula-Oder. (5). Berlin process/operation.

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If in view of the created medical-tactical conditions not all wounded, who were requiring the primary processing, could be operated in army specialized KhPPG, then arises question, what group of wounded was subject to evacuation to the following stage for the surgical processing of wounds. First of all were subject to

evacuation those wounded the skull with the damage of bones, but with pearl by solid cerebral shell (nonpenetrating wounds), without the phenomena of the elevated intracranial pressure: in the second burst, if forced to this tactical operation circumstances, the obtained penetrating wounds of skull, which were being found in satisfactory condition. More heavy condition, vomiting, change in the pulse and respiration, discharge of brain, its protrusion, hanger-on violations, discharge of the cerebrospinal fluid through the wound, infectious complications - all this served as contraindication to the evacuation of wounded from army specialized KhPPG. With slightest suspicion to hemorrhage the evacuation is inadmissible.

The experiment/experience of the Great Patriotic War showed that for the period of combat process/operation is most expedient the advancement of forward one of the mobile specialized evacuation hospitals subordinate to Front line authority, which was being arranged/located either near army rear or in army rear not far off from specialized army KhPPG of that army, which is located on the direction of main attack. Short evacuation route gave the possibility to evacuate of that not finished that unit of the wounded the skull and the brain, which by force noted above reasons could not be produced primary processing in army specialized KhPPG.

The evacuation of the unfinished wounded from army specialized

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KhPPG was conducted by different forms/species of transport, in dependence on the series/row of conditions. During Stalingrad battle evacuated on motor vehicles, paired horse vehicles or sleighs. Aeromedical service during this combat process/operation was utilized only in the single cases, since this form/species of evacuation was at that time connected with great risk as a result of the intensive activities of fighter aviation of the enemy. During the blockade break-through of Leningrad was widely used the motor transport, and at the end of the combat process/operation - evacuation by railroad.

Table 4. Operability of those wounded in skull in specialized KhPPG and KhPPG of general-surgical profile/specialty in different combat process/operations (in percentages)

(1) Военные операции	(2) Лечебные учреждения	(3) Специализированные ХППГ	(4) Общехирургические ХППГ	(5) Всего
(6) Сталинградская битва		44,7	55,3	100,0
(7) Прорыв блокады Ленинграда		98,6	1,4	100,0
(8) Орловско-Курсккая битва		99,0	1,0	100,0
(9) Освобождение Белоруссии		97,7	2,3	100,0
(10) Висла — Одер		99,0	1,0	100,0
(11) Берлинская операция		99,0	1,0	100,0

Key: (1). Combat process/operations. (2). Therapeutic installations. (3). Specialized KhPPG. (4). General-surgical KhPPG. (5). In all. (6). Stalingrad battle. (7). Blockade break-through of Leningrad. (8). Orel-Kursk battle. (9). Liberation of Belorussia. (10). Vistula-Oder. (11). Berlin operation.

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In an Orel-Kursk battle the evacuation of the unfinished wounded from specialized army KhPPG was carried out in essence by aeromedical service. For this purpose sanitary control of front attached to hospital a sufficient quantity of aircraft, which made it possible to evacuate by aircraft transport a considerable quantity of wounded. The presence of powerful/thick aeromedical service, the

approximation/approach of the front line specialized hospital to army, short evacuation route allowed army specialized KhPPG to evacuate a considerable quantity of the transportable wounded by those not finished.

The obtained the closed injury skulls were also subject to direction of the army area into the front line specialized hospital, if it was not readings to urgent surgical intervention in specialized KhPPG.

Procedure of processing the wounds of skull and brain.

The procedure of processing the wounds of skull and brain was during the Great Patriotic War completely developed. It is very significant, that in the first months of war the majority of the surgeons, who worked at different fronts, was stopped at the homogeneous procedure of processing the wounds of skull and brain. Already this alone the fact, based on the great number of observations, confirms vitality and practical value of this procedure.

In individual surgeons had differences only into fine details of surgical intervention during primary processing, whereas basic points were in all identical.

The procedure of the primary processing of the wounds of skull and brain, which was being applied in army therapeutic installations during the Great Patriotic War, was presented in Volume 4.

One should only note that at the beginning of war the individual surgeons, who performed processing the wounds of skull and brain, always did not realize it sufficiently radically and spare, then subsequently, in proportion to gaining of experience, these defects were removed. Were developed and refined separate parts in the procedure of processing the wounds of the skulls, which contributed to an improvement in the results of treatment.

In the practice of military field neurosurgery was widely introduced the so-called deferred processing of the wounds of skull and brain - to the 3-4th day, which with the impossibility of early processing gave very positive results.

In the course of war were also manufactured and sharpened the readings to reworking in the cases of nonradical nature of primary process/operation on skull and the substance of brain. The obtained during reworking favorable results completely refuted foreign neurosurgeons' opinion about the aimlessness of secondary

interventions on brain, which asserted that "that not done immediately, is lost forever".

It is necessary to note also that was completely developed the procedure of primary processing of the combined wounds of skull, eye, ear and sinuses of nose. In the studied combat process/operations, beginning with the blockade break-through of Leningrad and Orel-Kursk battle, this procedure already widely was applied in army specialized KhPPG.

Were developed also the most rational methods of the cessation of hemorrhage, including with the wounds of the venous sinuses of solid cerebral membranes, the methods of struggle with liquorrheas, etc.

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Based on the example of the studied combat process/operations is sufficiently clearly evident the use/application of a uniform procedure of processing the wounds of skull and brain and its further improvement in the course of war.

Relative to the post-operation conduct of wound it should be noted that surgeons' majority in the army hospitals adhered to during the Great Patriotic War of the so-called open method of conducting the wounds of skull and brain after their processing. The principle of this method with the wounds of skull and brain consists in the creation of a sufficient outflow from wound. For acceleration the healings of wound after the termination of primary processing usually on the territory of skin wound from both sides laid the drawing together sutures, and with the great wounds sutures on soft tissues were laid on the middle of the cut all over territories, leaving opened wound only on the territories; in this case the outflow from the wound of brain was of is completely sufficient. Wound they did not drain; sometimes they only fed rubber strip to solid cerebral shell.

Without stopping on a question about readings to the imposition of anechoic sutures during processing of the wounds of skull and brain, since this was stated earlier (see <sup>Vol.</sup> that 4), one should only again emphasize that the readings to anechoic suture on GBA are extremely restricted. There cannot be speeches about the use/application of the anechoic suture when to neuro-surgical work into individual cases can be drawn surgeons, which do not have the special qualification when due to the special features/peculiarities of tactical situation there is no confidence in the fact that the wounded will be able to be found entire post-operation period under the observation of that surgeon who him operated (which is compulsory during the imposition of anechoic suture), when there is no confidence in the fact that the anechoic suture will be superimposed only in such cases in which to this there will be the corresponding readings. With mobile warfare and mobile/motile front anechoic suture on GBA during the primary processing of the wounds of skull and brain in essence was not applied. However, there is a group of the wounds, when under all conditions the imposition of anechoic suture in the army hospitals is unconditionally shown, these are the cases, complicated by primary ventricular liquorrhea, without depending on whether did enter the wounded with liquorrhea or it appeared during primary processing. The experiment/experience of war showed the

unconditional advantage of anechoic suture in these cases, and neurosurgeons' absolute majority is the supporters of anechoic suture with liquorrhea.

Wider readings to the imposition of anechoic suture in army therapeutic installations were placed when there was nonpenetrating wound of skull. Here after the appropriate processing the wounds of soft tissues and bone, in the absence of the expressed inflammatory phenomena anechoic sutures successfully laid during the periods up to 2-3 days.

Complications with the wounds of skull and brain.

All complications, observed in the therapeutic installations of army rear with the wounds of skull and brain, can be divided into the infectious complications and the processes at foundation of which lies/rests the violation of blood and fluid circulation.

In the first place both in the frequency and on severity must be set infectious, usually purulent complications.

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Noting the progressive descent in the purulent complications

during the Great Patriotic War to GBA, which depends on good organization of the specialized aid, early and full-valued surgical processing, wide application of sulfanilamides, and at the end of the war and antibiotics, it is necessary to nevertheless note that the issues in early period with purulent complications were insufficiently favorable. The reason for lethality with purulent complications in the army hospitals was most frequently purulent leptomeningitis.

In of the army specialized KhPPG during the identification early purulent complications basic is a question about the differential diagnosis between primary traumatic syndrome and initial stage of suppuration. The early period of the bullet injury of skull and brain, observed in army KhPPG, has the specific dynamics of the neurologic symptoms, which are characterized by their expressed reverse development. The curtailment of the restoration/reduction of functions always must pay doctor's attention of the specialized by KhPPG to the possibility development of the restricted purulent infection.

The special importance with the diagnosis of the purulent complications of early period must be diverted to psychopathological symptomatology. A change in the conduct of wounded, a descent in the interest in that surrounding, lack of initiative are initial, and

sometimes by the only signs/criteria of the begun purulent complication. The progression of psychopathological changes, together with neurologic symptoms, leads subsequently to rough stupor, pathological sleep, what is characteristic for the final stage of the restricted purulent infection - the early abscess of brain.

Observation of the dynamics of the development of psychopathological changes, focus and general cerebral symptoms, their combination clinical characteristics of one or the other form of the restricted purulent complication of early period.

The valuable data, confirming suspicions to local purulent infection, are established/installed during x-ray examination (presence in area of the skull of foreign bodies, first of all bone fragments), and also during observation of the wound of brain.

Surgical intervention during the restricted suppurations of those observed in specialized army KhPPG, it is shown only if in the substance of brain, in the zone of the local suppurative process, are foreign bodies (bone, metallic fragments), when wound canal is not freed from the destroyed cerebral substance, blood clots, i.e., surgical intervention is shown in those all cases when either was not produced primary processing, or it was defective.

Thus, in the cases of defective primary processing in army KhPPG it was necessary sometimes to resort to reworking of the wound of brain. The experiment/experience of war showed that such reworkings proved to be completely rational and they made it possible to attain good results. Was simultaneously shown energetic sulfanilamide-<sup>penicillin therapy</sup>~~penicillin therapy~~.

Any form of the restricted purulent infection can give the generalization of the process.

Particularly important value in army therapeutic installations should be given the identification of the early abscesses of brain. In the studied combat process/operations on GEA were observed early abscesses in 2.0-3.0o/c of wounded.

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Under military field conditions the development/detection of early abscess determines surgeon's conduct in the sense of the urgency of surgical intervention, which is vitally shown. Extremely important value has the timely diagnosis of early abscess. If surgical intervention is undertaken in that stage of the early abscess when are already revealed rough symptoms from the side of the hanger-on departments of brain, then surgical aid hardly ever proves

to be effective in view of the advanced irreversibility of the process. This is why is necessary the timely diagnosis of the early abscesses when there are no yet violations from the side of the barrel of brain and when urgent surgical intervention, emptying of ulcer, can in the majority of the cases save the life of wounded.

Diffuse purulent infection in the army hospitals frequently appears as a result of the march/passage of the local inflammatory process into general/common/total in the form of diffuse purulent leptomeningo-encephalitis.

Together with diffuse purulent leptomeningc-encephalitides, in army specialized KhPPG is observed by that also spilled purulent encephalitis. Spilled purulent encephalitis - this is the generalization of infection on the substance of brain, which proceeds frequently from the local suppurative process, thus far peacefully or it is hidden flowing. Treatment with this encephalitis - conservative. Surgical intervention is conducted only by the appropriate readings according to the type of the deferred processing of wound.

To the group of the heavy infections, observed in army specialized KhPPG, should be regarded the anaerobic infection of brain. Its specific clinical characteristics and special

feature/peculiarity of bacterial flora require its liberation/excretion from the group of other infectious complications.

One should also emphasize that the observed in army specialized KhPPG complications from the side of the wound of brain, in the form of secondary protrusion of the substance of brain and ventricular fluid fistulas, are encountered with any infectious complication, sharply making the condition worse of wounded.

Simultaneously with observation of the course of the wound process is necessary the most careful daily observation of neuropathologist, in order to trap the initial symptoms of the appearing complications and to take appropriate therapeutic measures. The experiment/experience of the Great Patriotic War showed that via the in proper time initiated therapy even before will develop the full/total/complete clinical picture of infectious complication, succeed in many times lowering lethality with these severe complications. In connection with this must be turned the most careful attention to prophylaxis of the purulent complications via necessary sulfanilamide-penicillin therapy with the penetrating wounds of skull.

In the single cases was observed festering intracranial

hematomas with the closed injury of skull, which required surgical intervention.

The violations of fluid circulation, the observed after wound skulls or in the cases of its closed injury, require the particular attention of the doctors of army specialized KhPPG, mainly in view of the instability of circulatory mechanisms in early period. On this especially one should remember during the evacuation of wounded, when these complications can arise under the effect of transportation.

The violation of water metabolism/exchange constantly was noted in the early period of injury. One should indicate the frequently observed after injury expansion of cerebral ventricles and acute/sharp external hydrocephalia.

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The basic and most important violation of water metabolism/exchange is edema and bloating of brain. This violation of water metabolism/exchange can bring to death of wounded. Special importance has edema of the hanger-on unit of the brain with damage/defeat in these cases of vital departments.

The observed violations of fluid circulation in the favorably elapsing cases are not escorted/tracked by any organic consequences, but circulatory mechanisms remain unstable, about which one should remember the doctors of specialized KhPPG.

In the studied combat process/operations in post-operation period from complications most frequently it was possible to note meningitides; in an Orel-Kursk process/operation in the second place stood the early abscesses of brain, into the combat process/operation of liberating Belorussia - the meningoencephalites. However, the percentage of purulent complications from the side of brain and its shells in the operated wounded proved to be low. A great quantity of purulent complications was observed in the unoperated wounded. There is no doubt that in the latter/last cases had a value and the severity of wound.

During the treatment of the emergent purulent complications most frequently it was applied sulfamidamide therapy, cerebrospinal punctures, intravenous infusions of urotropin, and in the latter/last period of war good results it gave penicillin therapy.

In army specialized KhPPG in a number of cases in post-operation period in those wounded the skull and the brain was observed pneumonia. Pneumonia more frequently was in heavily wounded as a

result of the lowered/reduced ventilation and stagnant phenomena in the lower fractions/portions of the lung. Therefore doctors should be to always remember about the possibility of pulmonary complications in those wounded the skull and the brain, to in proper time distinguish them, and the main thing taken preventive measures against possible pneumonia.

Periods of hospitalization and leading to the evacuation of wounded from specialized KhPPG.

After the produced in army specialized KhPPG of processing the wound of skull and brain, as primary and deferred, so also secondary, the wounded with the favorably current post-operation period can be evacuated not earlier than 21 days after process/operation.

In the beginning of war always it was not possible to sufficiently follow carefully the periods of the post-operation hospitalization of those wounded the skull, which obuslovlivalcs6 on operational-tactical circumstances.

However, even under such severe conditions in which were located specialized KhPPG during Stalingrad battle, wounded the skull and the brain they did not evacuate earlier than the 13th day after surgical intervention.

From second half war the periods of the hospitalization post-operation of those wounded the skull were during the uncomplicated course not less than 3 weeks. Only after this period was allowed/assumed evacuation into the following therapeutic installation. This position/situation was carried out into life to the end of the Great Patriotic War.

The evacuation of those wounded the skull and the brain of the specialized KhPPG army area was conducted according to designation/purpose either into neuro-surgical separations/sections deeper located army hospitals, or in the specialized evacuation hospitals GBF.

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The transport, by which were evacuated the wounded into the army hospitals, depended in essence on the condition of roads and season. Evacuation into the specialized evacuation hospitals of GBF in essence was conducted by rail transport, but if evacuation hospitals GBF were arranged/located on close distance from army area as, for example, during the blockade break-through of Leningrad, then by motor vehicles.

Particular attention during evacuation turned to that so that the wounded with the penetrating wounds of skull would be situated in route/path under the permanent observation of medical personnel and with a strict observance of bed regime.

Experiment/experience showed that most advisable is the liberation/excretion in the trains of individual cars for those wounded the skull and the brain.

Is unconditionally contrasted evacuation from army specialized KhPPG of wounded with one or the other purulent complications. Wounded, who transferred purulent complications, can be evacuated not earlier than 3 weeks after the elimination of these complications. Must not undergo evacuation wounded with the discharge of cerebrospinal fluid and with the "malignant" protrusion of brain.

Extremely carefully one should approach the evacuation of the wounded, who withstood these or other the violations roof and fluid formation, taking into account the instability of circulatory mechanisms in the early period of the injury of skull and brain.

Entire experiment/experience of the Great Patriotic War showed

not only uselessness, but sometimes and the negative effect of the immobilization of head with the wounds of skull and brain. To second half war from it completely they refused. The head of wounded must be located on cushion in convenient for wounded position/situation.

Short characteristics of the wounds of the soft tissues of skull.

Separately should be examined the group of the wounds of the soft tissues of skull, which are the considerable percentage of all wounds of skull.

The obtained wounds of the soft tissues of skull are the lightest group of the wounded, who are located undergoing medical treatment in the therapeutic installations of army rear. The percentage of recovery among them is very significant.

The given diagram (Fig. 33) shows the relationship/ratio between those wounded the skull with the damage of bones and those wounded the soft tissues in an entire group of those wounded the skull during the studied combat process/operations. From it it is evident that the obtained wounds of the soft tissues of skull are more than half all wounded moreover in individual combat process/operations this percentage it rose almost to 80.0. The reason for the oscillations/vibrations of the relationship/ratio between the wounds

of the soft tissues of skull and the wounds of skull with the damage of bones depends on the series/row of reasons, including on carrying by the soldier of helmet.

In the study of the problem about rendering to the specialized aid by that wounded the skull in the hospitals of army rear it was already shown that the percentage of the wounded the skull with damage bones, encompassed by the specialized aid was sufficiently high and it reached to 90.0 and even to 99.0. With the wounds of the soft tissues of skull the percentage of rendering to the specialized aid was considerably below, since majority such wounded guided directly into general-surgical hospitals, passing specialized KhPPG. In particular, during combat in the environs of Stalingrad by the specialized aid there were encompassed 29.1c/c wounded the soft tissues of skull, into an Orel-Kursk battle - 43.60%, during the liberation of Belorussia - 63.40% and in process/operation the "vistula - Oder" - 53.1c/o.

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Taking into account the experiment/experience of the Great Patriotic War, should be recognized as correct the direction all of those wounded the skull, including easily wounded the soft tissues, it is compulsory into specialized KhPPG, where they must pass the

specialized classification. Only after the examination/inspection of wounded by neurosurgeon, but if necessary and after x-ray examination, if it is revealed, that there is no necessity to hospitalize for the specialized hospital, then should be guided a army general-surgical hospitals. With the nonobservance of this appeared individual errors, when DMP, without having adequate experience in the classification of those wounded the skull, guided into general-surgical hospitals under the guise those wounded into soft tissues obtained the penetrating wounds of skull and brain.

The experiment/experience of the Great Patriotic War showed that the wounds of the soft tissues of skull usually flow/occur/last without neurologic symptomatology; however, sometimes they can be escorted/tracked by the damage/defeat of brain and its shells. In these cases in army specialized KhFPG establish/install that or other neurologic symptoms, which depend on damage strength and on localization the wounds. Certain percentage of the wounds of soft tissues is escorted/tracked by the different degree of the contusion of brain. The special importance with the wound of the soft tissues of skull is to give to the tunicary symptoms, which are to a certain degree the indicator of the severity of damage. One should also indicate the observed in those wounded the soft tissues of skull sub-arachnoidal hemorrhages.

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The wounded the soft tissues skulls, if in them are discovered these or other the symptoms, which indicate the damage/defeat of brain or its shells, they must be left in specialized army KhPPG.

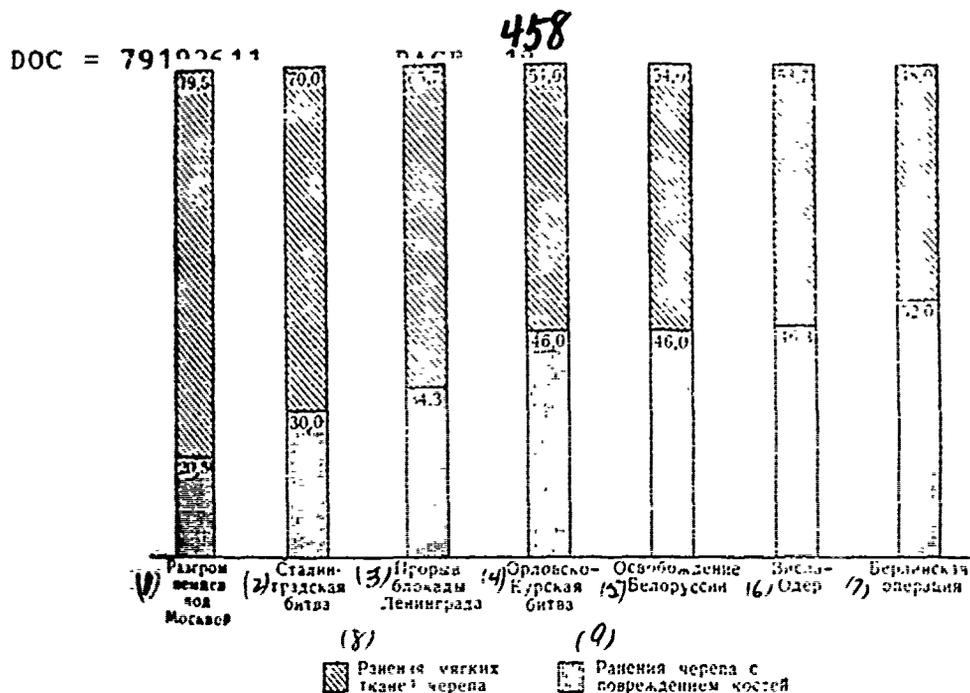


Fig. 33. Distribution of the character/nature of the wounds of skull in different combat process/operations (according to the data of army therapeutic installations in percentages).

Key: (1). Rout of the Germans in the environs of Moscow. (2). Stalingrad battle. (3). Blockade break-through of Leningrad. (4). Orel- Kursk battle. (5). Liberation of Belorussia. (6). Vistula-Oder. (7). Berlin process/operation. (8). Wounds of soft tissues of skull. (9). Wounds of skull with damage of bones.

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If in those wounded the soft tissues of skull, hospitalized in specialized KhPPG, soon is observed the reverse development both of

focus and general cerebral symptoms in the absence of indications of damage to bone, then such wounded are subject to conservative treatment. The staying power/persistency of neurologic symptoms, phenomenon of the increased intracranial pressure, especially the build-up/growth of neurologic symptomatology, determine readings for production in surgical intervention - the trepanation of skull.

One should also remember about that which with the wounds of the soft tissues of skull can occur, although is rare, the dissemination of purulent infection into depth, towards shells and substance of brain.

Diagram (Fig. 34) shows the percentage of operability of those wounded the soft tissues of skull on GBA during different combat process/operations.

If during the rout of the Germans in the environs of Moscow operability was small, then in the subsequent combat process/operations operability with the wounds of the soft tissues of skull considerably was increased, after achieving 33.00/o during the liberation of Belorussia.

The experiment/experience of the Great Patriotic War shows that among those wounded the soft tissues of skull about  $\frac{2}{3}$ , it is subject

to surgical treatment, that also was achieved by some armies, which were not being located on the direction of main attack, where a quantity of wounded was less considerably, but working conditions were more calmly.

Studying the evacuation of those wounded the soft tissues of skull from army therapeutic installations during individual combat process/operations, it is possible to note its progressive descent and tendency to complete the cure these wounded in army area up to their full/total/complete recovery.

Diagram (Fig. 35) shows the dynamics of recovery and abandonment undergoing medical treatment on GBA of those wounded the soft tissues of skull in different combat process/operations.

From the preceding information it is evident that if during the rout of the Germans in the environs of Moscow the percentage of those wounded the soft tissues of skull, left undergoing medical treatment on GBA, composed 13.6, then during Stalingrad battle it rose to 27.6. In the period of the blockade break-through of Leningrad actually all wounded the soft tissues skulls were evacuated to nearby GBF, and in the therapeutic installations of army rear remained for the recuperation only 1.50/c wounded into the soft tissues of skull, which is explained by the peculiar medical-tactical circumstances.

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which established in this combat process/operation.

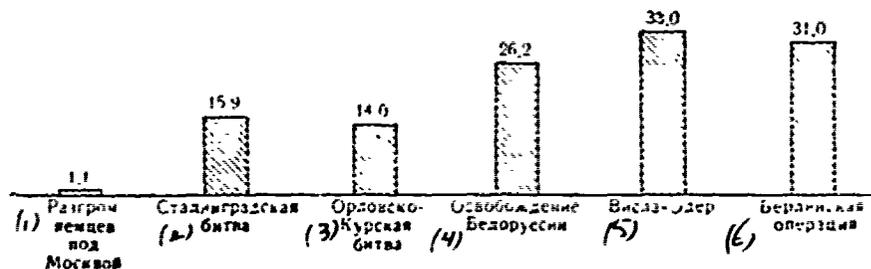


Fig. 34. operability of those wounded the soft tissues of skull in army therapeutic installations in different combat process/operations (in percentages).

Key: (1). Rout of the Germans in the environs of Moscow. (2). Stalingrad battle. (3). Great-Kursk battle. (4). Liberation of Belorussia. (5). Vistula-Oder. (6). Berlin process/operation.

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The nearness of the powerful/thick hospital basis of front, and also the need for the rapid unloading of cots GBA in progress of combat led to the fact that the recuperation of those wounded into the soft tissues of skull fulfilled by hospital the basis of front. Moreover, the unit of the army general-surgical hospitals was arranged/located in one area with the hospitals of front and frequently were received wounded not from army installations, but through front line SEG. In the subsequent combat process/operations is observed an increase of the percentage of those wounded into the soft tissues of skull, left

for recuperation in the army hospitals. Thus, for instance, during combat for Berlin from army area were evacuated altogether only 13.30/o wounded the soft tissues of skull.

Lethality with the wounds of the tissues of skull was observed in the single cases and in essence depended on the severity of the closed injury of brain, which was being escorted/tracked by the simultaneous wound of soft tissues.

Comparative data about lethality among those wounded the skull in different combat process/operations.

For the completeness of judgment about therapeutic aid it is necessary at least brief to be stopped at lethality among those wounded the skull in army therapeutic installations. In this case one should consider that during evaluation of lethality into different combat process/operations it is necessary to consider not only the severity of wound, but also special feature/peculiarity of operational-tactical circumstances.

The experiment/experience of the Great Patriotic War showed the progressive descent in the lethality the years of the war (see that 4). The data of the studied combat process/operations also show a descent in the lethality among those wounded the skull, connected

with the more broad coverage of this group of wounded by the specialized aid.

Diagram (Fig. 36) shows comparative lethality with the wounds of skull in specialized army KhPPG.

Comparatively high lethality with the wounds of skull and brain in KhPPG, intended for those wounded the skull, during battle in the environs of Stalingrad finds its explanation in the fact that the datum KhPPG fulfilled the role of "medical retention facility", concentrating in itself heaviest nontransportable wounded.

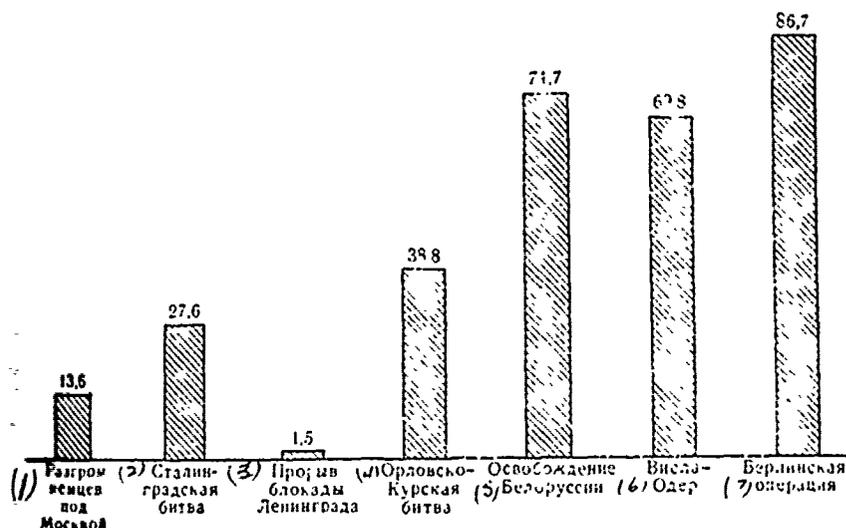


Fig. 35. Recovery and abandonment on the cot of those wounded the soft tissues of skull in the army hospitals in different combat process/operations (in percentages).

Key: (1). Rout of the Germans in the environs of Moscow. (2). Stalingrad battle. (3). Blockade break-through of Leningrad. (4). Orel- Kursk battle. (5). Liberation of Belorussia. (6). Vistula-Oder. (7). Berlin process/operation.

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During the blockade break-through of Leningrad, during an Orel-Kursk battle and in the period of the liberation of Belorussia the lethality in specialized KnPPG progressively descended. Considerably was lowered lethality in the period of combat

process/operation "vistula-Oder". Here the low percentage of lethality is explained by medical-tactical special features/peculiarities of this process/operation. Of the evacuations of those wounded the skull as such from specialized KhPPG during this process/operation it was not conducted, and wounded they transmitted from KhPPG into the arrived front line hospitals on the spot, in the same buildings. By this it is possible to explain the indicated in reports early evacuation and the short period of the stay of wounded in specialized KhPPG. Actually wounded remained on the spot, and left specialized KhPPG, indicating that the wounded "were evacuated" on GBF. Certain increase in the lethality in Berlin process/operation is explained by the fact that specialized KhPPG accepted those heavily wounded the skull and the brain not only with DMP, but also it is direct from units. It suffices to indicate that about 20.00/o of wounded entered into specialized KhPPG directly from units and from the field of combat, passing the intermediate stages of evacuation. In this case they carried from the field of combat and delivered within early periods into specialized KhPPG all of those wounded the skull, including those in agony. This determined the great entry of the heavy nontransportable wounded who in other combat process/operations always did not achieve specialized KhPPG.

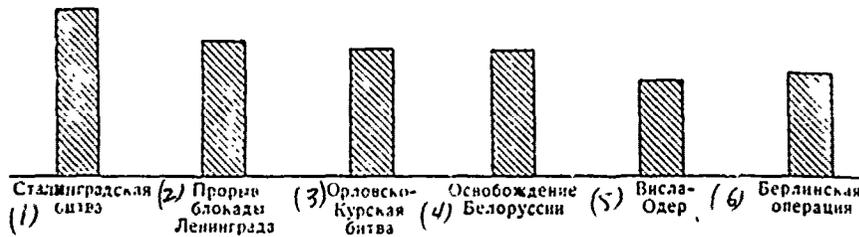


Fig. 36. General/common/total lethality with the wounds of skull with the damage of bones into the specialized KhPPG armies into different combat process/operations.

Key: (1). Stalingrad battle. (2). Blockade break-through of Leningrad. (3). Orel- Kursk battle. (4). Liberation of Belorussia. (5). Vistula-Oder. (6). Berlin process/operation.

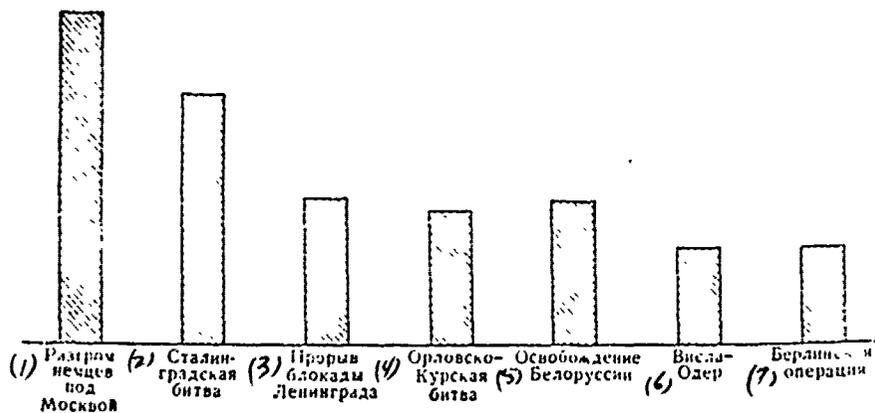


Fig. 37. General/common/total lethality with wounds of skull with damage of bones in all army hospitals in different combat process/operations.

Key: (1). Rout of the Germans in the environs of Moscow. (2).

Stalingrad battle. (3). Blockade break-through of Leningrad. (4).  
Orel- Kursk battle. (5). Liberation of Belorussia. (6). Vistula-Oder.  
(7). Berlin process/operation.

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For characteristics of the high severity of wounds in this combat process/operation it is necessary to indicate that in 59.00/o of delivered into specialized KhPPG wounded the skull with damage bones had the penetrating wounds of brain.

Diagram (Fig. 37) shows general/common/total lethality with the wounds of skull with the damage of bones in all hospitals of army rear.

From diagram it is evident that the higher general/common/total lethality among wounded with the damages of the bones of skull occurred during the rout of the Germans)

in the environs of Moscow. This percentage of lethality is explained by entry into all KhPPG of a considerable quantity of wounded in very heavy, nontransportable condition, within late periods after wound,

and sometimes also within the next few days after surgical interventions, produced on DMP. During battle in the environs of Stalingrad, although the percentage of the general/common/total lethality of wounded the skull with damage bones was lowered, it nevertheless still remained comparatively high. This is explained by the fact that the wounded entered KhPPG frequently directly from the field of combat in very heavy condition. Finally, should be noted the very severe medical-tactical conditions for this combat process/operation, that, certainly it could not but be repelled in the results of the treatment of those wounded the skull.

During combat process/operations on the blockade break-through of Leningrad, Orel- Kursk battle, liberation of Belorussia and Berlin process/operation general/common/total lethality among wounded the skull with damage bones considerably was lowered. Further descent in the lethality during combat process/operation "vistula-Oder" finds to itself explanation under those particular medical-tactical conditions which were in this process/operation and which has already been indicated above.

Diagram (Fig. 38) shows comparative lethality of operated in army specialized KhPPG those wounded into skull with damage bones in the studied combat process/operations. Is noted certain increase in the lethality among those operated during the blockade break-through

of Leningrad. This is explained by the fact that in this process/operation in view of the established medical-tactical conditions in specialized army KhFEG they operated those only most heavily wounded, and all transportable wounded the skull with the damage of bones they evacuated to nearby GBF.

In the subsequent combat process/operations the lethality among operated those wounded the skull gradually descended.

Diagram (Fig. 39) shows lethality among operated in all hospitals armies of wounded the skull with damage bones in different combat process/operations.

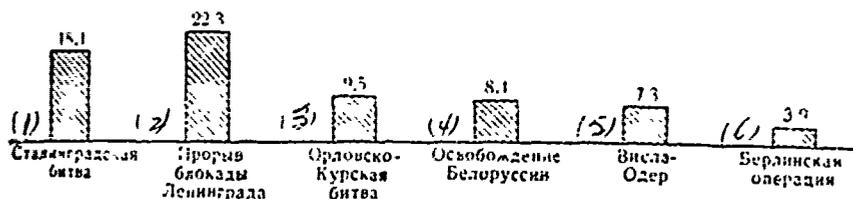


Fig. 38. Lethality among the operated wounded the skull with damage bones in army specialized KhPPG into different combat process/operations (in percentages). Key: (1). Stalingrad battle. (2). Blockade break-through of Leningrad. (3). Orel- Kursk battle. (4). Liberation of Belcrussia. (5). Vistula-Oder. (6). Berlin process/operation.

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The given data about lethality show that the correct formation of the specialized aid, its maximum approximation/approach to army area, timely and full-valued surgical processing lowered lethality with the wounds of skull and brain in the therapeutic installations of army rear.

Specialized aid with the wounds of skull in different combat process/operations.

Excessively to prove, that the organizational and therapeutic measures tightly are interwoven between themselves. Volume and

character/nature of the latter will cost first of all in connection with the combat circumstances and medical-tactical conditions in army and they escape/ensue of them.

The study of the organization of the specialized aid by that wounded the skull and the brain in the army hospitals during individual combat process/operations is necessary for the understanding of the carried out therapeutic measures and for the correct analysis of the obtained results.

In the course of war was carried out into life the ordered system of the specialized treatment of those wounded the skull in the army hospitals with their subsequent evacuation according to designation/purpose. At the very beginning of the great patriotic war this work it met the series/row of the difficulties, connected first of all with combat and tactical situation at front.

The experiment/experience of the Great Patriotic War showed that army specialized KhPPG is that stage where that wounded the skull and the brain received the first qualified neuro-surgical aid and where to it was provided conducting entire post-operation period with the subsequent evacuation according to designation/purpose.

The basic link of the organization of aid on GEA by that wounded

into skull were the groups of ORMU [OPMV - separate medical reinforcement company], without which would be impossible the maneuver of the specialized aid and, therefore, would be impossible the correct care of wounded the skull in different periods combat process/operations.

Most in proper time wounded into skull and head brain entered their specialized KhPPG when they guided there directly with DMP, passing all intermediate stages. So, during Berlin process/operation 98.70% of wounded entered into army specialized KhPPG with DMP and from units and only 1.30% of the hospitals, moreover this were wounded in which, besides the wound of skull, were other multiple wounds.

As is known, specialization of KhPPG is determined by imparting to it the corresponding groups of ORMU. The experiment/experience of war showed that hardly ever any KhPPG of general-surgical road profile of imparting the groups of ORMU it is possible to convert into specialized KhPPG. The neurosurgical group of ORMU by its forces in essence can service only operation-surgical dressing unit/block. Observation and care of those heavily wounded the skull and the head brain lie down on workers of KhPPG, hardly ever not familiar with this profile/specialty of wounded.

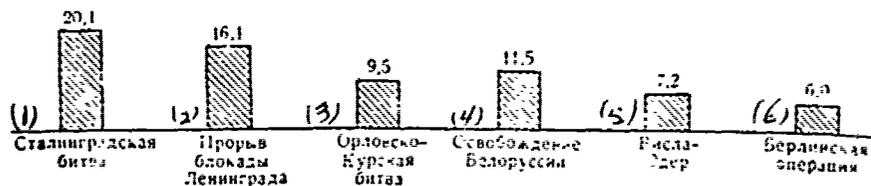


Fig. 39. Lethality among the operated wounded the skull with damage bones in all army hospitals in different combat process/operations (in percentages).

Key: (1). Stalingrad battle. (2). Blockade break-through of Leningrad. (3). Orel- Kursk battle. (4). Liberation of Belorussia. (5). Vistula-Oder. (6). Berlin process/operation.

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Then one should say, also, in the relation to the remaining specialized group of СБМУ. In the period of offensive operations the neuro-surgical group of ОРМУ, after it finished in essence processing wounded, they transport forward. Because of this further observation of wounded lies down completely on workers of KhPPG, where the wounded are located during the necessary period before their evacuation into front line hospitals. This superimposes on the doctors of KhPPG the responsibility not only to distinguish the appearing complications, but also to render with them necessary neuro-surgical aid. Furthermore, it is necessary to bear in mind,

that during the deployment of the bandaging units/blocks for the specialized groups is necessary the supplementary equipment of KhPPG. Consequently, so that KhPPG would become specialized, it is necessary that entire personnel, both medical and average, would master sufficiently well treatment and care of neuro-surgical wounded. Therefore for creation from KhPPG of the general-surgical profile/specialty of the hospital which could become specialized, it is necessary to previously conduct work on training of personnel and on materiel of hospital. Justified itself creation system in the army of several KhPPG, of those previously prepared for the reception/procedure wounded the skull, which in proportion to necessity became by imparting to them the groups of ORMU specialized.

Based on the example of the studied combat process/operations it is possible to clearly show that evolution the periods of war which occurred in rendering to the specialized aid.

During the rout of the Germans in the environs of Moscow the dismantled army did not have still specialized KhPPG, intended for caring wounded the skull and the brain. However, the greatest specific gravity/weight of those wounded the skull with respect to all entered wounded was observed in one of KhPPG. In an absolute quantity this KhPPG it accepted those wounded the skull more than all remaining KhPPG, together undertaken. In this it is possible to

perceive already the tendency of the specialization of this KhPPG.

During battle in the environs of Stalingrad outlined was already certain specialized aid that wounded the skull, for which were isolated two KhPPG.

During the blockade break-through of Leningrad the specialized aid by that wounded the skull and the brain was completely realized by imparting KhPPG of neuro-surgical group of ORMU. One should indicate some special features/peculiarities of the organization of aid by that wounded the skull and the brain in this combat process/operation. Basis was here the fact that the powerful/thick hospital basis of front was arranged/located near from army area in the presence of a good highway. This allowed specialized KhPPG to maximally evacuate transportable wounded on GEF.

In an Orel-Kursk battle the specialized aid by that wounded the skull and the brain was realized by two specialized KhPPG (of which one was found in the beginning of process/operation in reserve) and by neuro-surgical groups of ORMU. Here there were some special features/peculiarities in the organization of the specialized aid by that wounded the skull, since in army, besides the groups of ORMU, there was of two additional specialized by KhPPG with its staff specialists, which, as is known, it is not typical for GBA, where the

specialization is realized by imparting the corresponding groups of ORMU to KhPPG of general-surgical profile/specialty. From the special features/peculiarities of the organization of the specialized aid during this process/operation one should indicate, then that the entry of a great quantity of those wounded the skull and the brain into specialized KhPPG did not give to it the possibility to in proper time surgical process all wounded.

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Therefore the unit of the transportable wounded the skull with damage bones they immediately evacuated into the front line specialized hospital, advanced forward. Evacuation was conducted by aircraft.

The specialized aid during the liberation of Belorussia was realized by imparting KhPPG of the specialized groups of ORMU. The organization of the specialized aid had here also a series/rcw of special features/peculiarities, connected with the fact that the army after the penetration of the defense of the enemy passed within 18 days of approximately 500 km from the departure line. This rapid advance forward was repelled in entire organization of medical aid they were wounded, including neuro-surgical. If in the beginning of process/operation aid by that wounded the skull and the brain rendered the hospitals of the second line, then subsequently the

specialized aid was organized then in one, then in other foremost KhPPG by imparting to it the groups of OFMU.

During combat process/operation "a vistula-Oder" the provision of a medical aid presented great difficulties, connected with the penetration of the deeply distributed in depth and sustained defense of enemy, with the subsequent assumption of the offensive, the rapid pursuit of enemy to Oder and the capture of bridgehead/beachhead on his western shore. This put impression on the organization of an entire medical aid, including on aid by that wounded in skull and brain. In initial position on bridgehead/beachhead, on the western shore of the vistulas, which worked there neuro-surgical groups in essence realized a classification of those wounded into skull, that entered directly from units, and their evacuation into the front line specialized evacuation hospital, arranged/located on the eastern shore of the vistula, near from front line. In the course of further combat the specialized aid by that wounded the skull was realized by one or the other KhPPG route/path of imparting to it the groups of ORMU.

In Berlin process/operation the aid by that wounded the skull was realized by imparting KhPPG of the neuro-surgical groups of ORMU. In initial position neuro-surgical group was attached KhPPG, which was being located area's first of the hospitals line.

The experiment/experience of war showed that when offensive was conducted from narrow on front sector and the axis of evacuation is passed on one strictly defined route/path, completely justified itself the advancement of specialized KhFPG before the offensive area's first of the hospitals line, which provided early rendering to the wounded of the specialized aid.

In the course of of offensive after the troops/forces "sand bars" advanced KhPPG the groups of ORMU. Of the even greater possibilities of maneuvering by hospitals better provision with the specialized aid was received with the pulling before the offensive to the foremost line not only of army, but also front line specialized hospitals. In this system in the beginning of the combat process/operation of wounded accepted the front line specialized hospitals, and convoluted army KhFPG together with the groups of ORMU could rapidly follow the armies, being deployed and accepting wounded in the subsequent stages of combat.

Thus, based on the example of the studied combat process/operations evidently, as in the course of the Great Patriotic War continuously was improved the organization of medical aid on GBA and, in particular, it was improved the specialized neuro-surgical

aid by that wounded into skull and their evacuation according to designation/purpose.

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The corresponding maneuver by the specialized hospitals, the neuro-surgical groups of ORMU, and also by individual workers KhPPG allowed medical service to ensure the timely specialized aid in GBA with that wounded the skull and the brain even in very complicated operational-tactical circumstances.

Medical aid by that wounded the skull on GBF.

The organization of the medical aid by that wounded the skull and the head brain is not thought without the proper accounting and the scientific substantiation of all complicated course of the wound process with its characteristic, constantly changing periods.

In conformity with this on the hospital basis of front was provided the organization of the specialized medical evacuation agencies for wounded the skull and the head brain in development period in their early reactions and complications, and also in the following after it period - elimination of early complications with tendency toward the delimitation of infectious focus and the healing

of the wound (see that 4, page 71).

Taking into account the special features/peculiarities of the second and third period of the course of the wound process, medical aid on GBF consisted, on one hand, in the so-called deferred and late primary (but in a number of cases and in secondary) processing of wound, with another - in prophylaxis and treatment of early complications before their full/total/complete elimination with the subsequent evacuation of these wounded into the rear.

In front line area were treated also the obtained heavy closed damages of skull and brain. From the peculiar conditions for different combat process/operations underwent in a number of cases changes the composition of those wounded the skull, that entered front line therapeutic installations. These oscillations/vibrations were expressed both in the change in the relation between a quantity of those easily wounded the soft tissues and the heavily wounded with the damage of the bones of skull and in the relation to the condition entered heavily of those wounded into skull and head brain. Thus, for instance, frequently on GBF entered wounded into skull into the initial period, enveloping the first 72 hours after wound, and the requiring the primary (early) processing wounds. This position/situation occurred in the beginning of war in the blocked hero-cities - Leningrad, Stalingrad, Sevastopol and Odessa and also

subsequently with the penetration of defense and rapid pursuit of the routed enemy when army specialized KhPPG in initial position were convoluted and those wounded into skull directly entered the approximate front line hospitals. But was observed the reverse situation, when into the therapeutic installations of front rear wounded entered later periods, i.e., in the period of late complications and forming scar, but sometimes even in the period of the distant consequences.

The similar cases occurred, in particular, during the rout of the Germans in the environs of Moscow, the liberation of Belorussia and Berlin process/operation.

Finally, in rare cases on GBF simultaneously were concentrated those wounded the skull in all periods of the course of the wound process indicated. This exceptional position/situation occurred at Leningrad Front during the prolonged blockade of the city when the evacuation of wounded into the rear was impossible.

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SHORT CLINICAL CHARACTERISTICS OF THE WOUNDS OF SKULL AND BRAIN.

Basic composition of those wounded the skull and their clinical characteristics in front line area were caused mainly by medical-tactical circumstances and depending on it system of the organization of medical aid. From this point of view the easily wounded the soft tissues skulls, which composed on the whole in the therapeutic installations of army and army rear great half all wounded, retreated usually on GBF to background, being inferior the first place heavy to those wounded into skull with the damage of bones and brain.

The large part of those wounded the skull and the brain evacuated from the army hospitals into front line ones already after primary processing wounds and subsequent, sufficiently prolonged hospitalization. In this case on GBF they guided in essence transportable wounded, using convenient railroad, aviation or motor transport. This contributed so that the clinical picture in the majority of the entered wounded was less heavy, than in the same

group of wounded in the preceding/previous stages of evacuation.

In the majority of those wounded into skull, that entered front line therapeutic installations, the condition was satisfactory, bandage was superimposed correctly, consciousness clear, temperature of body normal or is subfebrile, and threatening general cerebral, hanger-on and tunicary symptoms were absent. During neurologic research were revealed/detected these or other focus disorders, which are determining zone and severity of the damage/defeat of the substance of brain. The x-ray examination of wounded, that was subjected to the primary processing of wound in army therapeutic installations, in most of the cases detected the defect of the bones of skull with even territories in the initial phase of the healing of the bone wound; bone fragments and metallic foreign bodies were absent. Exception were blind-end wounds with the long wound canal on day of which far from bone defect, and frequently even in contradictory/opposite hemisphere it was detected the unremoved/uneliminated fragment of shell or bullet, and also multiple mine fragment wounds, with which in the X-ray photograph of skull were sometimes visible the numerous small/fine metallic fragments, which jammed in soft tissues, bones, shells of brain and in the substance of brain.

The appearance of the processed wound during its smooth

uncomplicated course usually indicated already the phase of the completing process of the post-operation self-purification of wound canal from the remainders/residues of necrotic tissue. Were at the same time already expressed the processes of the substitution of tissue defect, appeared the granulations, growing from the surrounding the wound of brain mesodermal elements/cells and covering of the territory of skin, bone and tunical wound. Clinical characteristics of the nonpenetrating wounds of skull with the damage of bones was usually even more favorable than in the preceding/previous group of wounded with the smoothly elapsing penetrating wounds of skull and brain.

Both these groups of those wounded the skull and the head brain during the uncomplicated course usually underwent in front line hospitals conservative treatment. Less heavily wounded with the penetrating wounds of brain in the majority of the cases got better on GBP. Another group of wounded with the heavier damages/defects of brain, which require the prolonged periods of treatment, they evacuated into rear hospitals.

Besides the described groups of wounds, which smoothly take place after the primary processing of wounds and which composed on GBF the overwhelming majority, were other wounds, that were being escorted/tracked of various kinds by infectious complications. These wounded required repeated operational intervention and prolonged specialized treatment in front line hospitals. To the category indicated, which requires the more detailed illumination, should be regarded first of all heavily wounded into the skull and the brain, which entered on GBF without the primary processing of wound. The similar cases occurred if necessary for advance forward or to the overload of army specialized KhPPG, when the latter were changed over from an operational-surgical work to a sorting-the evacuation.

The following, small group composed wounded with the penetrating wounds of skull and brain, that entered front line therapeutic installations from army KhPPG by way of early evacuation soon after primary surgical processing. As a result of absence in these wounded yet those not had time to develop protective devices in meninges wound in the form of solid granulating shaft and tunicary joints in them during prolonged evacuation much more easily appeared different complications, than in analogous wounded, evacuated without processing of wound.

Clinical characteristics of wounded into skull and brain,

entered on GBF without the surgical processing wounds, with complications, and also after premature transportation, was expressed, first of all, in the great severity of the general condition of these wounded. Composite examination/inspection frequently detected deterioration in their condition in comparison with preevacuation also in a number of cases the aggravation of general somatic, infectious, general cerebral, focus and tunicary symptoms.

In some wounded kept high temperature, and they complained about strong headache. Consciousness in them was sometimes matted or they were delirious and were found in the condition of sharp psycho-motor excitation. In some wounded appeared convulsive attacks/seizures/paroxysms in the individual groups of paretic muscles. In majority their bottom it was possible to reveal/detect the tunicary symptoms, motor, and sometimes also vocal disorders. On ocular day frequently were noted these or other the changes (hyperemia, neuritis or stagnant nipple). The more delicate functional research of the fields of view, rumor of speech and psychics/psyche of wounded in a number of cases was difficult in view of heavy general condition. With the examination/inspection of these wounded they especially thoroughly investigated the lungs, the associated complications from the side of which in the form of fine focal/acinous bronchopneumonia were encountered so not rarely.

The laboratory investigations of the blood and of the cerebro-spinal fluid in combination with the data of clinical examination/inspection made it possible to in proper time come to light/detect/expose acute purulent meningitis, encephalitis or early abscess of brain. Sometimes was observed the violent picture of anaerobic encephalitis and gaseous gangrene of brain. Sometimes the heavy condition of wounded depended on acute traumatic edema of brain, but it is still less frequent - from acute/sharp hemorrhage into shells or into the substance of brain. Shock in those wounded the skull was observed on GBF exclusively rarely. Surgical and x-ray examination detected in a number of cases the characteristic features of the unfinished or defective processed wound with the uneven territories of all its layers and unremoved/uneliminated bone fragments or metallic bodies. The surface of wound presented in these wounded the expressed picture of purulent inflammation with edema of the surrounding soft tissues and exposure of the sector of bone in wound or even presence of edge/boundary osteomyelitis.

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Cerebral substance in wound was represented by edematous, stagnant, nonpulsating and protruded into wound defect in the form of

encephalitic protrusion.

The very severe complication of encephalitides and abscesses of brain with extensive protrusions were fluid fistulas with subsequent purulent ependymitis and basilar meningitides.

Depending on the described above character/nature and the condition of the wounds of skull and brain it was necessary to place readings to late or reworking of wound or to operational intervention apropos of the early abscess of brain, osteomyelitis, jamming of the protrusion of brain in the trepanation defect of skull, etc. In this case it was necessary in each individual case to consider the neurologic condition of wounded, the character/nature of inflammatory changes in wound, roentgenological and laboratory data.

The treatment of these wounded with the complicated course was usually very prolonged as a result of the tendency of infectious complications toward heavy coursing and repeated outbreaks and relapses.

Evacuations into the hospitals of the deep rear were subject only those wounded, in whom were eliminated inflammatory changes in wound, completely disappeared encephalitic protrusion of brain it was restored the normal picture of the blood and cerebrospinal fluid, was

noted the normal temperature of body, and the general condition was satisfactory. It follows, furthermore, to mention about the multiple wounds of skull and these combined with the wounds of other organs/organs, and also about a small number of those comparatively heavily wounded the skull without the damage of the bones which in a number of cases required in prolonged treatment in the specialized hospitals of front.

Group with the closed damages of skull and brain in the presence of organic syndromes concussion less frequently less frequent than compression character/nature, as a rule also it was held up for treatment on GBF in the specialized neuro-surgical or neurologic hospitals. After the removal of these wounded from their heavy condition they evacuated into rear hospitals for further treatment in view of the presence in majority of the cases of stable organic symptoms.

#### CONDITIONS FOR THE WORK OF THE SPECIALIZED HOSPITALS AND PROCEDURE OF THE EXAMINATION/INSPECTION OF THOSE WOUNDED A SKULL AND A HEAD BRAIN.

The organization of neuro-surgical service on GBF for the provision to their wounded into skull and head brain of specialized aid, with respect described clinical characteristics, was based on the principle of succession and it stood in direct dependence on the

constantly changing conditions of combat and medical-tactical circumstances at front.

From this point of view the organization of the specialized aid in GBF was changed in different combat process/operations of the Great Patriotic War. Especially important role in this case played the accounting of the character/nature of combat area, path length of evacuation and periods of the delivery/procurement of wounded in the specialized front line hospitals. Not smaller role played the degree of the provision of the hospital basis of front by specialist-neurosurgeons, etc. medical by cadres, medical supply, special equipment and by ambulance transport. Had a value the advisable arrangement of these forces and correct maneuvering by cadres and by specialized hospitals.

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Finally, it is doubtless, great role played in this case the continuously growing combat experiment/experience of military medical services as a whole and each specialist in particular.

In the form of illustration it is possible to give some examples of the largest-scale combat process/operations, which signify different periods and stages of the Great Patriotic War.

As is known, the organization of neuro-surgical service in front line therapeutic installations in the offensive operation of the rout of the Germans in the environs of Moscow was deployed under very complicated and unfavorable conditions. Specialized KhPPG in the period of this combat process/operation yet it was not. On GBF, where entered those wounded into skull from all armies, the specialized aid up to the moment of the offensive during December 1941 was concentrated in essence in two powerful/thick SEG of those worked with great load, on which and bellard entire/all severity of work. The net/system of hospitals from the so-called "operational ccts" played during this process/operation secondary role, although it was filled those most heavily wounded into skull.

In grandiose to its scale and in terms of historical value battle in the environs of Stalingrad the organization of neuro-surgical service on GBF had its special features/peculiarities. In some SEG were created the specialized neuro-surgical separations/sections.

Extremely complicated and unfavorable conditions, as a result of air bombardement and difficulty with rail transport for the evacuation of those wounded the skull from the army hospitals into

front line ones, did not allow from the first days of combat to completely utilize the specialized neuro-surgical division and hospitals of GBF. Great difficulties appeared also in view of the dispersion of the numerous hospitals of those located often in villages, deficiency the first time in the evacuation point of their own ambulance transport and small work experience. However, in view of the facts indicated in SEG entered the initially mainly easily wounded the soft tissues skulls of wounded with the penetrating wounds of the skull and brain, delivered by army medical trains on GBÄ, they guided sometimes without delay further, into the deep rear. The grown heavy wounded were hospitalized on GBF.

In more advantageous position/situation proved to be neuro-surgical service GBF during the prolonged blockade of Leningrad and combat process/operation on its penetration. The front line evacuation point, which was being located in Leningrad, had available during an entire war a number of large/coarse SEG, well equipped hospitals and civil/civilian therapeutic installations with the qualified cadres of specialist-neurosurgeons and a completely sufficient quantity of cots. Half these cots belonged to the large/coarse specialized evacuation hospital, which played the role of front line neuro-surgical center.

In the period of blockade break-through a basic number of those

wounded the skull was evacuated by motor transport and rail transport on GBF, where it underwent primary processing, since specialized army KhPPG was switched in essence to a sorting-evacuation work, leaving in itself only the extra-heavy, nontransportable wounded whom were processed on the spot.

The specialized aid by that wounded the skull during an Orel-Kursk battle had its special features/peculiarities. The leading role in rendering aid by that wounded the skull belonged to army specialized KhPPG and approximate hospitals of one evacuation point. Another evacuation point, which composed also unit GBF, picked up and in essence evacuated further into the rear of those wounded the skull.

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The completely arbitrary form of the organization of neuro-surgical service on GBF occurred in the period of the largest offensive operations of our troops/forces - the "liberation of Belorussia" and the "Vistula - Oder". They both were characterized, as is known, by the uncommonly rapid advance of forward our units which moved within 20-26 days of combat up to the distance of 500-600 km, and by the exceptional difficulty of the evacuation of wounded as a result of the decomposition of railroad lines on the route of our

troops/forces. Therefore the evacuation of wounded in these combat process/operations was realized in essence by motor transport and partly by temporary/time hospital trains.

Conditions indicated above gave rise to the completely new and peculiar system of organization of the medical service of wounded by the specialized aid. The latter consisted in maneuver by front line hospitals, that was being expressed in the fact that these hospitals advanced they forward and accepted frequently on the spot of those wounded into skull from army KAPPG. Under these difficult and peculiar conditions was provided full-valued neuro-surgical aid not only in army, but also on GBF.

In the latter, which completed the Great Patriotic War of Berlin combat process/operation the distinctive special feature/peculiarity of the organization of neuro-surgical service of GBF was a comparatively stout bolt of evacuation and excellent lines of communication. The well equipped specialized hospitals, completely manned by the staff of the experienced neurosurgeons and by medical personnel, trained to special care of those wounded the skull, were arranged/located in the maintained quarters/premises. A quantity of neuro-surgical cots on GBF was led in this process/operation to unprecedented sizes/dimensions.

The numerous specialized hospitals were located with individual "bushes", providing the cruder system of the consistent evacuation of wounded.

The most close to army area advanced base of front left in itself only nontransportable ones and easily wounded into skull, evacuating the others; the following bush of hospitals fulfilled a sorting-evacuation and therapeutic function; the subsequent bush of hospitals - basic therapeutic-operational activity and finally most distant bush it played the role of the rear basis of the front where the wounded concluded their usually treatment or whence then they evacuated into the deep rear.

The therapeutic activity of front line hospitals was characterized, in spite of extra-heavy character/nature of wounds and complications in this process/operation, by high surgical activity, low lethality and by comparatively small evacuation into the deep rear, since the unit of those wounded the skull, after reaching the rear basis of front, was treated on it up to full/total/complete recovery.

Thus neuro-surgical service GBF had available in different periods of the Great Patriotic War and in different combat process/operations different material and maneuverability capabilities for rendering to the specialized aid by that wounded the

skull. In-patient fund it is special for those wounded the skull which it had available, although strongly it oscillated, it exhibited steady tendency toward increase.

Great power and stability of in-patient fund of GBF in comparison with GBA, best equipment provision and its equipment status of numerous hospitals finally more full/totaler/more complete manning status by the necessary cadres of the neurosurgeons, neuropathologists, oculists, otiatrists, psychiatrists, roentgenologists and laboratory workers to a considerable extent determined the organization of the specialized front line hospitals, directly affecting working conditions for their, on the manufacture of the basic principles of examination/inspection and treatment of those wounded the skull and the head brain.

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Imparting to the front line hospitals of the groups of ORMU contributed to creation of the specialized hospitals for those wounded the head.

This specialized hospital compulsorily encompassed one or several neuro-surgical separations/sections, usually in combination with separations/sections for the adjacent areas of the surgery of

head - ocular, maxillofacial and by ENT service.

In the large/coarse specialized hospitals also occurred highly useful internal differentiation of neuro-surgical wards and even whole separations/sections on different areas of central and peripheral nervous system.

Thus, for instance, in the largest specialized hospital of Leningrad Front, which played the role of the front line specialized center, were isolated the numerous separations/sections, specially fitted out for those wounded the skull, the spine and the peripheral nervous system. It is more than that, from a number of neuro-surgical separations/sections, intended for the treatment of those wounded the skull and the brain, in turn, were isolated several larger than separations/sections for the most extensive group of those wounded in the arch/summary of skull. Furthermore, it was created special separation/section for those obtained the wounds of the basis of skull, usually combined with the wound of the adjacent areas: orbit, eye, nose, ear and person, and finally the particular separation/section, intended for wounded with infectious complications, mainly with meningitis and encephalitis. With respect to the shaping of the specialized separations/sections indicated was conducted the basic arrangement of the specialists. In the separation/section of the wounds of the basis of skull, together with

neurosurgeon, worked ophthalmologist, otiatrist and maxillofacial surgeon. In the separation/section of infecticus complications main role, besides neurosurgeon, played the neurcpathologist, psychiatrist, therapist, etc. In separations/sections for the wounds of the arch/summary of skull worked the basic group of the neurosurgeons.

All enumerated separations/sections were in equal measure interested in X-ray separation/section and in the number of special laboratories - clinical, bacteriological, biochemical, etc.

In view of the exceptional value of x-ray examination for the diagnosis of the bullet wounds of skull and brain on entire extent of the development of the wound process, from initial and to residual period, and also for evaluation of the severity of wound and its complications the military of neuro roentgenology engaged in the Great Patriotic War the very visible and critical place. The primary x-ray examination of each entered into hospital wounded the skull with the least suspicion for possibility at least surface damage to bone was the indissoluble team of comprehensive clinical X-ray research.

In the overwhelming majority of the specialized hospitals sufficiently widely practiced different auxiliary methods of X-ray

diagnostics in the form encephalo- and ventriculography, abscessography and fistulography by the introduction both air and different liquid contrast media. Is exclusive the value of these methods for the early and differential diagnosis of infectious and traumatic (Rubtsovs) complications, especially the abscesses of brain and traumatic epilepsy, was obtained for the first time broad acknowledgement in the Great Patriotic War.

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This fact was without fail considered also in the direction of entering the hospital wounded.

After the medical processing of wounded in receiving-sorting separation/section and primary composite examination/inspection by their neurosurgeon jointly with neuropathologist in the medical dressing room of this separation/section and after careful examination/inspection and dress/lavatory the wounds of the skull of these wounded, as a rule, guided into X-ray separation/section. After the X-ray analysis of skull and final formulating of primary diagnosis was conducted the classification of these wounded: then either they guided into the appropriate separation/section or directly they delivered into operating room for production in the urgent process/operation.

All entered wounded if necessary underwent additional consultative examination/inspection by different specialists. Furthermore, with it systematically produced different laboratory investigations of the blood and urine, and in the case of necessity also cerebro-spinal fluid, microflora of wound and the histological research of biooptical material. Thus, the procedure of the examination/inspection of those wounded the skull and the head brain in the front line specialized hospitals in a number of cases bore clinical character/nature or approached it.

The work of the bandaging unit/block in the specialized hospital bore by times the very stressed character/nature, being found in the tightest dependence on the activity of combat process/operations.

In the period of combat operations on front and high surgical activity of army of KhFEG the majority entered on GBF of those wounded into skull already underwent, as a rule, primary processing on GBA and did require the special treatment or particular surgical interventions from special readings, for example, in reworking of wound, autopsy of the early abscess of brain, etc. On the contrary, with execution by army KhPPG only of sorting-evacuation function basic load of the primary processing of those wounded into skull

fell, as a rule, to the specialized front line evacuation hospitals. With purpose of rationalization and acceleration of this operational activity and increase of the capacity of operational unit the work in operating rooms was conducted by usually 24-hour duty operating brigades.

Very significant role in the system of the organization of the treatment of those wounded into skull and head brain played well equipped of physiotherapy, massage and therapeutic exercise, contributed to a considerable extent to acceleration healings of wound, restoration/reduction of the disrupted functions and to fastest recovery of wounded.

PERIODS OF ENTRY AND ENVELOPMENT BY THE SPECIALIZED AID OF THOSE WOUNDED THE SKULL IN DIFFERENT CGMET PROCESS/OPERATIONS.

In contrast to the army therapeutic installations where the periods of the entry of those wounded the skull were calculated usually by hours or 2-3 by days after wound, the periods of the entry of those wounded the skull and the head brain to the hospital basis of front varied between very wide limits - from several hours to several days, weeks and even months from the moment of wound.

The main reason of these considerable oscillations/vibrations of

the periods of the entry of wounded was presence in the army rear of specialized KhPPG, to which was charged the basic task of aid by that wounded the skull and the head brain - first of all the primary processing of wound with the subsequent hospitalization of wounded by period to 2-3 weeks, depending on the severity of wound and post-operation coursing of wound process.

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Thus, the operated in army specialized KhPPG wounded usually did enter on GBF 2-3 weeks after wound.

However, this position/situation sharply changed with the offensive of active combat operations and large-scale process/operations. Thus, for instance, to the hospital basis of Leningrad Front, where those wounded into skull usually entered on army specialized KhPPG by already processed, on the average after 2-3 weeks after wound, in the period of active combat operations with the blockade break-through of Leningrad transportable wounded they entered not finished usually the 2-3-4th day after wound. This fact, together with the winter conditions for combat in the swampy locality, noticeably made coursing worse of wounds, limiting the possibility of their primary processing.

In Orel-Kursk battle basic severity on rendering aid by that wounded the skull lay on GBA. However, as a result of the considerable loading of army KhPPG by neuro-surgical wounded, the great percentage of those wounded the skull was directed by aircraft to the approximate specialized hospitals of evacuation point. These wounded, entering comparatively early periods, underwent, as a rule, operational intervention.

In combat process/operation the "liberation of Belorussia" many of those wounded the skull directly they evacuated from army on GBF. However, as a result of the rapid advance of our troops/forces up to great distances, evacuation route of GBF increased. In connection with this wounded into skull, that entered on GBF into first phase of combat through several hours after wound, subsequently entered there more lately - on 2-6 the days. Great role in the contraction/abbreviation of the periods of the entry of wounded on GBF played during this combat process/operation the advanced forward interarmy hospital base.

Similar pattern was observed also during combat process/operation the "Vistula - Oder", that was being characterized as preceding/previous, by the rapid offensive of our troops/forces. and into this combat process/operation the first specialized aid proved to be in essence on GBF, where in the beginning of this

process/operation those wounded into skull entered after only 6-12 hours after wound.

During Berlin process/operation the specialized hospitals of front line base received wounded in skull already after 5-6 hours after wound. Into the hospitals of the rear basis of front these wounded entered after month after wound.

A question of envelopment by the specialized aid in GBF of those wounded the skull is not less timely, than a question of its envelopment on GBA. If in GBA the envelopment of this category of wounded by the specialized aid were caused in essence on importance to ensure with their full-valued primary processing of the wounds of skull and brain, then on GBF, where usually it is necessary to carry out the post-operation treatment of these wounded, the specialized aid was dictated by the need for early identification, and also timely and proper treatment of complications. Furthermore, the specialists of front line therapeutic installations had to control, amend and supplement the work of the neurosurgeons of army KhPPG.

The envelopment of those wounded into skull by the specialized aid varied in different combat process/operations the dependence not only on a quantity on GBF of the specialized hospitals, sufficient

in-patient fund and specialist-neurosurgeons, but also on the series/row of other very essential reasons.

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In the initial period of war when the specialized agencies only were deployed and were equipped at different fronts, the envelopment of those wounded into skull by the specialized aid was in a number of cases by yet not sufficient. However, already during December 1941, during the rout of Germans in the environs of Moscow, available on GVF two powerful/thick SEG with neurosurgical separations/sections in them ensured the considerable percentage of the envelopment of those wounded into skull by the specialized aid. In the course of further combat manning army and front line hospital base by the groups of ORMU and by special armament comparatively rapidly increased this percentage.

However, besides the presence of the specialized aid, very vital importance had correct leadership/manual of it. No less important was also the ability of the leading medical organizations to distribute a considerable number entered of those wounded into skull, to maneuver with the specialized hospitals and cadres. In the course of the Great Patriotic War sufficiently demonstrative it is revealed/detected as in proportion to the acquisition of experiment/experience, the

preparation of the necessary specialists and improvement in the medical supply occurred further creative development of the ordered system of the specialized treatment, the approximation/approach of front line hospitals to working parts and steady improvement in the results of treatment even among the heaviest group of wounded - wounded the skull and the head brain.

As illustration it is possible to give many combat process/operations of the Great Patriotic War. In particular, during combat process/operation the "Vistula - Oder", in spite of the exceptional difficulties, connected with the rapid offensive of the troops/forces, special aid encompassed all requiring it those wounded the skull and the head brain.

#### READINGS TO SURGICAL INTERVENTIONS AND OPERABILITY ON GBF AMONG THOSE WOUNDED IN SKULL.

The diverse composition of those wounded the skull, that were being treated in front line therapeutic installations, determines to a considerable extent and reading to surgical interventions.

The primary processing of the wounds of skull during individual combat process/operations composed the basic task of the specialized aid not only on GBA; the significant part of these operational

intervention fell also to front line therapeutic installations.

Unfinished wounded into skull entered on GBF in a number of cases the 3-5th day from the moment of wound, and therefore their primary processing bore the frequently deferred and even late character/nature.

The stressed work in army and army therapeutic installations in the period of active combat operations was sometimes the reason for the fact that some wounded the skull, operated in army KhPPG, which entered then into the specialized hospitals of front rear, required reworking.

Tendency toward every possible improvement and acceleration of the healing of wounds placed, furthermore, before the neurosurgeons of GBF a comparatively new and crucial task - imposition of the deferred or secondary sutures on the pure/clean or well which granulate wounds skulls.

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Even more typical for the front line specialized hospitals, than the group of operational intervention indicated were the process/operations, directed toward struggle with severe infectious

complications and first of all with the early abscesses of brain. To this category of operational intervention should be regarded the distance/separation from the substance of the brain of available foreign bodies or bone scrap, which persistently support the suppurative processes in wound and which impede the healing of fistulas. Then one should speak also about operational intervention directed toward the elimination of the jamming of the encephalitic protrusion of brain in the trepanation aperture, and also edge/boundary or lamellar osteomyelitis. Finally, here was conducted the early carving of a tunicary-cerebral scar after 2-3 months after wound, with the subsequent anechoic suture with purpose of prophylaxis of later complications in the form of abscess and traumatic epilepsy.

With this diversity of operational intervention in the specialized hospitals of front rear a question about correct readings and contraindications to them, just as a question about their sequence, it acquired exceptionally important value.

As a result of the contemporary treatment of each bullet wound as is knowingly of that microbial contaminated, and consequently, that requires the surgical processing, a question about readings to the primary (but with its insufficiency - to secondary) processing of wound no longer is caused more than principle objections. However, the later periods of the entry of wounded on GBF in comparison with entry wounded on GBA it is considerable complicated this question with respect to heavy to wounded with the penetrating wounds of skull and brain. Into these hospitals the wounded frequently entered already in the stage of the purulent inflammation of wound with the beginning infectious complications, which caused the need for placing readings to late processing more carefully, but the contraindications to include are even more seriously.

Speaking about contraindications to processing of wound on GBF, it is necessary to keep in mind that the traumatic factor was usually inferior its here leading role to infectious.

During the decision/solution of a question about primary or reworking of wound it was always to proceed from the data of comprehensive comprehensive clinical X-ray research and careful evaluation of local inflammatory changes in wound and its periphery, general condition of wounded and period, which passed from the moment of wound.

In front line area the severity of the general condition of wounded was comparatively rarely serious obstacle to surgical intervention. However, it was necessary to compulsorily consider presence in their general/common/total, sometimes even no longer so/such heavy, condition of the phases, unfavorable for these process/operations. To such unfavorable phases should be, first of all, regarded the extreme fatigue of wounded into the first hours after his entry into the specialized evacuation hospital. Prolonged evacuation, pain, overall weakness, cooling by winter or superheating by summer, thirst so forth - all this extremely unfavorably was reflected in the general condition of wounded, strongly were decreased his resistivity to operating injury and infections. At the same time all these burdening moments comparatively easily and rapidly disappeared after that, KA to wounded gave by several hours rest. The loss of these hours for the primary processing of wound with surplus was redeemed by an improvement in the general condition of wounded.

So unfavorable, burdening a factor for operational intervention was the acute/sharp outbreak of purulent meningitis, which complicated the bullet wound of skull.

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Although the reason for this complication nested in wound and could be removed only via corresponding operational intervention, the operation of such wounded in the condition of violent outbreak meningitis was extremely disadvantageously and frequently it led to fateful consequences. Therefore it was necessary preliminary in by the aid of energetic brief (1-2 days) sulfanilamide or penicillin therapy to eliminate aggravation and after a descent in temperature and sanitation of cerebral-spinal fluid to subject wounded to operational intervention.

The idea of that deferred and later primary and reworking of the wounds of skull and brain, emergent in Soviet neurosurgeons even at the very beginning of the Great Patriotic War, as is known, was received subsequently wide acceptance. However, mechanical evaluation only of some periods without sufficiently taking into account the general condition of wounded, his wound and microflora in it was sometimes pregnant with very heavy consequences. This example occurred in the winter of 1943 during the blockade break-through of Leningrad. This difficult process/operation, which flowed/occurred/lasted under extremely unfavorable medical conditions (winter time, marshy ground, difficulty with the sanitation of soldiers), was characterized by the strong contamination of wounds,

by predominantly anaerobic and putrefactive microbes. The attempt to operate wounded with the penetrating wounds of skull and brain under these extremely unfavorable conditions in time of more than 4-6 days after wound was usually escorted/tracked in contrast to the series/row of other combat process/operations by the violent outbreaks of infection with an increase in the lethality, which made it necessary immediately to restrict the periods of primary processing in essence by the first 4 days. Therefore after the entry of wounded into front line hospitals within late periods after wound it was necessary be guided to constantly not by the calendar calculation/enumeration of time, but by the condition of wound, by the degree of manifestation in it and in its periphery of inflammatory phenomena, the character/nature of purulent discharge, the presence of the typical signs/criteria of anaerobic infection and finally by the general/common/total reaction of organism and by the condition of wounded. The sharper was expressed the suppurative process in wound and than more strong it was contaminated, the less there was usually the volume of operational intervention which pursued in the similar cases only the one basic goal - to ensure the free outflow of wound discharge from wound.

The question about readings to the surgical treatment of early infectious complications, which was concerning in essence of the early abscesses of brain, was solved in essence by already quite this

diagnosis.

The universally recognized position/situation, that the duration with these early abscesses, which appear, as a rule, after blind-end wounds, is inexpedient and too risky, unfortunately, sometimes it was confirmed also in the Great Patriotic War. The experiment/experience of war showed that operational intervention in the form of trepanation with autopsy and draining of the area of abscess was urgent and must be to follow directly diagnostic puncture. The transference of surgical intervention next day was considered inadmissible, especially in the absence of considerable decompression.

A question about the sequence of operational intervention under conditions of the front line specialized hospital was solved on the basis of both medical readings and medical-tactical conditions. After the entry of a great quantity of the wounded, who were requiring primary or reworking of wound, the work of operational unit by rear sight was changed over to this form/species of operational activity.

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First of all in such cases into operating rooms guided wounded with bullet ones or with the heavy closed damages the skulls with the

suspicion to intracranial hemorrhage, with the expressed picture of the intracranial pressure increase; in the second burst - wounded with liquorrhea, acute/sharp prolapses of brain and early infectious complications, source which was the unfinished wound; in third burst - all remaining wounded with the penetrating wounds of skull, moreover those of them, in which there were wounds of greater remoteness, they operated, as a rule, it is earlier; finally, for latter/last fourth, burst were headed the wounded with the nonpenetrating wounds of bones and soft tissues of skull.

In the waiting of the forthcoming process/operation by the hospitalized wounded usually was carried out the dehydrating therapy.

During evacuation or GBA of those wounded the skull, already operated there on the spot, and also in the periods of relative calm the operating rooms of the specialized front line hospital were occupied by almost exclusively purulent surgery. In them they operated usually wounded with different infectious complications and first of all with the abscesses of brain.

Thus, in the specialized hospitals of front rear readings to the surgical treatment of those wounded the skull and the head brain were placed very widely, especially in relation per and reworking.

Analyzing operability on GEF among those wounded the skull and the head brain during different combat process/operations, one should arrive to the conclusion/derivation that its sharp oscillations/vibrations were found in direct dependence on medical-tactical circumstances at front.

In the dismantled combat process/operations operability in the specialized hospitals of front among wounded the skull with damage bones is represented higher on diagram (Fig. 40).

As can be seen from this diagram, operability of those wounded the skull varied in different periods of the Great Patriotic War.

Comparing the data about operability in the army hospitals of wounded the skull with damage bones (page 155) with the same data of front line evacuation hospitals, one should to come to the conclusion that the surgical activity of the first frequently exceeded operability in front line hospitals.

Exception was only the Leningrad front where in the period of blockade break-through operability in the large/coarse specialized front line hospitals achieved 46.7o/o, exceeding many times operability in army specialized KhPPG (17.3c/c).

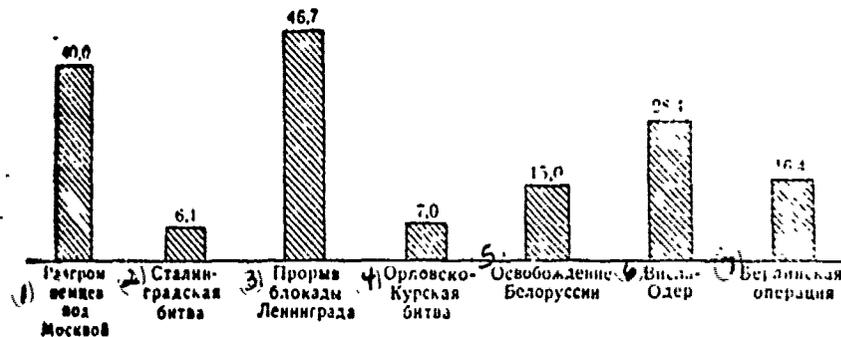


Fig. 40. Operability of wounded the skull with damage bones in all evacuation hospitals of GBF in different combat process/operations (in percentages).

Key: (1). Rout of the Germans in the environs of Moscow. (2). Stalingrad battle. (3). Blockade break-through of Leningrad. (4). Orel- Kursk battle. (5). Liberation of Belorussia. (6). Vistula-Oder. (7). Berlin process/operation.

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This was explained by completely peculiar conditions of this front, which had available near from army rear the powerful/thick hospital basis of front with a great quantity of neuro-surgical cots, which allowed army KhPPG to guide those wounded the skull for primary processing directly on GBF.

During the rout of the Germans in the environs of Moscow by the basic base where was conducted processing the wounds of skull, was also GBF, where were attached the corresponding forces also of substances. However, as already mentioned, operability of those wounded the skull in the therapeutic installations of immediate rear achieved in that period 30.00/o (see page 20).

SPECIAL FEATURES/PECULIARITIES OF THE PROCEDURE OF SURGICAL TREATMENT AND POST-OPERATION CONDUCT OF THOSE WOUNDED A SKULL.

The particular conditions for the work of the front line specialized hospitals and the composition of the treated in them wounded with the bullet and closed damages of skull and brain made it possible considerably to more widely utilize diagnostic and therapeutic possibilities for achievement of the fastest recovery of wounded.

Relative stability and technical equipment of the specialized front line hospitals made it possible for them to more widely utilize these advantages with purpose of the manufacture of the more advanced methods of surgical treatment. Presence in some operating X-ray machines, electric feelers and electromagnets contributed to the more advanced and careful processing of the wounds of skull and brain and facilitated the distance/separation of metallic foreign bodies.

Use/application in the surgical practice of different antiseptics in particular sulfanilamides, but toward the end of the war and antibiotics, allowed neurosurgeons to more daringly and more widely operate those wounded the skull and within also the late periods which in the preceding/previous wars were considered as strictly counter-indicative.

The procedure of deferred and late primary and reworking of the wounds of skull and brain, that obtained wide acceptance in the Great Patriotic War, was to a considerable extent obligated by its successes to both the improved technique of process/operation and to use/application of antiseptics and antibiotics.

To the same degree this was related also to the use/application of a primary anechoic suture. In this respect the therapeutic installations of front rear, for which were characteristic the later periods of the entry of wounded, were little being adequate/approaching for applying this most accomplished method during the primary processing of wound, especially with the penetrating wounds of skull. However, the presence of the qualified neurosurgeons, who well master process/operation technique on brain, and powerful/thick bacteriostatic preparations in combination with active post-operation treatment and careful observation and care of these wounded under the stable conditions of front line hospital made

early primary suture (in the first 24-48 hours) after the radical processing the little contaminated wounds by very promising process/operation. With the heavy wounds of the ventricles of brain liquorria anechoic suture considered absolutely shown. Unfortunately did not have time to find to itself wide application the deferred and secondary suture of skin integuments with the pure/clean, well granulated and smoothly healing wounds of skull and brain.

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Insufficiently still practiced in the absence of the primary processing of wound the process/operation of the early (after 2-3 months) total carving of a tunicary-cerebral scar together with bone fragments and foreign bodies, with the subsequent imposition of anechoic suture for the purpose of prophylaxis of late abscesses and traumatic epilepsy.

As is known, the basic method, which obtained widest acceptance in the hospitals of army and front line hospital base, was the so-called open method of conducting the wound after its processing. Of the special features/peculiarities of treatment by the open method should be emphasized the tendency to possibly more rarely make dressings to avoid the traumatization of the appearing granulations in wound. This task was successfully solved by use/application of a

very successful type of the long-term moist-drying bandage of Mikulich-Demmer-Goykhman. This bandage, laid on wound immediately after its surgical processing, they relieved usually not earlier than 14-16 days when wound already managed to be covered with fresh granulations. This convenient and practical long-term post-operation bandage in the case of the forced evacuation of wounded successfully performed the role of transport bandage.

To the special features/peculiarities of the treatment of the abscesses of brain should be regarded the more great possibility of the differentiated approach to the surgical treatment of these severe complications. Because of the prolonged stay of those heavily wounded on GBF and the diversity of the appeared in them abscesses in a number of cases was created the possibility of use for surgical treatment their not only open method with drainage, but sometimes and closed - paracentetic, but sometimes even method of the total extirpation of abscess together with capsule. Should be to mention Soviet neurosurgeons' another proposition laid in the therapeutic installations of front rear anechoic suture on wound after the autopsy of the abscess of brain and processing of its capsule by antiseptics and by antibiotics.

The post-operation conduct of those wounded the skull and brain was usually characterized by high activity. The use/application of

dehydration measures and massive doses of antiseptic substances with preventive and therapeutic target under the control of the laboratory investigations of the blood and the cerebro-spinal fluid was very is widely common in front line hospitals. With the least suspicions to infectious complication or, less frequent, sub-arachnoidal hemorrhage produced lumbar punctures, while during the development of meningitis or ependymitis these lumbar, and sometimes also ventricular punctures produced systematically. Together with the enumerated methods the treatments, in the specialized hospitals applied the fractional blood transfusions for reinforcing the general/common/total reactivity of organism.

Finally, very wide application in front line hospitals obtained in the Great Patriotic War physiotherapy and therapeutic exercise. Especially should be noted the favorable results, obtained from local ultraviolet lighting of the contaminated, limply granulating and infected wounds, and also the epileptic protrusions of brain. The early use/application of the therapeutic exercise also several contributed to the fastest recovery of those wounded into skull and to the contraction/abbreviation of the periods of their stay in hospital.

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#### COMPLICATIONS WITH THE WOUNDS OF SKULL.

The complications, observed with the bullet wounds of skull in the front line specialized hospitals just as in other therapeutic installations, they were shared, as already mentioned, to two basic groups - traumatic and infectious. The frequency of each group of complications oscillated in different periods of coursing of wound process. Traumatic complications were encountered usually in the therapeutic installations of army and army rear. Infectious complications were observed considerably more frequent in front line evacuation hospitals. Infectious complications in front line hospitals were related most frequently to the categories of early ones, developing in that period when the bullet wound of skull usually yet did not have time to heal. Among these infectious complications in the first place on frequency and severity stood the encephalitides and the abscesses of brain.

The decisive role in struggle with these terrible complications

played early diagnosis and their timely energetic treatment. This forced all neuropathologists and neurosurgeons vigilantly to follow the wounded entering and to thoroughly reveal/detect among them those grown heavy in route/path.

In view of the fact that the large part of the infectious complications was frequently escorted/tracked by changes from the side of eyeground, blood and of cerebro-spinal fluid, examination/inspection of oculist and systematic lumbar punctures with the research of the cerebro-spinal fluid and blood were necessary. Onset in the series/row of the cases of mental symptoms required psychiatrist's consultations.

Very important role in the timely identification of infectious complication played the X-ray analysis of skull. With its aid frequently it was possible to establish/install the source of the dissemination of purulent infection in brain (bone fragments, foreign bodies, edge/boundary osteomyelitis, etc.). In the cases, suspicious to the abscess of brain, the encephalography usually rapidly solved the existing doubts.

Less valuable diagnostic data received with the examination/inspection of the wound of skull and brain. The curtailment of the pulsation of cerebral substance and protrusion of

brain, edematic and stagnant granulations, dryness wounds or abundant malodorous discharge from it indirectly indicated the development of complications. During the development of the restricted purulent encephalitis or early abscess of brain one ought not to have constantly remembered about the tendency of infection toward dissemination into submembrane space and into depth with "penetration" into cerebral ventricles. These purulent ependymites, basal and diffuse meningitides one ought not to have in time detected and prevented by medicinal/medicamentous treatment or surgical intervention.

As a result of a sharp the intracranial pressure increase on the soil of edema of brain, which rapidly develops with purulent encephalitis or abscess, in the wound of skull appeared usually the extensive protrusion of brain, which required very cautious defense. This was very important in wounded with slight consciousness or psycho-motor excitation and it was achieved by usually special protective bandages with pasteboard-wadded framework/body or by the gypsum helmet, superimposed to the head of this wounded.

Particular attention and alertness required the anaerobic infection of brain. Very essential was the retirement of the means of pathogenic microbes and their association with purpose of the earliest use/application of specific sera.

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Among the scarce traumatic complications of the bullet wounds of skull and brain, observed on GBF, in essence practical value had the disorders in system roof and liquor circulation. The high hydrophilic behavior of the brain tissue, inclined to react to any injury by edema or by bloating, is the basic reason for the frequent development of these complications with the subsequent secondary expansion of cerebral ventricles and basal tanks of sub-arachnoidal space. Particular danger presented the spread of progressive edema to brain stem and its march/passage into the acute/sharp bloating of brain.

Acute edema of brain, which appeared in a number of cases under the effect of early transportation, was observed on GBF usually in wounded, recently arrived from army KhPPG. When, in these wounded, of the hypertension syndrome or protrusion of brain are present, in area of bone defect the doctor could place the erroneous diagnosis of purulent encephalitis or abscess of brain.

In the treatment of acute edema of brain the significant role played the limitation of the diurnal consumption of fluid/liquid by

wounded and the systematic dehydration therapy.

Shock, intracranial hemorrhages and traumatic epilepsy were encountered in front line therapeutic installations usually rarely, as an exception.

Table 5 gives the data about the frequency of the complications, which were being observed on GBF during two combat process/operations.

As is evident from Table 5, during the blockade break-through of Leningrad the first place in frequency occupied meningitides, in the second place stood meningoencephalites, also, on the third - abscesses of brain.

Another picture was observed during the Berlin process/operation, where with a sharp descent in all complications in the first place stood abscesses, on the second the meningoencephalites somewhat more rarely were encountered meningitides.

A considerable number of meningitides and meningoencephalites during winter process/operation on the blockade break-through of Leningrad was explained by the peculiar conditions of front (marshy

ground). The disproportionately low percentage of abscesses was explained by the high surgical activity of the specialized hospitals of the rear, which encompassed with primary processing the large part of the wounded. Incomparably more favorable hospital and tactical conditions in the period of Berlin process/operation, and also early prophylaxis of complications, beginning with foremost therapeutic installations, explained a comparative rarity of meningitides, meningoencephalites and abscesses of brain.

Comparison of the data, which total all complications, which were being observed in those wounded the skull during offensive operation in first half war, with the data of Berlin process/operation vividly testifies about the great successes of military field neurosurgery.

Table 5. Frequency of the complications, which were being observed on GBF with the penetrating wounds of skull (in percentages).

Осложнения при проникающих ранениях черепа (1)	Боевые операции (2)	
	Против блокады Ленинграда (3)	Берлинская операция (4)
Абсцесс мозга (5)	3.1	2.9
Менингит (6)	15.1	2.3
Менинго-энцефалит (7)	5.1	2.6
Травматическая эпилепсия (8)	1.1	—
Прочие осложнения (9)	11.7	6.0
Всего (10)	36.1	13.8

Key: (1). Complications with the penetrating wounds of skull. (2). Combat process/operations. (3). Blockade break-through of Leningrad. (4). Berlin process/operation. (5). Abscess of brain. (6). Meningitis. (7). Meningoencephalitis. (8). Traumatic epilepsy. (9). Other complications. (10). In all.

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PERIODS OF THE HOSPITALIZATION OF WOUNDED IN THE SKULL AND INDICATIONS FOR EVACUATION INTO THE REAR.

Chronic protracted nature of the period of early reactions and complications and following after it period of their elimination required usually sufficiently prolonged hospitalization at GBF of those wounded in the skull; periods these were calculated on the average 2-3 by months. They were different for easily wounded with the shorter periods of treatment and for heavily wounded with the penetrating wounds of the skulls and brain, for which were required the prolonged periods of treatment, finished usually in the therapeutic installations of the deep rear. However, combat situation at front sometimes introduced substantial changes, imperatively dictating either the need for the premature evacuation of wounded into the rear or, on the contrary, limiting and even completely lichen the front of the possibility of this evacuation.

Striking examples of the considerable evacuation of those wounded the skull from front line hospitals into rear therapeutic installations can be seen during the combat process/operations of first half war, which flowed/occurred/lasted under severe conditions. Here is related the offensive operation of the rout of the Germans in the environs of Moscow, during which GBF in view of considerable loading of bed resources in essence did not hold up in itself for the prolonged treatment of those wounded the skull, widely evacuating

them into the rear. A quantity of evacuated from GBF wounded the skull with damage bones achieved in this combat process/operation 72.1o/o. From a number of those easily wounded the soft tissues of skull it is evacuated into rear 81.8o/o.

Another position/situation was observed in the period of battle in the environs of Stalingrad. Hospitals of GBF proved to be within a comparatively short period loaded easily wounded. For the rear were headed only wounded, who were requiring the prolonged treatment or for a long time lost the ability to work. In all into the rear it was evacuated by 25.7o/o wounded the skull with damage of bones and 19.2o/o wounded the soft tissues of skull.

Exceptional position/situation was created at Leningrad Front in period with the full of its blockade winter of 1941/42, when surrounded by the intimate annulus of hostile forces the city-front was completely renounced from the rear and for the length of 17 months is lost the possibility to evacuate wounded. Under these conditions the periods of the hospitalization of those heavily wounded in skull and head brain achieved maximum sizes, since these wounded usually completed its treatment on GBF.

Is average/mean the duration of the treatment of those wounded the head brain on GBF to full/total/complete recovery it was equal to

57.1 days, for a heavier group it was considerably more - 79.8 days. A quantity of those evacuated for this process/operation (immediately after blockade break-through) was also very low, composing 20.30/o of total number of wounded with the damage of bones and altogether only 5.00/o of those wounded the soft tissues.

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With the offensive operations of last year of war the "liberation of Belorussia" and " Vistula-Oder", as a result of the rapid advance of our troops/forces in extensive territory with the destroyed iron roads, groups of front line hospitals, which were being moved "sand bars", accepting on the spot of wounded from army KhPPG, constructed their work according to the principle of the nearest front rear with rendering aid by that wounded the skull in the specialized hospitals.

Nontransportable wounded they usually held up for prolonged period. Wounded with the period of treatment to 60 days also were treated on the spot. Evacuated into the rear of those only transportable wounded the skull with the period of treatment more than 2 months or lost for a prolonged time ability to work.

Then is related also to the latter, Berlin, process/operation,

during which wounded the skull, remaining in the majority of the cases in the therapeutic installations of front rear to final recovery, underwent then evacuations in the limits of front from one basis of the specialized hospitals to another.

The evacuation of those wounded into skull was conducted, as a rule, according to designation/purpose into the specialized hospitals of the deep rear. Readings to this evacuation on GBF were usually changed depending on the severity of the composition of wounded and requirement for free bed resources because of the need for the advance of hospitals forward.

Evacuations into the rear were subject first of all all heavily wounded with the penetrating wounds of skull and brain, the transferred infectious complications after the remission/abatement in them of inflammatory phenomena, in the absence of the hypertension and membrane symptoms, cerebral protrusions and with normal temperature, composition of the blood and the cerebro-spinal fluid. Furthermore, evacuations into the rear were subject wounded after the penetrating wounds with the extensive defects of bones skulls and skin integuments, with stable paralyzes and hemipareses, aphasias, hemianopsia and so forth as requiring the prolonged treatment.

Evacuations were subject also wounded with nonpenetrating wounds

and with the closed damages of skull and of brain, the escorted/tracked heavy contusions of brain with extensive ones and struts by the fallouts or functions. In comparatively rare cases were subject to evacuation into the rear and the wounded the soft tissues skulls with the great defects of skin integuments, with the heavy contusion syndromes from the side of brain and with the multiple wounds of other areas of body.

The transportation of these all wounded into the rear was realized by usually rail transport, in particular cars - for heavily wounded and in general/common/total ones - for less heavy ones of them. In comparatively rare cases for the evacuation of wounded into the rear was utilized the aircraft transport.

Of any special immobilization of head in those wounded the skull during transportation them into the rear it was not applied.

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#### COMPARATIVE DATA ABOUT LETHALITY AMONG WOUNDED IN THE SKULL ON DIFFERENT COMBAT PROCESS/OPERATIONS.

In order to completely characterize organization of medical aid and formulating of the specialized treatment of those wounded the

skull and the head brain on GBF, it is necessary separately to be stopped at a question of lethality.

The study of the statistical materials of the Great Patriotic War revealed/detected a steady descent in the lethality from the years of the war (see that 4).

The analysis of different combat process/operations in essence also confirms this law. In spite of the considerable oscillations/vibrations of both general/common/total lethality and lethality among those operated, the basis tendency to its descent is sufficiently distinct. These oscillations/vibrations to a considerable extent depended not only on character/nature and severity of the contingents of wounded, but also on medical-tactical circumstances into one or the other process/operation.

Diagram (Fig. 41) shows comparative lethality with the wounds of skull with the damage of bones in the hospitals of front rear.

As can be seen from this diagram, lethality among wounded the skull with damage bones progressively descended from the first combat process/operation - the rout of the Germans in the environs of Moscow - to the latter, Berlin, process/operation.

If with the first process/operation, which flowed/occurred/lasted in the exclusively complicated and stressed circumstances, in the absence even in the army of the specialized agencies for wounded the skull, the lethality among heaviest group wounded it achieved in the front line hospitals of a comparatively high level, then with the completing war Berlin process/operation lethality was lowered more than 4 times, since the clearly organized neuro-surgical service completely provided the highly skilled aid all by that wounded the skull and the head brain, beginning with KhPPG of the first line, GBA and ending with the front line hospitals.

Lethality during battle in the environs of Stalingrad was already comparatively small. However, in specialized SEG, where were concentrated heavily wounded the skull, lethality was higher than on entire GBF.

Lethality on GBF with the blockade break-through of Leningrad also should be recognized low, taking into account that in this combat process/operation specialized army KhPPG was occupied by the surgical processing only of nontransportable wounded, but all others it evacuated into the specialized agencies of the front rear where they were operated within comparatively late periods.

Low lethality in Orel-Kursk process/operation is caused also by

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the fact that army specialized KnPEG left and processed in itself those most heavily wounded the skull. The large part of the transportable wounded was very rapidly delivered by aircraft on GBF, where they were operated within early periods.

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Fig. 41. General/common/total lethality with the wounds of skull with the damage of bones in the hospitals of front line area in different combat process/operations.

Key: (1). Rout of the Germans in the environs of Moscow. (2). Stalingrad battle. (3). Blockade break-through of Leningrad. (4). Orel- Kursk battle. (5). Liberation of Belorussia. (6). Vistula-Oder. (7). Berlin process/operation.

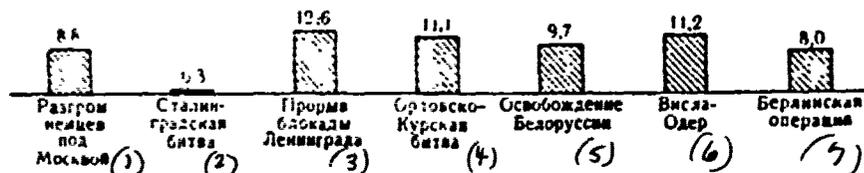


Fig. 42. Lethality among operated wounded skull with damage bones in hospitals of front line area in different combat process/operations (in percentages).

Key: (1). Rout of the Germans in the environs of Moscow. (2).

Stalingrad battle. (3). Blockade break-through of Leningrad. (4).  
Orel- Kursk battle. (5). Liberation of Belorussia. (6). Vistula-Oder.  
(7). Berlin process/operation.

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Lethality on GBF among those wounded the soft tissues of skull was absent or it was negligible, oscillating from 0.10/o in the period of the blockade break-through of Leningrad to 0.70/o during the rout of the Germans in the environs of Moscow and process/operations "Vistula-Oder". The reasons for lethality with these, it would seem, light wounds was either the heavy contusion of the hanger-on departments of brain by analogy with the closed damages or infectious complications.

Diagram (Fig. 42) gives the data, which concern lethality among the operated wounded the skull with damage bones in the hospitals of front rear in the period of different combat process/operations.

As can be seen from these data, lethality among operated during the combat process/operations indicated was small. During their attentive analysis taking into account the severity of the operated wounded and medical-tactical circumstances at front is noticeable the tendency toward descent.

Especially low should be recognized the lethality among those operated during offensive Berlin operation, according to the data of the foremost hospital basis of front, which had available 4 neurosurgical hospitals. High surgical activity in these hospitals caused that the fact that the majority of those obtained the penetrating wounds of skull was in proper time operated.

So/such low was lethality among those operated on GBF during the liberation of Belorussia.

Thus, the specialized treatment of those wounded the skull and the head brain must be based on the careful accounting of the dynamics of coursing of wound process in its different periods with the possibility of the development of diverse complications.

The analysis of comparative data about lethal outcomes on GBF in those wounded the skull and the head brain during different combat process/operations in the Great Patriotic War with a certainty attests to the fact that the lethality had a tendency toward steady descent from one combat process/operation to another as a result of further improvement of the organization of neuro-surgical aid by that wounded into skull and head brain.

## SPECIALIZED AID TO WOUNDED IN THE SKULL ON GBF.

The study of the system of organization and volume of the specialized aid by that wounded the skull and the head brain on GBF in different combat process/operations of the Great Patriotic War attests to the fact that this means of the specialized aid was in each of them peculiar. The reason for this was a difference in the operational and medical-tactical circumstances during individual combat process/operations, under different geographical conditions and in different seasons. Furthermore, the character/nature of the specialized aid depended on the provision of the medical and sanitary service of army in the field and fronts by cadres of the neurosurgeons and specialists of adjacent disciplines, and also by X-ray and other equipment. Finally, not smaller role played the arrangement of these forces and the distribution of the materiel between the specialized hospitals, or maneuver by the cadres of the specialists, by the groups of ORMU and by hospitals. The continuously growing combat experience of the neuro-surgical service of Soviet army as a whole and each individual specialist in particular, and also an improvement in the material and technical equipment of the specialized hospitals of army and front line area they contributed so that the organization and the provision of these wounded into skull

by the specialized aid continuously creatively were improved and were improved from one combat process/operation to another.

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The specialized treatment of those wounded the skull and the head brain must be based on the careful accounting of the dynamics of coursing of wound process into its different periods and possibilities of the development of diverse complications.

Volume and character/nature of the specialized aid by that wounded the skull in the hospitals of front rear usually correspond to the period of early reactions and complications, and also to the period of the elimination of these early complications with the delimitation of infectious focus and the healing of wound. However, depending on the peculiar medical-tactical conditions for one or the other combat process/operation, volume and character/nature of this aid on GBF unavoidably vary, either approaching an army and even army area or, on the contrary, as if moving away - to rear, and in individual ones, exceptional ones, cases even enveloping all periods and stages, together undertaken, beginning with the earliest and ending with the latest - residual period (blockade of Leningrad).

Neuro-surgical aid in the form of the primary surgical

processing of wound had to first of all prove to be in the majority of those wounded the skull in specialized KhPPG of army rear in order to maximally utilize possible earlier periods of processing wound (first 3 days from the moment of wound) and only in the second burst - in the specialized evacuation hospitals of front rear. The treatment of those wounded the skull and the head brain in the specialized hospitals of front rear pursues in essence prophylaxis and struggle with the developing infectious complications in order to ensure the fast recovery of wounded and simultaneously to prepare for evacuation into the rear of the most heavily wounded, who require prolonged treatment.

In the period of the active combat process/operations at front and the considerable entries of those wounded the skull into army specialized KhPPG, which forced were to be occupied in essence by sorting-evacuation work, basic severity on the primary surgical processing of wounds lay down on the front line specialized hospitals. The latter in the course of war used extensively a possibility not only of the early and deferred, but even late processing of wounds.

In the periods of calm at front, besides the treatment of those wounded the skull, was carried out also increase in the qualification of those being and training new specialist-neurosurgeons for army and

front line therapeutic installations on the basis of the specialized evacuation hospitals.

Medical aid by that wounded the skull in the hospitals of the deep rear.

Short clinical characteristics of the bullet wounds of skull and brain.

During the Great Patriotic War the specialized aid by that wounded the skull was organized from GBA to the hospitals of the deep rear; a great quantity of those wounded with damages skulls guided during an entire war into the hospitals of the deep rear.

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In contrast to army and army therapeutic installations the entry of wounded into the hospitals of the deep rear did not reflect the special features/peculiarities of combat operations, since wounded they evacuated here from different fronts and in different periods after wound. In connection with this the analysis of therapeutic aid by that wounded the skull in the hospitals of the deep rear cannot be carried out on individual combat process/operations and in essence is given on the years of war.

For characteristics of the entry of those wounded the skull into the hospitals of the deep rear in different periods of war it can serve as table 6.

This gradual increase of the relative number of those wounded into skull, that entered the hospitals of the deep rear, should be explained not an increase in the injuries of skull generally, but by reinforcing of evacuation into the rear of the heavier composition of wounded, including wounded with the damages of skull.

It is necessary to indicate that the duration war in rear hospitals the composition of those wounded into skull considerably changed. If during the first year of war almost in half entered those wounded into skull had the damages only of soft tissues, then toward the end of the war this group of wounded in the hospitals of the deep rear was only the tenth unit of those wounded the skull, about which testify the data of Table 7.

From table 7 evidently, as among entered those wounded into skull changed the relationship/ratio between the penetrating and nonpenetrating wounds. Wounded latter/last groups in the course of war in essence concluded treatment in more foremost stages.

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This change in the character/nature of the wounds of skull among those entered the hospitals of the deep rear speaks about a progressive improvement in the organization of neuro-surgical aid to army, about correct classification during foremost stages and rational evacuation it is strict according to designation/purpose.

Table 6. Entry of those wounded the skull into the hospitals of Ural military district on half-years (with respect to all wounded).

Полугоды войны (1)	Первое полугодие (2)	Второе полугодие (3)	Третье полугодие (4)	Четвертое полугодие (5)	Пятое полугодие (6)	Шестое полугодие (7)	Восьмое полугодие (8)
Процент поступивших (9)	1,8	2,1	3,0	3,2	2,9	3,7	2,8

Key: (1). Half-year of war. (2). The first and the second. (3). The third. (4). The fourth. (5). The fifth. (6). The sixth. (7). The seventh. (8). The eighth. (9). Percentage of those entered.

Table 7. Distribution of the wounds of skull according to their character/nature in the hospitals of the deep rear on the years of war (according to data of Ural military district in percentages).

Характер ранения черепа (1)	Год войны (2)			
	Первый (3)	Второй (4)	Третий (5)	Четвертый (6)
Без повреждения костей (7)	49	27	21	10
С повреждением костей (8)	51	73	80	90
В том числе: (9)				
с проникающими ранениями (10)	40	60	68	74
с непроникающими ранениями (11)	10	13	12	16

Key: (1). Character/nature of the wound of skull. (2). Year of war.

(3). The first. (4). By the second. (5). The third. (6). The fourth. (7). Without damage of bones. (8). With damage of bones. (9). Among other things. (10). with penetrating wounds. (11). with nonpenetrating wounds.

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Those wounded into skull entered the rear predominantly in the third and fourth period of the bullet injury of skull, i.e., in the period of the elimination of early complications with tendency toward the delimitation of infectious focus and in the period of late complications. Specific for these periods complications in the form of the abscesses of brain, meningoencephalites, osteomyelitis, epilepsies, etc. caused clinical characteristics entered into the hospitals of the deep rear of those wounded the skull.

Clinical coursing of the wounds of skull in these periods of bullet injury was determined first of all by the character/nature of wound, and also by quality and periods of the primary surgical processing of the wound of skull and brain. Than earlier, better and the more full/totaler/more complete was produced the primary processing of the wound of skull, the less in rear hospital there was complications and heavy issues. It should be noted that during war the frequency of the primary processing, produced in the therapeutic

installations of army and front rear, always increased, about which testify also the materials of rear hospitals (Table 8).

As can be seen from Table 8, in two neuro-surgical hospitals of the rear the percentage of those wounded the skull, not processed primary in foremost stages, sharply it was decreased from year to year, from half-year to half-year. To this one should add that in the course of war continuously increased the percentage of those operated within early periods after wound, mainly in time from 3 to 6 days, and was decreased the percentage of the primary neuro-surgical processing of the wounds of skull within later periods after wound.

It is well known that the development of infectious complications (meningitides, meningoencephalites, in particular, from the distance/separation of bone splinters. Great effect on coursing of bullet wounds of skull and brain had also the periods of evacuation after primary surgical processing. The frequency of infectious complications from the side of brain and its shells after the penetrating wounds of skull depended on the period of the evacuation of wounded after primary processing.

Table 8. Percentage of those wounded into skull, that entered into rear hospitals without primary processing, on the half-years of war to a total number of those wounded the skull (on each half-year).

Тысяч в госпиталь (1)	Полугоды войны (2)							
	Первое (3)	Второе (4)	Третье (5)	Четвертое (6)	Пятое (7)	Шестое (8)	Седьмое (9)	Восьмое (10)
Специализированный нейро-хирургический госпиталь тыла (Свердловск) (11)	31,3		21,3	14,5	8,4	9,5	5,6	3,8
Специализированный нейро-хирургический госпиталь тыла (Горький) (12)	32,0	14,7	7,3	9,6	6,7	8,1	4,2	2,5

Key: (1). Rear hospital. (2). Half-year of war. (3). The first. (4). The second. (5). The third. (6). The fourth. (7). The fifth. (8). The sixth. (9). The seventh. (10). The eighth. (11). Specialized neuro-surgical hospital of rear (Sverdlovsk). (12). Specialized neuro-surgical hospital of rear (Gor'kiy).

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So, according to the data of Sverdlovsk neuro-surgical hospital, complication after the penetrating wounds skulls were observed into 31.50/o of cases, if wounded they evacuated during the first week

after primary processing, into 10.00/o - if evacuation was realized in time from 8 to 15 days after primary processing, and they did not exceed 8.30/o, if wounded they evacuated later than the 15th day after process/operation. It is completely obvious that the periods of evacuation have great value for further coursing of wound process in brain after the penetrating wound of skull. The experiment/experience of war showed that the accepted during war period of the evacuation after 15-21 days after the primary surgical processing of the wound of brain is best, giving subsequently a small quantity of complications (Table 9).

As can be seen from table 9, a number of complications with the penetrating wounds of skull in rear hospitals descends, especially sharply from sixth half-year of war. This occurred as a result of the decrease of complications not only from the side of brain, but also from the side of soft tissues, bones of skull and shells of brain.

So sharp a descent in the frequency of infecticus complications in rear hospitals after the penetrating wounds of skull during war is explained by a series/row of moments.

1. Beginning from the second and especially during third and fourth year of war primary processing it was conducted in greater unit of those wounded skull and earlier periods.

2. In these periods of war steadily was decreased number of untreated wounded, who entered hospitals of deep rear, due to not only primary, but also reworking of wounds in more foremost therapeutic installations.

3. Beginning from second- third year of war sharply they increased periods of hospitalization of wounded on the spot after primary surgical processing of wounds of skull and brain.

4. Quality of primary surgical processing from the second year of war considerably was improved.

During the first year of war partially the secondly were encountered the individual defects of processing, namely:

a) the circular, cross-shaped or flap sections/cuts of skins which on great surface bared the bones of skull and gave a large number of fistulas and osteomyelitis;

b) the insufficient processing of bone defect, in consequence of which subsequently were received the complications, most frequently in the form of edge/boundary osteomyelitis, which composed 20.00% of

complications during the first year of the war;

c) the insufficient distance/separation of bone and metallic fragments from the surface of the brain;

d) the insufficient distance/separation of bone fragments of the depth of brain.

Table 9. Infectious complications after the penetrating wounds of skull the wounded have in the rear hospitals of Ural military district on the half-years of war (in percentages).

Осложнения всех ранен	(1)	(2)	Абсцессы мозга	(3)	Менингиты	(4)	Менинго- энце- фалиты	(5)	Эпилепсия	(6)	Прочие осложне- ния <sup>1</sup>	(7)	Резко осложне- ны	(8)
Первое и второе	(9)	7.2	2.2	5.6	4.3	25.1	44.4							
Третье и четвертое	(10)	3.8	1.3	3.8	1.8	14.1	24.5							
Пятое	(11)	4.7	1.8	2.6	1.0	23.8	33.9							
Шестое	(12)	4.7	1.2	1.5	0.7	5.1	13.2							
Седьмое	(13)	5.0	0.9	1.8	0.7	3.0	11.4							
Восьмое	(14)	2.0	0.4	0.9	1.5	2.0	6.8							

Key: (1). Half-year of war. (2). Complications. (3). Abscesses of brain. (4). Meningitides. (5). Meningoencephalitis. (6). Epilepsy. (7). Other complications <sup>1</sup>.

FOOTNOTE <sup>1</sup>. Other complications include prolapses, unhealing fistulas, osteomyelitis, epidural abscesses, etc. ENDFOOTNOTE.

(8). In all complications. (9). The first and the second. (10). The third and the fourth. (11). The fifth. (12). The sixth. (13). The seventh. (14). The eighth.

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The distance/separation of all bone fragments of the brain in the first stages of evacuation during the primary processing of the wound of brain occurred less than in half wounded during the first year of war, somewhat increased during the second year of war and progressively grew/rose into the third and especially during the fourth year of war (table 10).

The experiment/experience of the Great Patriotic War makes it possible to assert that the abscesses of brain most frequently are formed around the remaining in brain fragments (mainly bone).

Thus, the given above data tell about that which the decrease of a number of complications in rear hospitals with the penetrating wounds of skull, beginning with the second year of war, is connected with great envelopment with the operational aid of wounded, with the shortening of the periods of primary processing and with an improvement in its quality, and also with lengthening of the periods of hospitalization on the spot after primary neuro-surgical process/operation.

In the specialized hospitals of the deep rear in essence were encountered the following clinical forms and the syndromes:

1) late purulent complications in the form of the late abscesses of brain, late meningitides, late meningencephalites, epidural abscesses, osteomyelitis of the bones of skull and of various forms of festering the cerebral scar;

2) late nonpurulent complications in the form of the traumatic cysts of brain, external pachymeningitis, late chronic inflammations of brain with arachnoiditis, traumatic hydrocephalus with its extreme stages in the form of the ruptures of the ventricles of brain and finally of liquor fistulas which in the known unit of the cases were the consequence of the purulent complications:

3) traumatic epilepsy;

4) residual phenomena after the injury: paresis and paralyzes, aphasias and agnosia, and also chronic prolapses of brain.

Table 10. Distribution of wounded with the completely removed bone fragments in foremost stages according to the half-years of war (according to the data of Ural military district).

Полугоды войны (1)	Первое полугодие (2)	Третье (3)	Четвертое (4)	Пятое (5)	Шестое (6)	Седьмое (7)	Восьмое (8)
Процент раненых (9)	53,6	48,3	48,8	41,7	59,0	72,4	81,2

Key: (1). Half-year of war. (2). The first and the second. (3). The third. (4). The fourth. (5). The fifth. (6). The sixth. (7). The seventh. (8). The eighth. (9). Percentage of wounded.

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#### LATE PURULENT COMPLICATIONS.

A number of infecticus complications with the penetrating wounds of skull, which were being observed in rear hospitals, in the course of war steadily descended (from 44.40/o in the beginning of war to 6.80/o at the end of it).

a) the late abscess of brain - one of the most severe purulent complications of the wound of brain in the period of late complications.

The frequency of the observed in rear hospitals abscesses of brain was decreased from year to year (from 7.2 to 2.00/o); however, the specific gravity/weight of abscesses among all complications with the penetrating wounds of skull in the course of war grew/rose. During the first year of war the abscesses of brain composed 16.<sup>0</sup>/o of all infectious complications, in second year - 15.00/o, in the third year of war - 20.00/o, while during the latter, the fourth, the year of war the abscesses composed in rear hospitals 39.00/o of all infectious complications with the penetrating wounds of skull.

b) Late purulent meningitis in rear hospital was encountered considerably less frequent than abscesses. Usually purulent meningitis was developed suddenly, violently, with heavy sharp head pain and expressed meningeal symptoms, high temperature, vomiting, etc.

c) Late purulent meningoencephalitis was encountered in rear hospital considerably more frequently than meningitis, but is less frequent than the abscess of brain. With the meningoencephalitis usually there were expressed general cerebral symptoms, and also grew

or appeared focus symptoms.

d) Epidural abscess with the penetrating wounds of skull - sufficiently rare complication. Usually it is connected with rotting bone splinters or granulations, which lie on solid cerebral shell, or, which more rarely occurs, with it is developed osteomyelitis of the territories of bone defect.

e) Osteomyelitis of the bones of skull was encountered with the penetrating wounds less frequent than with the bullet nonpenetrating wounds of the skull; however also with the penetrating wounds osteomyelitis was developed as a result faulty processing of the casualty sectors of bone with primary surgical intervention or as a result of surplus carving of soft tissues with the considerable exposure of bone. The frequently external manifestation of edge/boundary osteomyelitis was the lastingly existed purulent fistula.

Are known, however, the cases when osteomyelitis of the bones of skull with the penetrating wound became apparent in no way. Only the formation of epidural abscess or subsequently of external pachymeningitis was escorted/tracked by the appearance of one or the other neurologic symptomatology.

f) Festering cerebral scar. During the Great Patriotic War was for the first time raised a question about the possibility of the liberation/excretion of the clinical picture of festering the forming scar in brain after the penetrating wound. In these cases the wounded, with greater unit in the presence of fistula, began to complain about the moderate headaches, sometimes nausea and vertigoes. At the same time, grew/rose the stress/voltage in the area of scar in the blood after appearing most frequently small leukocytosis and was accelerated ROE; temperature sometimes rose to subfebrile numbers. In cerebro-spinal fluid also was detected small cytosis and an increase in the protein to 0.45-0.60/o. In certain cases festering the forming cerebral scar flowed/occurred/lasted violently, resembling the clinical picture of the meningoencephalitis.

#### LATE NONPURULENT COMPLICATIONS.

a) the cysts of brain. In rear hospitals the cysts of brain were encountered 3-4 times less frequently than abscesses. The clinical picture of the traumatic cyst of brain was so/such not distinct, headaches moderated, the temperature of body was increased very rarely, meningeal phenomena usually were absent. From focus symptoms were reinforced only those, that referred to the place of wound. Eyeground barely changed, then epileptic fits were encountered into

27.00/o of cases, i.e., even it is more frequently than with the abscesses of brain. Some authors noted with cerebral hand normal or moderately accelerated ROE and to mono-singing. In their opinion, this picture of the blood sharply differed from the same with abscesses.

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In rear hospital frequently it was necessary to differentiate cyst from the abscess of brain, especially with the slowly growing clinical picture of abscess. Are known also the cases of festering the cyst of brain.

b) Nonpurulent external pachymeningitis. This complication most frequently was encountered with the fragmentation wounds of skull and flowed/occurred/lasted in the form of the productive inflammation of solid cerebral shell with its thickening, rarely with the advent of a great number of granulations in epidural space on shell. Clinically external pachymeningitis was frequently characterized by blurred local head pain with its irradiation into bridge of the nose and into eyes, and also by general/common/total malaise. In this case meningeal phenomena were barely expressed, cerebrospinal fluid changed. Purulent fistula in these cases usually was absent.

c) The chronic productive inflammatory process can take not only solid, but also soft cerebral snells, but frequently also the substance of brain around scar. Wounded with the phenomena of late chronic nonpurulent inflammation usually began to complain about malaise, breakdown, headache; locally was determined small blcating and sickliness of scar. Subsequently frequently grew the focus symptoms; sometimes appeared epileptic fits. In the blood was noted small leukocytosis and moderate acceleration of ROE. In cerebrospinal fluid - small increase of protein and number of cells. Similar conditions in wounded in rear hospital sometimes suggested about the presence of the slowly developing abscess or traumatic cyst of brain.

d) Hydrocephalus. Frequently, when wound has already been shut, in wounded appeared the paroxysmal headaches; in this case in the gaps/intervals between attacks/seizures/paroxysms the health of wounded was completely satisfactory. Undertaken in these cases ordinary clinical examination/inspection did not reveal/detect any new organic symptoms. In the blood and the cerebrospinal fluid also they did not detect any changes.

Control pneumo-encephalogram revealed/detected frequently uniform hydrocephalus of lateral ventricles, depending on the violations of circulation as a result of nonpurulent inflammatory changes in the places of the outflow of cerebrospinal fluid, and

sometimes - and the rupture of the ventricles of brain.

f) Liquorrhoea and liquor fistulas were encountered, according to the data of the maps/charts/cards of the deepened characteristics, into 6.20/o of penetrating wounds in all stages of evacuation. According to the data of rear hospitals, liquor fistulas were observed into 0.8-1.4c/o of penetrating wounds of skull in the different periods of war. The danger of these fistulas consists in the fact that they lead to secondary infection, which can be extended on liquor routes/paths and cause meningitis, ependymitis and meningoencephalitis. Frequently liquor fistulas are the consequence of the infectious complications of the wounds of brain, even more complicating the severity their coursing.

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#### TRAUMATIC EPILEPSY.

In rear hospitals epileptic fits in those wounded in the skull were encountered so not rarely. They were observed usually with traumatic cysts, abscesses of brain, less frequent - with meningoencephalites. fits bore first general/common/total, then local (Jackson) character/nature. Epileptic fits are the result of displacement or stimulation of cerebral tissue by scars, by joints in

liquor-conductive system, and they also frequently accompany the appearance of the restricted encephalitis or arachnoiditis. The presence of metallic foreign bodies and bone fragments in brain also can serve as the reason for the onset of convulsive fits. According to the data of the specialized hospitals of Ural military district, traumatic epilepsy was approximately 2.00/o of all complications with the penetrating wounds within always of war (from 4.30/o in its beginning to 1.50/o at the end).

It should be noted that in the hospitals of the deep rear with blind wounds with the presence of metallic foreign bodies in the substance of brain the epileptic fits were encountered in 8.60/o of wounded, i.e., almost 4 times it is more frequently than with the remaining penetrating wounds of skull.

It is necessary to consider that in rear hospitals can be observed not only reinforcing or frequency increase of fits, but also epileptic condition. In particular, in one of the neuro-surgical hospitals of the rear epileptic condition (status epilepticus) occurred in 5.00/o of all wounded whose coursing of wound was complicated by the appearance of epileptic fits.

The diagnosis of traumatic epilepsy is not complicated. To considerably more complicatedly establish/install the direct cause

for epileptic fit in wounded. As soon as this reason it is explained, naturally, it is necessary to take possible measures for its elimination (distance/separation of abscess, cyst, foreign body, etc.).

#### RESIDUAL PHENOMENA.

Residual phenomena after the penetrating wounds of skull in essence are reduced to hemiparesis, aphatic disorders, agnosia and aproxia. In the specialized rear hospitals during the appropriate reducing treatment of such wounded they strove an improvement in these heavy residual phenomena. In this case the vital importance had the fact that repeated reinforcing of these motor or vocal disorders testified usually about the beginning of the development of any complication.

Protrusion of brain, that was being encountered quite often in the foremost therapeutic installations both as a result of injury itself and in further coursing of wound, in rear hospitals it is noted, according to different authors' data, in 6.8-7.0o/o of cases.

By the basic reason for chronic and prolonged protrusion of brain after its injury can be the following: a) chronic the restricted suppurative process (abscess, festering of the scar,

festering around foreign body), which, besides the protrusion of brain when the trepanation defect of bone is present, can by clinically nothing not become apparent; b) the atrophy of cerebral tissue in the area of injury and the approximation/approach of ventricle to bone defect up to the appearance of rupture of the ventricle of brain with associated hydrocephalus; c) the chronic bloating of cerebral tissue around metallic foreign body or scar in brain tissue.

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#### TREATMENT OF BULLET WOUNDS AND DAMAGES OF SKULL AND BRAIN.

From the very beginning of war it already became it is clear that for the successful treatment of wounded with the damage of nervous system must be organized the specialized neuro-surgical hospitals in the rear. During the first year of war in these hospitals were found undergoing medical treatment those wounded into skull, spine and obtained wounds of peripheral nerves. Beginning from the second year of war, ripened the need for the internal profiling of neurosurgical hospitals and separations/sections of rear district and even local evacuation point. In particular, in the limits of Ural military district it was organized on one large/coarse neuro-surgical hospital for wounded the skull and the brain at each evacuation point

and on separation/section for such wounded in head hospital for a territorial group hospitals in the limits of each evacuation point. The specialized neuro-surgical cots occupied the visible place in the bed resources for this district (table 11).

In these numbers do not enter the specialized cots for wounded with the damage of peripheral nerves in general-surgical hospitals. Of all wounded with the damage of nervous system in neuro-surgical hospitals most of all were concentrated the obtained bullet wounds of skull and brain. Toward the end of the second year of war in large/coarse neuro-surgical hospitals these wounded the skull and the brain occupied from 60.0 to 75.00/o of all cots. The remaining cots of hospital were intended either for separations/sections, specially which were being occupied by treatment injuries of spinal column and spinal cord or for the treatment of the wounds of peripheral nerves.

Need in surgical interventions with the penetrating wounds of skull in rear hospitals during war gradually was decreased (Table 12).

Despite the fact that the percentage of the penetrating wounds in the neuro-surgical hospitals of the rear from haud per annum grew/rose, the percentage of operability descended and to the fourth year of war decreased almost doubly. The reason for this descent

consists, as it was shown, in an increase in the number of primary process/operations in foremost therapeutic installations, improvement in the quality of finish of wounds and lengthening of the periods of hospitalization after processing on the spot. All this lowered the frequency of purulent complications in rear hospitals, as a result of which in them was lowered operability.

Most frequently surgical interventions in rear hospitals were undertaken for separating the bone fragments from the substance of brain (table 13).

Table 11. The specific gravity/weight of cots for neuro-surgical wounded in the hospitals of Ural military district on the years of war (to all cots).

Год войны (1)	Первая (2)	Вторая (3)	Третья (4)	Четвертая (5)
Процент нейрохирургических боков (6)	5,2	9,0	8,0	6,7

Key: (1). Year of war. (2). The first. (3). By the second. (4). The third. (5). The fourth. (6). Percentage of neuro-surgical cots.

Table 12. Frequency of operational interventions in rear hospitals with the penetrating wounds of skull on the years of war (in percentages).

Год войны (1)	Первая (2)	Вторая (3)	Третья (4)	Четвертая (5)
Число оперативных вмешательств (6)	51,0	37,0	42,0	26,0

Key: (1). Year of war. (2). The first. (3). By the second. (4). The third. (5). The fourth. (6). Frequency of surgical interventions.

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Then occurred process/operations apropos of the abscesses of brain and reworking of wound. One should be specified that all means of surgical interventions indicated in percentage relationship/ratio underwent considerable changes in different periods of war. In particular, reworking of wound was conducted considerably more frequent in the first two years, than into those following, in connection with an improvement in the quality of primary processing. Process/operations apropos of festering scar began to undertake from the end of the third year of the war when were substantiated readings to them.

#### CONSERVATIVE TREATMENT AND CARE.

Vital importance in rear neuro-surgical hospitals had conservative treatment and care of wounded with the penetrating wounds of skull. It is necessary to note that certain unit of these wounded even 3-4 weeks after process/operation heavily withstood transportation. Therefore to those wounded the skull on their arrival into rear hospital they gave absolute rest during several days and even weeks. If one considers that surgical intervention with wounds

into skull was produced in rear hospitals in the first year of war in 51.00/o of all treated wounded, and in the fourth year - in 26.00/o then hence follows that during the treatment of all remaining wounded were applied only the conservative methods.

Basic attention must be given to the treatment of purulent complications from the side of brain and its shells and first of all - to treatment of purulent meningitides and meningoencephalites. With these patient frequently produced lumbar punctures, publishing considerable amount of liquid. In the series/row of hospitals successfully was applied endolumbar introduction to 0.80/o of solution of streptocide, and with ventricular fistulas - the introduction of this solution is direct to ventricle. In rear hospitals intravenously frequently poured 10c/c solution of streptocide 40o/o solution of urctropine.

Table 13. Character/nature of surgical interventions in rear hospitals with penetrating wounds of skull.

Характер оперативных вмешательств (1)	Процент к общему числу операций (2)
Вторичная обработка ран (срощив менингеальных оболочек, удаление несаживающихся ран, удаление поверхностных костных и металлических осколков и т.д.) (3)	20,4
Секвестротомия по поводу остеомиелита костей черепа (4)	11,8
Удаление костных осколков из вещества мозга (5)	25,2
Удаление металлических инородных тел из вещества мозга (6)	10,0
Операции по поводу абсцессов мозга (7)	21,0
Операции по поводу кист мозга (8)	6,3
Операции по поводу нагноения мозгового рубца (9)	2,0
Операции на желудочках мозга (10)	1,3
Операции при эпилепсии (11)	1,0

Key: (1). Character/nature of surgical interventions. (2). Percentage to total number of surgical interventions. (3). Reworking of wounds (fistulas of soft tissues, unhealing wounds, distance/separation of surface bone and metallic fragments, etc.). (4). Sequestrotomy apropos of osteomyelitis of bones of skull. (5). Distance/separation of bone fragments from substance of brain. (6). Distance/separation of metallic foreign bodies from substance of brain. (7). Process/operations apropos of abscesses of brain. (8). Process/operations apropos of cysts of brain. (9). Process/operations apropos of suppuration of brain cicatrix. (10). Process/operations on

ventricles of brain. (11). Process/operations with epilepsy.

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Used extensively also all forms/species of sulfanilamides - streptocide, sulfidine, sulfazole, sulfathiazole - it is intravenous both preventive to the process/operations and after them. In last year of war were successfully used the penicillin and gramicidin. Particular value acquired the method of the intra-carotid introduction of sulfanilamides and penicillin, developed during the war of N. N. Burdenko and by his colleagues, as basis of whom was assumed the principle of deep antisepsis of the purulent infection of cerebral tissue.

For decreasing the increased intracranial pressure, besides punctures, were applied in essence intravenous infusions - 10-15o/o of solution of common salt and 40o/o of solution of glucose. The introduction of the solutions of sulfate magnesia did not acquire wide acceptance as a result of the fact that almost all wounded received sulfanilamides.

Wide application during war with the wounds of skull and brain obtained physiotherapy. With the long not healing and limply granulating wounds of skull, or during the protrusions of brain a

good effect gave ultraviolet lighting. With certain success was applied UHF therapy after operational interventions.

For warning/preventing the development of rough collagenic ones Rubtsov in brain some authors utilized X-ray therapy by small doses.

With residual phencrena after the wounds of brain successfully was applied the complex of physical therapy measures - galvanic current, UV and X-ray irradiation.

The considerable place during the treatment of those wounded into skull was given also to the therapeutic exercise.

In all cases of traumatic epilepsy with the shut wound where are excluded the complications, which require surgical treatment, is shown pneumo-encephalography. The injection of air frequently decreases a number of fits, and sometimes it leads to their disappearance for a prolonged time. Produced at this moment X-ray photographs are oriented in the relation to the character/nature of the cicatrical process in brain. Besides the injection of air, positive effect gave ionization of the place of wound by potassium iodide, and also use/application inside luminal and preparations of bromine.

Care of those wounded in the skull had very important value in the process of treatment. The basic task of attentive observation of patient consisted in in time noting of changes in the general condition of wounded, in his conduct and mental reactions.

For the first time for the time of the Great Patriotic War in rear hospitals on wide scale was organized the reducing treatment of those wounded the skull and the brain with the phenomena of motor violations, aphasias, apraxia and agnosia. This reducing treatment of those wounded the skull acquired extremely important value, since the final goal of the organization of entire neuro-surgical service, from its foremost stage to the deep rear, was the restoration/reduction of ability to work in a maximally great quantity of those wounded the skull.

In the hospitals of the deep rear was conducted great work on the restoration/reduction of the lost functions as a result of damaging the brain.

As is known, with the wounds of the skull of the cell of brain, the located near focus decomposition of the substance of brain, can come into the condition of temporary/time suppression - "blockade", causing by this the fallout of functions for sufficiently prolonged period. In some cases at the foundation of this suppression

lay/rested primarily anatomical changes - edema of brain, violation of blood circulation and liquorodynamics, in other cases occurred the physiological process as the result of inhibition ("guardian inhibition" according to I. P. Pavlov).

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The independent restoration/reduction of functions after wounds of the skull, having been observed on the 2nd and 3rd week after wound, apparently was connected with disappearance of edema of brain.

Further restoration/reduction of the functions of brain as a result of the applied therapeutic measures - the therapeutic exercise, physiotherapy, ergotherapy and carried out preventive medical work in the majority of the cases it was connected with the removal/taking of pathophysiological condition - the "blockade" of nerve cells.

For this purpose by Soviet scientists it was proposed to introduce Prostigmin (procserin), affecting synaptic communications of nervous system. The use/application of this preparation in those wounded the skull during motor violations in certain cases was exclusively effective both into the early ones and within late periods after wound (from 3 to 8 months).

From other methods of restoring the functions of brain it is necessary to note the various forms of treatment, which stimulate the independent restoration/reduction of the lost functions by use and stimulation of the plastic function of cerebral cortex. Such observations are related mainly to the restoration/reduction of the disrupted as a result of wound great hemispheres of the highest human functions (speech, gnosis, praxis). In this respect great role played the logopedicians, it is persistent and long worked at restoration/reduction in the wounded of speech, memories, etc.

Therapeutic work in a number of cases was headed on the route/path of readjustment of functional systems, being based on the great plasticity of cerebral cortex.

Restoration/reduction of movements in extremities. The treatment of paralyzes and paresis with the wounds of skull and brain stored/added up from the whole complex of measures. Into it entered: the therapeutic exercise to which belonged the leading role, physiotherapy and occupational therapy.

The therapeutic exercise. The essence of the activity of the therapeutic exercise with paralyzes and paresis consists in an

improvement in the process of reduction of motor function via effect on nerve cells from periphery (centripetal impulses/momenta/pulses). Together with the effect on nervous system the therapeutic exercise improves the condition of supporting-motor apparatus and prevents the development of strains and contractures.

The therapeutic exercise should be begun in proper time, until develop difficulty of movement in joints or sharp pathological changes of the muscular tone.

The cautious use/application of the therapeutic exercise is possible within early periods, on the 2-3rd week after primary processing. However, intense systematic exercises by physical exercises are better to carry out after 1-1 1/2 months after wound in the period of the elimination of early complications and delimitation of the infectious process.

Contraindication to the use/application of the therapeutic exercise were the signs/criteria of the onset of any infectious intracranial complication. The appearance of epileptic fits also made it necessary to abstain during several days from the use/application of the therapeutic exercise. Insignificant headaches in those wounded into skull did not serve as contraindication to therapeutic gymnastics.

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During the Great Patriotic War the department of the physiology of the institute of the gymnastics of the name Lesgaft manufactured the sufficiently rational procedure of the therapeutic exercise with the wounds of skull with primary damage/defeat of pyramidal system. This procedure, which was being applied in the neuro-surgical hospitals of the deep rear, pursued the following tasks:

- 1) the restoration/reduction of steering, struggle with spastic phenomena in motor apparatus, with the associated movements, with contractures, with increased reflex excitability;
- 2) restoration/reduction and development of the muscular force;
- 3) the restoration/reduction of the elementary complicated coordinations;
- 4) formation of the substitute motor skills;

5) the restoration/reduction of the working class movements in extremities.

For this were manufactured the complexes of physical exercises with gradual transition from passive movements to passive-active ones and finally to active ones.

Struggle with spastic phenomena and increased tone of muscles was conducted by the multiple repetition of passive movements. This not only reduced reflector excitability, helping in this way to struggle with contractures, but also it stimulated the activity of the corresponding nerve centers. In the foundation of this procedure to take the positions/situations, developed by I. P. Pavlov, according to whom "the passive reproduction of the specific movement pulses into those motor cells of the cortices whose stimulation actively produces this movement".

Usually the execution of passive movements is begun with healthy/sound extremity, fixing/recording the attention of patient in the perception of the slack movement. Then produced the movements by injured extremity, striving the changeover of the perception of the weakening of musculature, obtained on healthy/sound extremity. Exercises began with movements in large/coarser joints gradually converting/transferring to small/fine ones. In order not to cause the

sharp stress/voltage of the antagonists, passive movements were carried out slowly, smoothly, in a small volume. Only on measure the decreases of spastic phenomena in muscles increased scope and speed of movement. On the basis of the fact that lengthening the spastically abbreviated/reduced muscles reduces their excitability and is decreased tone, all movements were in essence constructed by the elongation of flexors. In initial position with passive movements, on the contrary, they strove the maximum weakening of flexors, since this gave the possibility to produce movements in large volume. For example with the bent hand is facilitated the straightening of fingers/pins, since in this case are weakened the flexors of fingers/pins.

For dealing with friendly movements free from movements extremity was fixed/recorded. Subsequently were conducted the special anticoncomitant movements, and by exercises in walking the particular attention of patient turned for opposition to concomitant movements.

For dealing with contractures, besides passive movements, was utilized the "treatment by position/situation". The latter consisted in the fact that the extremities were fixed/recorded with the aid of gypsum casts or special splints in average/mean physiological position/situation.

In a considerable number of observations the correctly organized exercises with the therapeutic exercise led to the onset of random movements. In these cases they converted/transferred from passive movements to active-passive, and then to active movements.

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The experiment/experience of war convinces that the positive effect is feasible only when physical exercises were simple, easily feasible, they were carried out systematically and had as a goal the gradual restoration/reduction of elementary, and thereupon complicated coordinations in the form of the restoration/reduction of the skills of self-service, capability sit down itself, to stand and to be moved. In the favorable cases with purpose of further development of active movements with exercises with upper extremities usually they began from the movements of household order/formation - they trained patient to independently dress, etc. Gradually were introduced power exercises, increased stress/voltage. Singular attention was focused on the restoration/reduction of the muscular force of paretic hand and the development of precise movements of hand and fingers/pins.

With exercises with lower extremities was carried out preparation/training for the report/event of walking first in

position/situation lying, then sitting and finally standing. Simultaneously with work on the restoration/reduction of the report/event of walking by the series/row of exercises was achieved strengthening force in lower extremities and development of equilibrium.

With the stable fallout of the functions of the individual groups of muscles, connected with the decomposition of the corresponding sectors of cerebral cortex, the complex of physical exercises was headed for the manufacture of the substitute motor skills, compensating for the lost movements.

Entire/all work on the therapeutic exercise was realized with the necessary accounting of the professional/occupational skills of wounded.

Exercises were organizationally constructed thus such: wounded they shared into three basic groups: the first group - post-operation and litter wounded, deprived of the possibility to sit and to stand; the second group - wounded whose condition makes it possible to fulfill exercises sitting, a little to stand and to walk with the aid of crutches and sticks; the third group - wounded, capable of fulfilling exercises standing and to independently move.

In the first two groups of the wounded the works were carried out individually, in exercises with the third group it was observed the principle of collective exercises, moreover wounded united into numerical small groups. <sup>^</sup> Estimating the results of applying the therapeutic exercise in those wounded the skull with paralyzes and paresis, it is necessary to note considerable increase in the majority of them of the volume of the movements of extremities, descent in the increased tone of muscles, and also decrease of pathological friendly movements. To nevertheless completely eliminate appearing in connection with the wound of skull spasticity and pathological synkinesis always did not manage. Muscular force was restored, as a rule, it is extremely slow. Gait although was improved, it continued to frequently bear the features of a spastic-paretic.

Then in all cases were noted an improvement in the general physical condition of wounded, cardiovascular activity, an increase in the emotional tone.

The results of applying the therapeutic exercise in those wounded the skull with paralyzes and paresis (according to A. N. Krestovnikov's data, rear hospital) are represented in Fig. 43.

From the given diagram it is distinctly evident that in the

group of wounded, that were being occupied by the therapeutic exercise during prolonged period, movement in extremities they were restored/reduced in the majority of wounded.

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In all groups of wounded as a result of exercises by the therapeutic exercise of movement they were more frequently restored in the more proximal departments of extremities. Movements in small/fine joints were restored in the smaller appropriate sectors of the motor zones of brain core, by the how much rapidly developing secondary changes in joints.

Hence ensues the most important conclusion/derivation: the therapeutic exercise with wounds into skull with motor abaissements should be carried out long, persistently and systematically. Its beginning should be transferred to the earlier stages of the evacuation of army and front rear.

Physiotherapy. During the treatment of paralyzes and paresis the known value acquired the physiotherapy in the form of light massage in the initial stages of treatment, with connection subsequently of water procedures and electropathy. The faradization of the paretic groups of muscles, and also iontophoresis with lithium to small/fine

joints of hand and fingers/pins contributed, on the statement of a number of the authors, warning/prevention of the development of contractures and difficulty of movement in joints.

Ergotherapy had as a goal to restore/reduce the capability of wounded for useful activity, since the function of the organs/controls of movement in man was not separated from his labor activity. Occupational therapy began already with the onset of the first coordinated movements in extremities, in this case were considered the professional/occupational skills of patient and the possibility to fulfill subsequently these or other means of the labor processes. Ergotherapy always was carried out taking into account the general condition of wounded and character/nature of the wound of skull and brain.

Issues of the wounds of skull in the hospitals of the deep rear. During an entire war in the hospitals of the deep rear the composition of those wounded into skull changed in the direction of the predominance of the heavier wounds, which were being escorted/tracked by hemipareses, aphasia, violations of view and by other fallouts of the functions of brain. Less than heavily wounded they left in the more foremost therapeutic installations where they were located to recovery. This could not but be repelled in the issues of the treatment of those wounded the skull and the head brain

in the hospitals of the rear. So, according to the data of the hospitals of Ural military district, toward the end of the war gradually increased a quantity of those wounded the skull, that lost the ability to work; into the first half-year of war among those finished treatment a quantity of disabled ones was equal to 52.6c/c, whereas in the last half-year of war it composed 76.80/o.

At the same time in the hospitals of the rear steadily from year to year descended the percentage of purulent complications in those wounded the skull, which caused the progressive decrease of lethality. If we compare data of Bruskin according to which during the first world war in rear hospital it died to 75.0c/o of those wounded the skull with purulent complications, then lethality of these complications in rear hospitals during the Great Patriotic War was from 19.0 to 27.00/c. In other words, during the Great Patriotic War lethality with severe purulent complications after the penetrating wounds of skull on the average proved to be almost triply less than in the period of the first world war.

In more detail lethality with the penetrating wounds of skull (complicated and uncomplicated) is represented in Table 14.

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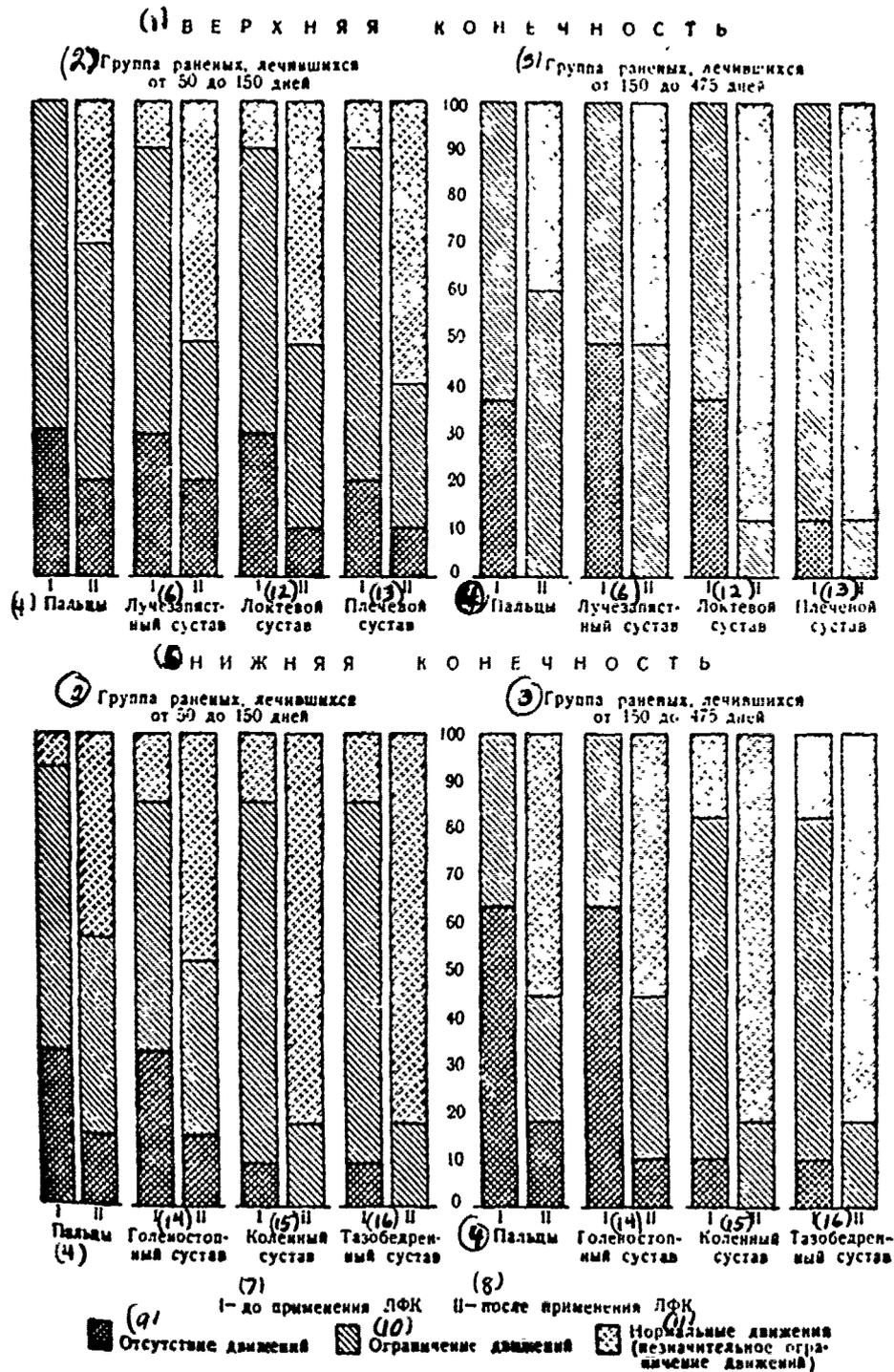


Fig. 43.

Fig. 43. Degree of restoration/reduction of simple motions in upper and lower extremities.

Key: (1). Upper extremity. (2). Group of wounded, who were being treated from 50 to 150 days. (3). Group wounded of those treating from 150 to 457 days. (4). Fingers. (5). Lower extremity. (6). Wrist joint. (7). before application of LFK. (8). After application of LFK. (9). Absence of movements. (10). Limitation of movements. (11). Normal movements (insignificant limitation of movements). (12). Elbow joint. (13). Shoulder joint. (14). Ankle joint. (15). Knee joint. (16). Hip joint.

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This descent in the lethality in rear hospitals toward the end of the war is explained first of all by an improvement in the specialized aid of those wounded the skull in foremost therapeutic installations, and also by an improvement in the therapeutic process in rear hospitals.

Table 14. Lethality in rear hospitals with the penetrating wounds of skull on the years of war (in percentages).

(1) Год войны	(2) Первая	(3) Второй	(4) Третий	(5) Четвертый
(6) Летальность	4,1	3,0	3,1	2,1

Key: (1). Year of war. (2). The first. (3). By the second. (4). The third. (5). The fourth. (6). Lethality.

#### GENERAL CONCLUSIONS ABOUT THE TREATMENT OF WOUNDS OF SKULL IN THE HOSPITALS OF THE DEEP REAR.

The created in the beginning wars and its steadily improved work in course rear specialized neuro-surgical hospitals played great role in the treatment of those wounded the skull.

In the hospitals of the deep rear they guided in essence wounded obtained the heavy damages of skull and brain, predominantly penetrating. Wounded, who obtained the nonpenetrating wounds of skull, during the development in them of complications and need for prolonged hospitalization, also they evacuated into the hospitals of

the deep rear. In the course of war changed the composition of those wounded the skull due to entry into the hospitals of the deep rear of heavier groups, since the slightly wounded remained in the foremost stages of the evacuation where completed treatment.

Clinical picture in wounded, who entered into rear hospitals, in the majority of the cases corresponded to the third and fourth period of the bullet injury of skull - to period of the elimination of early complications and delimitation of the infectious process, and also to the period of late complications.

The observed in wounded complications, characteristic for these periods, were shared into two basic groups: infectious complications and complications, connected with the developing cicatricial processes in brain.

Among infectious complications most frequent were the abscesses of brain, then the meningoencephalites and osteomyelitis of the bones of skull. Other complications in the form of epidural abscess and festering of cerebral scar were encountered considerably less frequent.

Among the complications, connected with Rukhtsovs with the processes in the substance of brain, most frequently was observed

traumatic epilepsy; also occurred productive arachnoiditis, cysts of brain, hydrocephalus, etc.

The percentage of different infectious complications with the wounds of skull was lowered in rear hospitals toward the end of the war more than doubly.

Reduction of a quantity of complications in the hospitals of the deep rear was explained first of all by an improvement in the rendering to neuro-surgical aid by that wounded the skull in foremost therapeutic installations.

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This progress depended basically on improvement in the quality of the primary processing produced by the appropriate specialists in army specialized KhPPG, and also from lengthening of the periods of the hospitalization of those wounded the skull on the spot in post-operation period. In the course of war considerably decreased the percentage of those wounded to skull, that entered into the hospitals of the deep rear without the primary neuro-surgical processing of wounds.

According to the character/nature of operational interventions,

produced in rear hospitals, the first place in frequency occupied the distance/separation of bone fragments from the substance of brain, that it was most frequently necessary in the first year war, then - reworking of skin or bone wound and operational interventions apropos of the late abscesses of brain.

One should again emphasize that for elongation/extent the wars of the relationship/ratio of different surgical interventions in the hospitals of the deep rear changed. Thus, for instance, toward the end of the war considerably decreased the percentage of the process/operations of later primary processing of the wounds of skull. At the same time, there was increased the specific gravity/weight of process/operations apropos of osteomyelitis, epilepsy, and also developed in the course of the war of interventions with festering cerebral scar and process/operations of the total distance/separation of the abscesses of brain.

In the hospitals of the rear the special importance had the conservative treatment of wounded, since the majority of the entered wounded was already processed in the preceding/previous stages. Attentive observation of coursing of the wounds of skull and timely medicinal/medicamentous therapy with complication were the basic task of the specialized hospitals of the rear, those more after process/operations apropos of these complications.

During the Great Patriotic War for the first time received wide acceptance recovery therapy, having as a goal the maximum restoration/reduction of the functions of the brain, having suffered wound. Systematic work on the restoration/reduction of the lost functions basically was effective and it contributed to an increase in the ability to work of those wounded the skull.

Extremely important team in the work of rear hospitals was the correct appraisal/review of the wounds of skull, which was latter/last stage in the treatment of these wounded. The acquired within the time of war extensive experiment/experience played great role in the permission of complicated questions of the correct appraisal/review of those wounded the skull.

Issues in rear hospitals differed from issues by the preceding/previous stages of evacuation in terms of a great quantity of disabled ones number of which in the course of war it increased due to direction into the hospitals of the rear of the heavier groups of wounded. At the same time lethality in rear hospitals was comparatively small and it was decreased with each year of war. The progressive decrease of the frequency of infectious complications and lethality with them was the result of the correct organization of an

entire system of the specialized aid by that wounded into skull during the Great Patriotic War, beginning from foremost therapeutic installations to the hospitals of the deep rear.

B. CHARACTERISTICS OF LETHAL OUTCOMES FROM WOUNDS OF SKULL AND BRAIN IN THE STAGES OF EVACUATION.

In the fourth volume were presented the data about the morphology of the wounds of skull and brain, and also their complications.

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For successful warning/prevention and treatment of heaviest pathological processes, which appear in coursing of the wounds of skull and brain, together with presented earlier morphological data, great value has study of reasons of death of wounded in different therapeutic installations.

As a result of the activity of the pathoanatomical service of Soviet army during the Great Patriotic War was the possibility to study the character/nature of pathoanatomical changes and to establish/install the reasons not only for dead death in therapeutic installations and on the evacuation routes, but also killed on the

field of battle. Comparison of these data made it possible to specify the means of the pathological processes, most which were being frequently encountered in those wounded the skull and the brain in the therapeutic installations, arranged/located on different stages of evacuation, and to also explain some deficiencies in diagnosis and treatment of wounded, sometimes observed during the Great Patriotic War.

Characteristics of lethal outcomes from the wounds of skull and brain on the field of battle.

The bullet wounds of skull and brain in those fallen on the field of battle are encountered more frequent than other wounds. The materials of the positional warfare of second half past century and the first world wars, based only on the visual examination of those killed, attest to the fact that about third to half of all of those been killed on the field of battle comprised those wounded the skull.

The autopsies, produced during the Great Patriotic War, showed that also in mobile warfare of the wound of skull and brain in those killed on the field of battle they will cost in the first place in their frequency. The wounds of skull and brain were encountered in 30.90/o those killed on the field of battle.

In 99.10/o of cases of the injury of skull were discovered the penetrating wounds of skull and brain.

Fragmentation wounds were encountered into 69.80/o, bullet - into 30.20/o. The predominance of fragmentation wounds was reflected in character/nature and severity of damages. Frequently were observed the extensive breaking up of the bones of skull and the considerable damages of brain. In brain tissue frequently were introduced secondary shells - fragments of the bones of skull. Is noted numerous cases when in the substance of brain to a large extent were detected many small/fine bone fragments. During microscopic examination it proved to be that the smallest fragments of bones were sometimes arranged/located at considerable distance from wound canal in the sectors of brain, which were macroscopically seeming with undamaged/uninjured ones. The fragments of bones in a number of cases caused the damages of greater volume than caused by the wounding shell. In certain cases was detected the introduction of scrap of helmet into the area of skull with the extensive decomposition of brain, the helmet playing the role of secondary shell. The helmet, pierced by small/fine fragments, was not encountered, evidently, the helmet is a reliable defense from them.

According to the data of the autopsies of those killed on the field of battle, the perforating wounds of skull somewhat

predominated above blind ones. Almost in third of cases perforating wounds were diametric.

According to anatomical character/nature the wound defects of the bones of skull were very diverse - from small/fine perforated breaks to the extensive multisplinter breaking up of the bones of skull, sometimes converted into continuous scrap different sizes/dimensions and form. With blind-end wounds were observed the perforated and plumb breaks with the introduction of scrap of bones into shells and substance of brain at one or the other depth.

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Special position among the damages of skull on the field of battle occupied the decapitation, which was being characterized either by the full/total/complete disengagement of head, sometimes together with the significant part of neck, or with complete decomposition of cerebral skull with the retention/preservation/maintaining of part of the face. In other cases were observed the wounds of the basis of skull with the simultaneous extensive decomposition of the bones of arch/summary and the ejection of almost all brain from the area of skull.

The character/nature of wound canals in the substance of brain

was various. With perforating wounds by greater unit was a narrow, sometimes slit-shaped, wound canal. With blind-end wounds was frequently noted the expansion of wound canal in the location of fragment or bullet, in the depth of brain tissue. Were observed also the additional wound canals, caused by the introduction of large/coarse bone scrap into the substance of brain. The tangential wounds of brain were characterized by the sulci of one or the other depth in the substance of brain. On the course of wound canal usually lay/rested the blood clots, frequently - fragments.

To judge about severity and character/nature of the wounds of skull and brain in those killed on the field of battle possible according to the following data.

(1) Объем повреждения мозга	(2) Процент
(3) Полное разрушение головного мозга или полное разрушение одного из больших полушарий . . . . .	23.7
(4) Ранения двух больших полушарий мозга или трех долей одного полушария . . . . .	33.3
(5) Ранения двух долей одного полушария . . . . .	12.3
(6) Ранения одной доли мозга . . . . .	9.0
(7) Ранения ствола мозга и мозжечка . . . . .	21.2
(8) Сотрясение мозга (в случаях закрытой травмы)	0.5
(9) Всего . . . . .	100.0

Key: (1). Volume of the damage of brain. (2). Percentage. (3).

Complete destruction of brain or complete destruction of one of great hemispheres. (4). Wounds of two great hemispheres of brain or three fractions/portions of one hemisphere. (5). Wounds of two fractions/portions of one hemisphere. (6). Wounds of one fraction/portion of brain. (7). Wounds of barrel of brain and

cerebellum. (8). Brain concussion (in cases of closed injury). (9).  
In all.

These data testify about the large volume of the decomposition of the substance of brain in those fallen on the field of battle, and also about the high specific gravity/weight of wounds of the barrel of brain.

Are given below data, together with the volume of damage concerning and severities of the wounds of skull and brain in those killed on the field of battle, depending on localization of wounds.

During the composition of this table was used the principle of "preference" of damages for the presence of the combinations which always it was not possibly repel.

(1) Локализация повреждения мозга	(2) Процент
(3) Ранения коры и белого вещества полушарий мозга	12,4
(4) Ранения боковых желудочков, а также ранения их в сочетании с повреждением серых узлов мозга	29,2
(5) Ранения III желудочка и зрительных булбов . . .	4,5
(6) Комбинированные ранения моста, ножек мозга, продолговатого мозга и мозжечка . . . . .	10,7
(7) Ранения моста и четверохолмия . . . . .	2,2
(8) Ранения продолговатого мозга (нередко с повреждением IV желудочка) . . . . .	3,1
(9) Ранения мозжечка . . . . .	5,2
(10) Полное разрушение мозга или полное разрушение одного из больших полушарий . . . . .	23,7
(11) Значительные повреждения нескольких долей мозга без указания точной локализации повреждений	9,0
(12) Всего . . . . . 100,0	

Key: (1). Localization of the damage of brain. (2). Percentage. (3). Wounds of cortex and white substance of hemispheres of brain. (4).

Wounds of lateral ventricles, and also their wound in combination with damage of gray ganglia/nodes of brain. (5). Wounds of III ventricle and visual wounds. (6). Combined wounds of pons, pedicles of brain, medulla oblongata and cerebellum. (7). Wounds of pons and quadro-mounding. (8). Wounds of medulla oblongata (limber with damage IV ventricle). (9). Wounds of cerebellum. (10). Complete destruction of brain or complete destruction of one of great hemispheres. (11). Considerable damages of several fractions/portions of brain without instruction of precise localization of damages. (12). In all.

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To the heaviest, greater part not causing doubts of the sense of their lethality, are related the wounds of barrel. Closely to them in severity stand wounds of III ventricle and area of visual wounds.

By very heavy of the damage of the lateral ventricles which were previously considered as absolutely lethal on the field of battle. The experiment/experience of the Great Patriotic War showed that such wounded they sometimes successfully operate and they get better; nevertheless their unit does not achieve therapeutic installations and it perishes on the spot of battle.

In fallen on the field of battle were observed the diverse

variants of wounds of ventricles. In certain cases wound canal concluded in the area of the ventricle where, together with the issuing from blood, were detected the free foreign bodies. In other cases the wounding shell pierced both walls of ventricle. Sometimes bullet or fragment passed through both lateral ventricles and they jammed somewhere out of them or was perforating wound of skull and brain. Usually the wounds of ventricles were escorted/tracked by more or less considerable hemorrhage in their area from vascular web/plexus and subependymal vessels.

The wounds only of cortex and white substance of hemispheres composed 12.40/o. In the majority of the cases they were escorted/tracked by massive intracranial hematomas, which squeezed brain, by the breaks of the bones of the basis of skull, and sometimes also by great external hemorrhage.

Breaks and extensive cracks of the bones of the basis of skull were observed into 21.80/o of all cases. Sometimes they were not connected with the basic wound; for example, together with the wound of cortex and white substance of hemispheres in the area of arch/summary, was detected the break of the bones of the basis of skull. Evidently, in these cases victim at the moment of wound with force was thrown back in side by blast effect, that also led to the break of the basis of skull. in a number of cases were noted the

straight/direct wounds of the basis of skull, which were being frequently combined with the damages of the bones of face.

Massive hemorrhages into the shells of brain are noted into 33.80/o of cases. More frequently were observed the extensive subdural hemorrhages, which appeared mainly during the damages of the veins of brain in the area of their inflow into the sinuses of solid cerebral shell. Frequently hematomas were connected with the damages of sinuses themselves or the wound of the barrel of average/mean tunicary artery. Subdural hematomas in certain cases during comparatively small damages of the substance of brain were so massive that the fatal result, obviously, were connected with the compression of brain (about 6.00/o of cases.) Frequently were noted small sub-arachnoidal hemorrhages from the vessels of the surface of brain. Large/coarse epidural hematomas were encountered considerably less frequent than subdural hemorrhages.

The damages of the sinuses of solid cerebral shell with the wounds of skull on the field of battle were encountered fairly often. However, the extensive damages of sinuses with massive lethal hemorrhages in the absence of the wounds of the vital areas of the brain were noted in all in 1.10/o of cases. The massiveness of hemorrhage with the wounds of sinuses was caused by the fact that their dense walls were not dropped and gaped with wounds.

The reasons for death of those been killed from the wounds of skull on the field of battle were distributed as follows.

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Bulk of those wounded skull (92.10/o) perished of the lethal and incompatible with life damages in the form of the full/total/complete or partial decomposition of brain, damage of ventricles and gray ganglia/nodes of basis with hemorrhage in them, damage to the hanger-on unit of the brain and cerebellum, and also of the extensive breaks of the bones of the basis of skull, 6.10, ) perished from an increase in the intracranial pressure (compression of brain by massive hematomas and sometimes traumatic edema and acute/sharp bleeding of brain). In 1.30/o of wounded death advanced from acute/sharp blood loss as a result of the extensive breaks of the sinuses of solid cerebral snell or damages of the vessels of the basis of brain. In 0.5<sup>of</sup>/<sub>o</sub>cases death followed from brain concussion with the closed injury of skull.

Characteristics of lethal outcomes from the wounds of skull and brain in army area.

According to sectional data, in the therapeutic installations of immediate rear in the overwhelming majority of the cases of the injury of skull were encountered the penetrating wounds; among them most frequently were encountered fragmentation wounds.

The blind-end penetrating wounds of skull composed 85.2c/o. With these wounds metal fragments or bullets were found in brain not in all cases. Morphological findings make it necessary to secrete the ricocheting wounds with which the shell, being hit about the bone of skull, broke them, without penetrating the area of skull moreover the wound of brain it was deposited by numerous bone fragments. The destructive effect of the fragments of bones in such cases often acquired the leading value, and its consequences were heavier than caused by shell itself. Perforating wounds composed 13.0o/o (segmental - 7.3o/o, diaxetric - 5.7o/o), tangents - 1.8o/o.

Localization of wound defect, according to the data of the autopsies of army therapeutic installations, was the following: wound in sincipital area was encountered into 30.4o/o, in frontal - into 17.0o/o, in temporal - into 21.3o/o, in postcranial into 15.0o/o. In the remaining cases were observed the wounds of two adjacent areas.

Frequently (18.6o/o) were observed the combined wounds of cerebral skull and sinuses of nose. The severity of injury with

combined wounds was complicated by the extensive breaks of the bones of the basis of skull.

With the penetrating wounds of the arch/summary of skull the breaks of the bones of its basis were discovered into 30.00/c. Most frequently underwent wound front/leading cranial pit with the selective damage/defeat of the upper wall of eye socket. Relatively more rarely were encountered the breaks of the roof of drum area and posterior cranial pit, in the area of slope. Cracks and breaks of the bones of the basis of skull were detected mainly in wounded, dead persons within the next few days after the injury; in dead persons within later periods the breaks of the bones of base of skull were observed considerably less frequent. On the course of the cracks of the basis of skull on autopsy were determined small hemorrhages into the subjects of tissue. In a number of cases, in spite of the great length of cracks, it was not hemorrhages into eyelids, trails of hemorrhages from the ears and other known morphological manifestations of this form/species of injury.

The material of autopsies in army therapeutic installations was characterized by the great manifestation of the anatomical damages of brain.

This caused the distribution of the reasons of death of dead persons from the wounds of skull and brain in these therapeutic installations.

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(1) Причины смерти	(2) Процент
(3) Изменения, связанные с непосредственным действием и травма . . . . .	75,5
(4) Инфекционные осложнения . . . . .	20,9
(5) Пневмония у раненых . . . . .	3,6
(6) Всего . . . . .	100,0

Key: (1). Reasons for death. (2). Percentage. (3). Changes, connected with direct activity of injury. (4). Infectious complications. (5). Pneumonia in wounded. (6). In all.

Among the reasons for death the leading place occupied the changes, connected with direct action of injury (75.50/o), the periods of death of wounded reaching to 3 days.

The reasons for death, connected with the direct activity of injury, were following: external blood loss during the wide damage of the sinuses of solid cerebral shell - in 4.90/o of dead persons, subdural hematomas - in 11.90/o, the acute/sharp bloating of brain - in 1.70/o, the decomposition of the substance of brain - in 57.00/o.

Decomposition of brain. The frequency of this reason for death on sectional material oscillated depending on the conditions of combat and organizational moments. Special importance had good organization of carrying the wounded from the field of combat and the nearness of therapeutic installations to front/leading territory. Under these conditions a quantity of heavy injuries of brain, discovered on material autopsies in therapeutic installations,

sharply grew/rose. Common for this form/species of death was extensive decomposition as the bones of arch/summary, so frequently and the basis of skull. The violation of the integrity of the skin integuments of head did not sometimes correspond to the volume of the damage of bones and substance of the brain: in the insignificant defects of skin in a number of cases were observed vast breaks of skull. In other cases the integuments of head for considerable elongation/extent were stripped, scaled, rags of skin twisted, by the pore extremely contaminated and hung in the form of the scraps; the bones of skull proved to be exposed. The value of wound aperture in bone was sometimes disproportionately it was small in comparison with the volume of the damage of soft tissues.

In the cases extra-heavy damages of skull with rapidly advanced death frequently were absent the extended hemorrhages into cellulose of the integuments of skull. The breaks of solid cerebral shell were different value, but they more frequently corresponded to the value of bone defect. The breaks of the sinuses of solid cerebral shell, most frequently longitudinal sinus were discovered in the cases of death from the decomposition of brain in 21.8% of dead persons.

In the cases of death from the decomposition of brain wound canal usually could not be determined. Extensive cerebral wound was amorphous.

During damage over the great area of brain by the shell, which possesses great kinetic energy, simultaneously appeared several shocks/counterblows. Sometimes the force of the latter was so considerable that they in turn, were initial point for new shocks/counterblows. Only in a number of cases it would have been possible to explain the extremely extended and complicated topography of the damages of brain.

In 82.60/o of cases of death from the decomposition of brain were wounds of cerebral ventricles. In the areas of ventricles was located the issuing from blood, sometimes with the admixture/impurity of the crushed brain tissue. As the source of hemorrhage usually served the numerous small/fine vessels of the substance of the brain; the gaps of the large/coarse vascular branches were detected sufficiently rarely.

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With hemorrhage from the vascular webes/plexi the ventricles were expanded, in there lumen was located coagulated blood. When death attacked/advanced following by injury, the blood both in the wound of brain and in the lumen of ventricles remained liquid.

In dead persons from the extensive decomposition of brain frequently were encountered epi- and subdural hemorrhages, but usually they were small.

The lifetime of wounded, dead persons from the decomposition of the substance of brain, was such: in the first twenty-four hours died 75.40/o, the secondly - 20.30/o and into the third - 4.30/o.

With the autopsy of dead persons from the decomposition of brain into late periods the issuing from blood both in the wound and under the shells of brain frequently had brownish hue; the substance of brain in the area of wound was painted by blood pigments in yellow and orange tones. At the same time, they were encountered and fresh hemorrhages more or less considerable volume.

Frequently the onset of repeated hemorrhages could be connected with the transportation of wounded. This was confirmed by the fact that the intracranial hemorrhages frequently were detected in dead persons on evacuation routes (see below).

Subdural hematomas. According to the data of autopsies of wounded, dead persons in the therapeutic installations of immediate

rear, into by 11.90/c reasons for death were early subdural hematomas. The primary hemorrhage, which usually appeared following by wound, in the majority of the cases independently stopped. The attacked/advanced bloating of brain around wound insulated for some time submembrane space from environment, impeding the outflow of the blood outside. Sometimes into the nearest hours after injury, as a result of the instability of blood and intracranial pressure, incompactness and unreliability of occlusion of blood clots, appeared conditions for the renewal of hemorrhage. Its basic source they were the vessels of soft cerebral shell and partly the substance of brain. To a lesser degree the outflow of the blood occurred from the porous substance of bones, and also from the vessels of solid cerebral shell.

With the blind-end penetrating wounds of arch/summary hematomas were arranged/located predominantly on the side of wound and were encountered with the wounds of the brain of most varied value. In this case on the spot of hematoma the hemisphere was usually somewhat hollow. The value of hematomas oscillated over wide limits. The maximum accumulation of the blood in submembrane space was equal to 400 cm<sup>3</sup>. Most frequently the volume of hematomas was from 100 to 150 cm<sup>3</sup>. Great hematomas were observed with location in area of the large/coarse branches of average/mean cerebral artery. With perforating wounds more frequently was noted the accumulation of the

blood under the shells close to outlet. Smallest of led to death hematomas where a quantity of issuing from blood was equal to 50 cm<sup>3</sup>, corresponded to the area of the basis of brain most frequently to posterior cranial pit. In a number of cases of hematoma they were arranged/located in the places of shocks/counterblows on the side, contradictory/opposite to wound.

The frequency of early subdural hematomas in sectional material in different periods of the combat operations of army changed in connection with the periods of the carrying out of wounded and their delivery/procurement into army therapeutic installations, and also in connection with the possibility of urgent surgical intervention.

From a number of these wounded the skull, the dead persons from subdural hematomas, 57.6% perished in the first twenty-four hours after injury, 30.0% - the secondly and 12.4% - into the third. Of a number of dead persons in the first twenty-four hours 32.0% of wounded lived less than 6 hours after wound.

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The earliest hematomas, which served as a reason for death, were either by small ones and they were localized in area of the base of brain, or with the gaps of large vessels they were, on the contrary,

very great. If death attacked/advanced later than 6 hours a quantity of hematomas, which were the reason for death, somewhat was decreased, and after the first day it again increased. Clinically this corresponded to the so-called bright gaps/intervals between the injury and appearance of the symptoms of the compression of brain. Hematomas, which grew more violently, led to death with their comparatively small volume, whereas the gradually growing hemorrhage she was transferred by wounded somewhat better and hematomas in this case achieved great sizes/dimensions. In dead persons in acute/sharp period the issuing from blood it frequently remained liquid, whereas in dead persons within later periods the blood was frequently that rolling up and it was removed/taken with the surface of brain in the form of the cake, which squeezed brain. During the comparison of these sections with records in the histories of disease/sickness/illness/malady it was explained that in certain cases, even with the considerable accumulations of the blood in subdural space, the explicit symptoms of intracranial pressure increase to the time of the arrival of wounded into therapeutic installation disappeared, which impeded the diagnosis of subdural hematomas.

The wounds of the sinuses of solid cerebral shell served as a reason for lethal external hemorrhages into 4.9c/o of cases of death from the wounds of skull and brain. Longitudinal sinus in this case

was damaged into 89.10/o of all wounds of the sinuses of solid cerebral shell, transverse - into 2.70/o and sigmoid - into 8.20/o.

In studied material 20.90/o they fall in the cases of death from infectious complications from the side of shells and substance of brain. Among the latter a great quantity arrived on the fraction/portion of purulent leptomeningitis (16.20/o). Frequently were encountered the cases of early meningitis. From a total number of cases of death from purulent meningitis into 4.80/o of cases this complication was observed in time from 20 to 24 hours from the moment of wound, in 18.10/o lifetime it reached to 5 days. So early a meningitis was the complication of the heaviest damages of brain with multiple failure of the bones of the basis of skull and the statement of the wound of brain with appendage areas.

The early abscesses of brain, complicated by meningitis, were encountered into 1.20/o of cases of death from the penetrating wounds of skull in army therapeutic installations. By that spilled purulent encephalitis was encountered into 1.20/o. Secondary subdural hemorrhages against the background of purulent infection of the wound of brain composed 1.00/o. A quantity of issuing from blood in this case did not exceed <sup>100</sup>~~400~~ cm<sup>3</sup>. Sometimes with the occurrence of foreign bodies and bone fragments in submembrane space the hemorrhage was the consequence of the violation of the integrity of vessels as a result

of bed sore. Secondary intra-ventricular hemorrhages composed 0.20/o as secondary hemorrhages from sinuses. The anaerobic infection of the wound of brain was observed in 0.90/o of dead persons.

Pneumonia was the reason for death into 3.60/o of cases. The greatest frequency of pneumonia, besides especially early, according to the material of autopsies, fell in essence on November - December. Pneumonias were macrofocal and frequently with drainage. In other cases were detected aspiration pneumonia with especially turbulent flow, which led to death frequently in the first 2-3 days. The onset of aspiration pneumonia stood in connection with the damage of the innervation of the organs of respiration and upper department of the digestive tract as a result of the wound of brain.

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Characteristics of lethal outcomes from the wounds of skull and brain on GBA.

The detailed study of the maps/charts/cards of sections and protocols of the autopsies of dead from wounds and damages of skull and brain in the therapeutic installations of the army rear of different fronts showed that the character/nature of these wounds and damages was dissimilar. Wounds and damages of skull in dead persons

were distributed as follows.

(1) Характер повреждения	(2) Процент
(3) Закрытая травма черепа . . . . .	2.2
(4) Ранения мягких тканей черепа . . . . .	0.3
(5) Непроникающие ранения костей черепа . . . . .	3.9
(6) Проникающие ранения черепа . . . . .	91.7
(7) Всего . . . . .	100.0

Key: (1). Character/nature of damage. (2). Percentage. (3). Closed injury of skull. (4). Wounds of soft tissues of skull. (5). Nonpenetrating wounds of bones of skull. (6). Penetrating wounds of skull. (7). In all.

Most rarely were encountered the wounds of soft tissues, the nonpenetrating wounds of the bones of skull and the closed injury.

The closed injury of skull was encountered into 2.20/o of cases. Most frequently the reason for death was the contusion decomposition of the substance of brain and hemorrhage in it. Somewhat less frequent death was caused the intracranial pressure increase as a result of extensive epi- and subdural hematomas. Sometimes the reason for death was brain concussion. Negligible place among the reasons for death with the closed injury occupied infecticus complications from the side of shells and substance of brain, and also pneumonia. In 50.00/o of dead persons from the closed injury broke discovered the breaks of the bones of the basis of skull.

The wounds of soft tissues composed 0.40/c. The substance of brain and its shell in the majority of the cases they were not damaged. The reason for death was purulent leptomeningitis, and sometimes tetanus.

The nonpenetrating wounds of the bones of skull composed 3.00/o. The reasons for death with them were the following processes.

Changes, connected with the direct activity of injury, in 26.60/o of dead persons. In all cases was established/installed death from the intracranial pressure increase due to extensive subdural and intra-cerebral hematomas. Periods of death from 1 to 6 days. In 25.0% dead persons were damaged to bone the bases of skull.

Infectious complications are noted in 66.60/o. Most frequently was encountered purulent leptomeningitis, with which almost always were detected the breaks of the bones of the basis of skull.

Pneumonia in wounded was the reason for death into 6.80/o of cases.

Penetrating wounds of skull and brain. In overwhelming majority (94.40/o) of dead persons from the injury of skull were encountered the penetrating wounds.

In a number of cases was noted extra-heavy character/nature of wounds. In particular, into 23.50/o were encountered the damages of the ventricles of brain, in 9.90/o - damages to the hanger-on unit of the brain, into 5.50/o - cracks and breaks of the bones of the basis of skull and into 1.10/o - damage of the sinuses of solid cerebral shell. The given data testify about the considerable severity of the wounds, which were being observed in dead persons in KhPPG of army rear.

Are given below the reasons for death with the penetrating wounds of skull and brain in dead persons in the therapeutic installations of army rear.

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	(1) Причины смерти	(2) Процент
(3) Изменения, связанные с непосредственным действием	.....	32.2
(4) Прямые осложнения	.....	65.1
(5) Пневмония у раненых	.....	2.7
(6) Всего . . .		100,0

Key: (1). Reasons for death. (2). Percentage. (3). Changes, connected with direct activity of injury. (4). Infectious complications. (5). Pneumonia in wounded. (6). In all.

In dead persons from the penetrating wounds of skull and brain on GBA most frequently the reason for death were infectious complications from the side of shells and substance of the brain; vital importance had also the changes, connected with the direct activity of injury. In the small percentage of the cases as the reason for death served connected pneumonia.

Is given below the information, characterizing the individual groups of the reasons for death with the penetrating wounds of skull and brain.

I. Death from the changes, connected with the direct activity of injury, it is noted into 32.20/o of cases. The first place among this group (21.20/o) occupied the cases of death from the decomposition of the substance of brain. somewhat less frequent (8.00/o) was established/installed death from the compression of brain by hematomas, predominantly subdural localization. Sometimes the reason for death was traumatic edema of brain (3.00/o).

In dead persons from the decomposition of brain more frequently were detected the wounds of two or three fractions/portions; in 10.00/o were encountered the wounds of ventricles with the determination of metal and sometimes bone fragments in them. The relatively high percentage of multi-longitudinal wounds in this group indicates the rapid delivery/procurement of wounded with the decomposition of brain into the hospitals of army rear, that depends both on the rapid evacuation and on the approximation/approach of neurosurgical aid to foremost stages, 76.00/o of wounded were delivered into the hospitals of army rear earlier than 24 hours after wound.

Extensive subdural and sometimes epidural hematomas were the reason for death in 8.00/o of dead persons from the penetrating wounds of skull. In these cases usually were encountered the damages by one or two fraction/portion of brain. The periods of death

oscillated from 1 to 5 days; more frequent wounded perished in the first 48-72 hours. In the majority of cases (81.00/o) the condition of wounded was such heavy that they could be operated or hematomas in them were not identified. Death of the wounded of this group attacked/advanced from the developing the intracranial pressure increase. Frequently in such cases were detected only the small wound defects of bones and solid cerebral shell, which did not provide conditions for natural decompression. As the sources of hemorrhage usually served the damaged vessels of soft cerebral shell.

Comparatively rarely were encountered the cases of death from traumatic edema of brain, it is more frequent with the wounds only of the one fraction/portion of brain. In the majority of the cases of such wounded they did not operate; death attacked/advanced usually into the first 1-2 days.

II. Death from infectious complications from the side of substance and to the shell of brain occurred into 65.10/o of cases. Most frequently was detected the purulent inflammation which was observed into 60.80/o of cases of death from the penetrating wounds; into 4.30/o of cases was established/installed the anaerobic infection of brain.

The manifestations of the purulent inflammation, which served as a reason for death of those wounded into skull and head brain, were different.

The first place among them occupied primary purulent leptomeningitis, that was encountered into 20.1c/o of cases of death from the penetrating wounds. In dead persons from purulent leptomeningitis were usually wounded one-two fractions/portions of brain. Wounded died predominantly to the 4-10th day after wound. In 1/5 cases the inflammatory process was localized in the shells of the basis of brain, in this case predominated the damages of the bones of the basis of skull and bones of face skeleton. In these cases, besides the infected cerebral wound, was an even newer source of infection - aeriferous areas of the bones of the basis of skull and face skeleton.

Spilled purulent encephalitis was the reason for death into 15.20/o of cases. In certain cases this process was spread to the wall of ventricle and it led to the onset of secondary periventricular purulent encephalitis (ependymitis). In this case sometimes was observed the melting of the wall of ventricle and the onset of pyocephalus. In other cases of pyocephalus the walls of

ventricles were macroscopically represented by undamaged/uninjured ones. In the unit of the cases the process was limited to the purulent inflammation of the wounded fraction/portion of brain, but sometimes it was spread also to considerable distance from cerebral wound. By that spilled purulent encephalitis as the reason for death was more frequently observed with wounds by one or two fraction/portion of brain, the periods of death from the spilled purulent encephalitis oscillated from 5 to 15 days from the day of wound.

The abscesses of brain were discovered in 9.30/o of dead persons. Localization of abscesses was differently. The periods of death on the abscesses of brain depended on the character/nature of the processes, which complicated their coursing. From complications of the abscesses of brain in dead persons in KhFPG of army rear most frequently was encountered the transition of purulent inflammation on walls of ventricles with the formation of periventricular purulent encephalitis, sometimes with the penetration of pus into ventricle. Less frequent coursing of abscess was complicated by secondary purulent leptomeningitis, secondary spilled purulent encephalitis, secondary hemorrhage or secondary edema of brain.

Festering wound canal, complicated by secondary suppurations, was observed in 9.10/o of dead persons. In this case was noted the

transition of the inflammatory process to soft cerebral shells with the onset of secondary purulent leptomeningitis, dissemination of the process to the walls of ventricles with the education of secondary purulent periventricular encephalitis, the transition of the suppurative process to the substance of brain with the education of the secondary spilled purulent encephalitis and sometimes - secondary edema of brain. The periods of death on the complicated festering of wound canal depended on the character/nature of complications and oscillated from 3 days to 1 months, but in certain cases they were more than month. In essence were encountered the wounds by one and two fraction/portion of brain.

The special position among the reasons for death of those wounded into skull occupies the polythalamous group of infectious complications, named "purulent meningoencephalitis" and composed 6.10/o. This group entered into statistical data because during the first years of the Great Patriotic War some prosecutors in their records did not secrete the primacy of the damage/defeat of the substance of brain or its shells. Into this group entered the cases of festering the wound canal, complicated by purulent meningitis, the primary and secondary encephalitis with the damage/defeat of soft shells by the inflammatory process, etc.

The cases of this group it cannot be regarded to any of the examined above complications, since in protocols and maps/charts/cards no section for this there is enough evidence.

Festering subdural hematoma was encountered in 0.60/o of cases of death from the penetrating wounds. Were usually wounded one-two fractions/portions of brain. With autopsy under solid cerebral shell found 120-200 cm<sup>3</sup> of pus, mixed with the decomposing blood. In the unit of the cases was noted the transition of the process for soft cerebral shells and formation of purulent leptomeningitis.

Most rarely was encountered the primary periventricular encephalitis (ependymitis) - 0.40/o. In these cases wound canal usually is passed either in immediate proximity of lateral ventricle, or through it. Wounded perished in time from 10 days to 1 months from the moment of wound.

Considerably less frequent than the purulent inflammation was encountered the anaerobic infection, which complicated the wounds of brain, according to sectional data, into 4.30/o of all penetrating wounds. On GBA death from the anaerobic infection of brain attacked/advanced in the limits of 5-10 days after wounding.

Autopsies attempted to produce as early as possible in order to exclude posthumous changes.

With autopsy in the cases of anaerobic infection the soft tissues of head were edematous, it is more on the side of wound. Subcutaneous-fatty layer had yellowish-greenish color, was slimy, sometimes jelly-like. Skull was scalped very easily. From the section/cut of soft tissues flowed almost transparent/hyaline greenish-yellowish fluid/liquid. From bone wound and defect of solid cerebral shell there protruded the decomposed substance of brain, in certain cases with unpleasant odor and gas bubbles. Solid cerebral shell on the side of wound, as a result of liberation/excretion from the wound of a great quantity of gangrenous changed substance of brain, was frequently wrinkled. Soft cerebral shells were impregnated with the hemolyzed blood, they slipped down from bends. A precise direction of wound canal was usually difficultly determine, since almost entire hemisphere was found in disintegration condition. The boundary between the destroyed unit of the brain and healthy/sound tissue it was difficult-distinguish. The frequently gangrenous process crossed the hanger-on unit of the brain and to contradictory/opposite hemisphere. Cerebro-spinal fluid was usually painted by the hemolyzed blood. The characteristic feature of anaerobic infection was the expressed hemorrhagic character/nature of the inflammation of brain. Most frequently by anaerobic infection

were complicated the most severe penetrating wounds of skull and brain.

III. Pneumonia in wounded. Besides death from the direct activity of injury and infectious complications from the side of brain and its shells, on GBA were encountered the cases of death from pneumonia (2.7%) of those wounded the skull. The character/nature of these pneumonia was different: were encountered macrofocal, and fine focal/acinous. Usually pneumonia were bilateral and they had drainage character/nature.

Characteristics of lethal outcomes from the wounds of skull and brain on GBF.

The pathoanatomical material of the hospitals of front line base at individual fronts and in different combat process/operations was not identical. Its character/nature manifested themselves the nearness of front line base to the place of military activities, the condition of roads from army rear, the presence of transport means the bed resources for hospital base the equipment of hospitals, the possibility of the evacuation of wounded in the rear and much other.

Depending on the enumerated conditions, section material of GBF acquired features, then is more characteristic to the material of the therapeutic installations of army and even immediate rear, then - to material of the hospitals of the deep rear.

Death of wounded in the hospitals of front rear attacked/advanced both within the nearest periods after wound and into later (more than 120 days from the moment of wound).

The consequences of the closed injury of skull served as the reason of death of wounded only into 1.10/o. In 94.60/o of sectional cases were encountered the penetrating wounds of skull, into 3.90/o - nonpenetrating wounds of the bones of skull and into 0.40/o - wound of the soft tissues of skull.

With the closed injury of skull permanent anatomical findings were the numerous contusion foci, being located predominantly in brain core. Together with them, occurred the small/fine scattered hemorrhages in soft shells, in white substance and under ependyma. In certain cases of death soon after injury the contusion foci were detected in the hanger-on unit of the brain. The reason for death with the closed injury more frequent was serous-purulent meningitis. In the unit of the cases the fatal result was connected with the education of great epidural and subdural hematomas.

Death from the wounds of the soft tissues of skull, which was being generally encountered extremely rarely, *WAS CAUSED BY* the onset of purulent complications (sepsis, meningitis, etc.).

With nonpenetrating wounds frequently were detected the breaks of the bones of the basis of skull. Frequently wound canal passed through soft tissues and bones of face. The damages of the bones of the arch/summary of skull were encountered more rarely.

The reasons for death with nonpenetrating wounds were following: subdural hematoma - in 20.00/o of dead persons, spilled purulent meningitis - in 43.30/o, the abscess of brain, complicated by purulent meningitis, in 10.00/o, festering subdural hematoma - in 20.00/o, the thrombosis of sinuses - in 3.30/o, other causes - in 3.40/o.

The penetrating wounds were encountered in the overwhelming majority of dead persons from the injury of skull and brain (94.60/o). From them extra-heavy (perforating wounds) were observed into 12.90/o (segmental wounds - into 11.50/o and diametric - into 1.40/o).

The most frequent place of the entry of shell was sincipital area (28.20/o). In comparison with the preceding stages somewhat were repeat/quickened the damage/defeat of frontal area (22.50/o) and was decreased a number of wounds of temporal (13.70/o) and postcranial (10.50/o) area. In the remaining cases were observed the wounds of adjacent areas.

On GBF was noted the decrease of the frequency of the combined wounds (wound of brain and the additional nasal cavities), they were discovered into 9.10/o. Breaks and cracks of the bones of the basis of skull with the penetrating wounds were encountered into 13.10/o of cases.

The volume of the traumatic decomposition of brain was various. As a rule, on GBF it was considerably less than in army and army therapeutic installations. More frequently were encountered the cases with the distinctly expressed wound canal in brain.

The wounds of the ventricles of brain occurred in 15.40/o of dead persons.

Bulk of wounds was plotted/applied by metallic fragments by usually not exceeded 1-1.5 cm according to the greatest diameter.

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Special importance both for the surgeons and for anatomical pathologists acquire blind wounds by fragments, especially by the fragments of low value. As a result of edema of soft tissues around the wound, which did not exceed 0.3-0.5 cm, and the occlusion of inlet scab, the doctors in attendance sometimes accepted similar wounds for surface scratches. Wounded with such damages arrived into the hospitals of front line base by frequently not finished, and sometimes also with the expressed symptoms of severe complications. However, in view of the careful examination/inspection of wounded in the specialized hospitals, similar small/fine wounds of that penetrating character/nature were not intravitaly identified only into 0.9o/o of cases.

The reasons of death of dead persons from the penetrating wounds of skull and brain in the hospitals of front rear were distributed as follows.

(1) Причины смерти	(2) Процент
(3) Изменения, связанные с непосредственным действием травмы . . . . .	3,3
(4) Инфекционные осложнения . . . . .	91,8
(5) Пневмония у раненых . . . . .	1,9
(6) Всего . . . . .	100,0

Key: (1). Reasons for death. (2). Percentage. (3). Changes, connected with direct activity of injury. (4). Infection complications. (5). Pneumonia in wounded. (6). In all.

In front line hospitals in comparison with foremost therapeutic installations sharply fell the value of the changes, connected with the direct activity of injury, among other reasons for death of those wounded the skull and the brain. The basic reason of death of such wounded, dead persons in the hospitals of front line area, were infectious complications.

I. Changes, connected with direct action of injury. In the hospitals of front line region the specific gravity/weight of the cases of death from the changes, connected with the direct activity of injury, among the reasons for death of those wounded the skull and the brain although was small however it oscillated in considerable limits. In those combat process/operations, when the hospitals of front on medical-tactical reasons were arranged/located closely to army area, a number of lethal outcomes, caused by the changes, connected with direct action of injury, it grew/rose. A number of cases of death from the changes, connected with the direct activity of injury, increased also when according to one or the other to reasons army KhPPG did not hold up in itself wounded the skull, but immediately were sent them on GBF.

The individual means of the changes, connected with the direct

activity of the injuries, which served as the reason for death in the hospitals of the front rear of those wounded the skull, were distributed as follows: subdural hematoma - 1.40/o, the acute/sharp bloating of brain - 0.90/o, the decomposition of brain - 0.80/o, the external hemorrhage from the sinuses of solid cerebral shell - 0.10/o, epidural hematoma - 0.10/o.

Thus, in comparison with the preceding stages of evacuation the individual means of the changes, connected with the direct activity of injury, did not have among other reasons for death of those wounded skull and brain of great value, although they were encountered in front line therapeutic installations.

II. Infectious complications from the side of shells and substance of brain. Infectious complications in the therapeutic installations of front rear served as the main reason for death of those wounded the skull and the head brain.

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In the hospitals of front rear, as on GBA, in the overwhelming majority of the cases of death from infectious complications was detected purulent infection - into 93.70/o, considerably more rarely was encountered anaerobic infection - into 1.00/o and tetanus - into

0. 10/o.

The manifestations of purulent inflammation in dead persons from the wounds of skull were distributed as follows.

(1) Проявления гнояного воспаления	(2) Процент
(3) Первичный гнойный лептоменингит . . . . .	38,8
(4) Абсцессы мозга . . . . .	30,6
(5) Первичный разлитой гнойный энцефалит . . . . .	9,3
(6) Вторичные кровоотечны . . . . .	7,7
(7) Первичный гнойный перивентрикулярный энцефалит . . . . .	2,2
(8) Сепсис . . . . .	1,2
(9) Прочие гнойные осложнения . . . . .	5,9
(10) Всего . . . . .	93,7

Key: (1). Manifestations of purulent inflammation. (2). Percentage. (3). Primary purulent leptomenigitis. (4). Abscesses of brain. (5). Primary spilled purulent encephalitis. (6). Secondary hemorrhages. (7). Primary purulent periventricular encephalitis. (8). Sepsis. (9). Other purulent complications. (10). In all.

The most frequent manifestation of general/common/total purulent inflammation in those wounded the skull, the dead persons on GBF, was primary purulent leptomenigitis, established/installed in 38.80/o of dead persons from the penetrating wounds of skull and brain, death in the majority of the cases attacking/advancing into the first 7-10 days from the moment of wound.

In a number of cases was noted the preferred damage/defeat of the shells of the basis of brain, is more frequent that encountered

with particularly early meningitides. The mechanism of the development of predominantly basal meningitides after wounds was not identical. In the cases of particularly early meningitides, which appeared during the first 2-3 days after injury, the predominantly basal disposition of purulent changes in shells was into 7.30/o connected with the damage of ventricles. In 9.00/o of cases basal meningitis appeared when the breaks of the bones of base of skull are present. Here the development of meningitis to a certain degree stood in connection with the course of the cracks, communicating the area of cerebral skull with the additional nasal cavities. In certain cases primary purulent leptomeningitis proceeded from wound.

General/common/total for all primary meningitides both the appeared with the wounds ventricles, the breaks of the basis of skull and proceeding from wound, were the extremely early periods of their development and the rapid progression of the process in shells.

Earliest meningitides which were encountered in the studied material, were discovered 24-30 hours after wound.

The abscesses of brain in dead persons on GBF are noted into 30.60/o of cases of the penetrating wounds of skull. Abscesses in dead persons earlier than 10 days with the onset of wound were encountered rarely. The formation of the capsule of abscess

frequently was observed at the end of the second and third week. The formation of capsule and the delimitation of abscess depended on the series/row of conditions. When in wound the great sectors of the necrotized tissue are present,, during the progression of infection the process of shaping of capsule decelerated. Differently was formed/activated capsule, also, in dependence on the disposition of abscess. The deeply lying/horizontal periventricular abscesses usually more lately outgrew by scar tissue, by virtue of which they were more inclined to progression, more frequently had irregular scalloped configurations and exhibited tendency to be spread towards ventricles. If abscesses were arranged/located nearer to shells, capsule was developed earlier. The nearer were arranged/located the abscesses to external wound, the earlier and the more reliable they were encapsulated. Sometimes the formation of the capsule of abscess was involved/tightened even on year.

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The diameter of abscesses, discovered on autopsy, it oscillated from 1 cm to very great sizes/dimensions, when abscess occupied almost entire hemisphere of brain.

Multiple abscesses on the course of wound canal were discovered into 7.20/o of cases; more frequent than there were two or three. The

multiple abscesses, which were being arranged/located out of wound canal, were encountered into 8.90/o of cases. Single abscesses composed 84.80/o. It should be noted that among the discovered abscesses of brain only 5.00/o they were arranged/located in cortex.

The single abscesses, which were being arranged/located along the course of wound canal, composed 28.60/o (among other things 7.40/o of near-ventricular ones). Bulk of abscesses (55.40/o) was arranged/located out of wound canal, in the nearest periphery of wound. In 13.30/o of cases the abscesses hit the ground far from wound canal, frequently in the hemisphere, contradictory/opposite to wound. The abscesses, which were being localized in the places of counteroffensives, were found in 2.70/o.

Different sectors of the capsule of abscess were dissimilar. As a rule, in it was a series/row of the weaker places where it could be easily damaged during process/operation, transportation of wounded, etc. This corresponded to the places of the diligence of abscess to ventricles, in the unit of the cases - to locations of foreign bodies, to sectors of merging/coalescence of abscess with encephalitic foci, to sectors of secondary hemorrhages in the wall of abscess. At the same time capsule achieved considerable density during its merging/coalescence with Rubtsovs by elements/cells. In view of the fact that the durability of capsule in its different

sectors first grew/rose, then it was reduced, the total distance/separation of the abscess of brain with the penetrating wounds was extremely difficult. In terms of this abscesses with the penetrating wounds essentially differ from the abscesses of brain with the closed injury of skull and especially from the abscesses of nontraumatic origin.

In 40.60/o of dead persons was established/installed the penetration of abscess into the area of ventricles, in 35.20/o identified clinically. In 15.60/o this complication was connected with surgical intervention, target which was emptying, draining or distance/separation of abscess.

by direct cause death with abscesses into 88.10/o of cases was secondary purulent leptomeningitis. Death from meningitis, which complicated abscess, most frequently attacked/advanced through 20-40 days after wound. In 5.40/o by direct cause death with abscesses was connected edema of brain. In the unit of the cases death followed from the spilled purulent encephalitis, which complicated the abscess of brain.

Primary spilled purulent encephalitis was the reason of death 9.30/o of dead persons from the penetrating wounds of skull and brain.

In the unit of the cases spilled the encephalitis had the distinctly expressed putrefactive character/nature, moreover was noted the absence of the expressed festering and the extensive decomposition/decay of brain tissue. From wound abundantly escape/ensued semi-fluid mass with putrefactive odor. Frequently as a result of the corrosion of vessels appeared considerable secondary hemorrhages. Death from such forms of the spilled encephalitis more frequently attacked/advanced not later than 15 days from the moment of wound. The majority of the cases of death from primary purulent encephalitis fell for period to 25 days after wound.

Secondary hemorrhages, which complicated coursing mainly of purulent inflammation of substance and shells of brain, were the reason for death in 7.7% of dead persons from the penetrating wounds of the skull (cases of death from the secondary hemorrhage, which complicated the abscess of brain, are not here connected, since they entered into heading the "abscess of brain").

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In contrast to "repeated", or "consistent", hemorrhages (see that 4) secondary hemorrhages always appeared as a result of the

progression of the infectious process in substance or shells of brain.

The object/subject of the pathoanatomical study usually was hemorrhage in the area of the skull. Secondary external hemorrhages from sinuses were noted only in 0.10/o of dead persons.

Among secondary intracranial hemorrhages as the reason for death most frequently served secondary subdural hematomas (5.70/o). Intra-ventricular secondary hemorrhages composed 0.80/o. According to data of T. I. Stankevich, that relates to hospital basis of one of the fronts, secondary subdural hemorrhages were encountered into 8.80/o, and intra-ventricular hemorrhages - into 1.30/o. Secondary hemorrhages into brain tissue were the reason for death into 1.20/o. Most frequently as their source served small/fine vessels.

Usually with secondary hemorrhages wounded did not lose a great quantity of blood (with exception of the cases of hemorrhages from sinuses). The fate of wounded depended first of all on localization of hemorrhage and condition of the basic pathological process in brain. Secondary hemorrhages in wounded, who were being located in the hospitals of front rear, appeared most frequently after 5-15 days after wound (43.90/o of all dead persons from this complication).

In the cases of death from secondary subdural hematoma with the autopsy of skull solid cerebral shell proved to be sharply stressed, under it fluctuated the issuing from blood. During the section/cut of solid shell the blood ensued/escaped/flowed out under certain pressure. The issuing from blood either howled liquid or it contained very loose blood clots. A quantity of blood was usually it small and greatly rarely exceeded 70-100 cm<sup>3</sup>; most frequently it was possible to gather only 40-50 cm<sup>3</sup> of the blood. In the cases of death from secondary subdural hematomas usually was a plethora of veins and sinuses of solid cerebral shell, moreover in the latter, as a rule, blood it remained liquid. The vessels of the basis of brain and vein of the soft shell of arch/summary were plethoric and sharply they protruded above the surface of brain, giving to brain cyanotic form/species. The tanks of brain were overfilled by the semitransparent, painted by the blood fluid/liquid. In a number of cases from the course of bends was determined certain swelling of soft cerebral shell. Brain was increased in volume. On the spot of hematoma was detected the insignificant depression of brain. Shells after washing of the blood proved to be those slightly painted by blood pigment. Hematoma usually was spread over the surface of brain. However, simultaneously with this were encountered individual hemorrhages in the mass of white substance and under ependyma, given to walls of ventricle variegated form/species. In the presence of secondary s. ural hematomas in a number of the cases were discovered

the hemorrhages in the labyrinth brain tissue, in the walls of wound canal, while in the presence of abscesses and in the thickness of the walls of the latter. Sometimes secondary subdural hematomas appeared on the side, opposite the wound, in the places of shocks/counterblows where there were phenomena of purulent encephalitis. The volume of secondary subdural hematoma did not depend on gravity of wound. Frequently small wounds led to death from massive secondary subdural hematomas.

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The onset of secondary hematomas in a number of cases could be connected with the transportation of wounded in the period of the progression of wound infection. A maximum number of cases of death from secondary subdural hematomas is related to the day of the arrival of wounded to front line hospital base. The transportation of wounded in these cases frequently was carried out on second-third week from the moment of wound.

It should be noted that secondary subdural hematomas in half the cases were not diagnosed with life, which, apparently is explained by the short duration of the symptoms of compression, by the surprise of hemorrhage (frequently in night time) against the background relatively happy coursing of wound process.

Primary purulent periventricular encephalitis was direct cause death 2.20/o of dead persons from the penetrating wounds of skull and brain. This complication more frequently was encountered with such wounds when wound canal passed in direct proximity to ventricles or, less frequent, through the area of the ventricles of brain. Sometimes was observed 3-5 days after wound. A great number of dead persons from primary periventricular encephalitis fell to the first three weeks after wound.

In 1.20/o of cases those wounded the skull and the brain died from sepsis. As the source of sepsis usually served festering thrombi in the sinuses of solid cerebral shell. In more rare cases the sepsis was developed on soil osteomyelitis of the bones of skull.

Other purulent complications composed 3.90/o of all cases of death from the penetrating wounds of skull and brain, that occurred in the hospitals of front rear.

In this group in essence are connected the cases of secondary purulent leptomeningitis, which complicated occurring of periventricular purulent encephalitis, progressive festering of wound canal, festerings of subdural hematoma.

Separately one should be stopped at the extensive necroses of cerebral tissue, which were being encountered usually against the background of purulent complications. In the unit of the cases this were the large/coarse foci of the red softening, which were being formed in connection with the extended thromboses of the sinuses of solid cerebral shell, and also the more or less large vessels of soft cerebral shell. Thromboses frequently appeared near wound during the progression of destructive changes. The large/coarse foci of softening, obviously, were developed not long before death. In the unit of the cases were observed the extensive foci of white softening. Extensive necroses were encountered in near-wound to zone. Frequently into necrosis were involved subcortical ganglia/nodes and area of internal and external capsules. Were observed the cases of softening whole hemisphere both on the side of wound and on opposite side. Sometimes softened proved to be almost entire brain; unmelted remained its only hanger-on unit. The large/coarse foci of white softening frequently accompanied the spilled purulent encephalitis.

The great sectors of red and white softening were encountered after 15-20 days with the moment of wound.

III. Pneumonia was the reason for death in 1.90/o of those

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wounded into skull and head brain. In 12.50/o of dead persons pneumonia, discovered on autopsy, was estimated as the associated disease.

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Characteristics of lethal outcomes from the wounds of skull and brain in hospitals of the deep rear.

In the hospitals of the deep rear usually it was not observed the cases of death of those wounded the skull and the head brain from the changes, connected with the direct activity of injury. The reason for death in the overwhelming majority of cases (96.60/o) were infectious complications in the form of secondary suppurations in substance and shells of brain. In the small unit of cases (0.90/o) death was connected with the existence of the formed scar in the substance of brain, which led to the onset of epileptic condition. Rarely were observed the cases of death of those wounded the skull from connected pneumonia (2.50/o).

Among the suppurations, which led to death of wounded, the leading place occupied the abscesses of brain, which were encountered in 67.30/o of dead persons from the wounds of skull and brain in the hospitals of the deep rear. By direct cause death with the abscesses

of brain was the dissemination of purulent inflammation to the surrounding abscess substance and the shells of brain. In this case were observed secondary purulent leptomeningitis, the secondary spilled purulent encephalitis, the secondary purulent periventricular encephalitis (ependymitis). In certain cases the dissemination of purulent inflammation led to the onset of massive intra-cerebral or submembrane hemorrhages as a result of the corrosion of the wall of vessel.

The secondary diffuse suppurations, which complicated local festerings (with exception of the abscess of brain), were the reason for death 26.30/o of those wounded into skull and head brain; in 10.00/o of them was observed secondary purulent leptomeningitis, in 1.00/o - secondary spilled purulent encephalitis and in 15.30/o - purulent meningoencephalitis.

In 3.00/o of cases the purulent inflammation of shells or substance of brain led to massive secondary intra-cerebral or submembrane hemorrhages, which served by direct cause death.

Among the cases of disagreeing the clinical and anatomical diagnosis great value had nonrecognition of abscesses of brain. According to D. G. Schaeffer's data, the frequency of undiagnosed abscesses of brain was distributed on the years of war as follows:

during the years 1941-1942 - 10.00/o, in 1943 - 6.00/o, during the years 1944-1945 - 4.80/c.

The given numbers convincingly attest about a steady improvement in the quality of clinical diagnosis for the time of the Great Patriotic War.

Characteristics of lethal outcomes from the wounds of skull and brain on the routes/paths of evacuation.

The well organized evacuation was one of the most important components of the successful treatment of those wounded the skull and the head brain in the days of the Great Patriotic War.

The need to possibly more rapidly deliver those very heavily wounded the skull into the appropriate therapeutic installations caused sometimes the offensive of death on evacuation routes. The frequency of the similar cases depended on many facts, by the main things of them were the conditions of combat and medical-tactical circumstances. Great value had the distance between therapeutic installations, a quality of roads, a season, weather, form/species of transport and condition of patient during transportation. Very important moment was the establishment of a precise clinical diagnosis, and also correct evaluation of condition and

transportability of wounded by doctors evacuating therapeutic installation.

The facts indicated caused different frequency of the cases of death on evacuation routes during different combat process/operations.

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For example, according to V. L. Byalik's data, the cases of death on evacuation routes on one of the fronts composed 3.50/o of all lethal outcomes from the wounds of skull and brain; according to V. L. Kisilevskiy's data, at other front this percentage was equal to only 2.4.

During the entire Great Patriotic War the cases of death on evacuation routes, caused by different wounds, underwent particularly careful pathoanatomical research. The results of these research were generalized and were led to the information of the doctors in attendance in order to improve the battle for reduction in the lethality on evacuation routes.

For generalizing the experiment/experience of the Great Patriotic War were analyzed the records and maps/charts/cards of the

sections of dead persons from the wounds of skull on evacuation routes at different fronts.

Lethal outcomes from the wounds of skull and brain were encountered in different sectors of evacuation route. First of them was route/path from PMP to DMP or sometimes to KhPPG of the first line. The second sector was route/path from army therapeutic installations (DMP, KhPPG of the first line) into army specialized KhPPG. The third sector in the limits of front was route/path from army therapeutic installations into the specialized front line hospitals (evacuation hospitals GBF).

The distribution of the studied sectional material according to the individual sections of evacuation route is represented below.

	(2) Процент
(1) PMP на DMP	52,1
(4) в армейских лечебных учреждениях в армейские KhPPG	37,0
(5) с ГБА на ГБФ	9,9
	(6) Всего . . . 100,0

Key: (1). Distribution of the cases of death on evacuation routes. (2). Percentage. (3). From PMP to DMP. (4). From army therapeutic installations into army KhPPG. (5). From GBA to GBF. (6). In all.

The given data testify that more than half dead persons on evacuation routes from the wounds of skull and brain falls to route/path from PMP to DMP and only the small unit - to route/path

from GBA to GBF.

Are examined below the cases of death from the wounds of skull and of brain, the observed in individual sections evacuation routes of wounded.

I. Route/path from PMP to DMP. Lethal outcome in the sector of evacuation route in question attacked/advanced usually not later than 12 hours after injury, it is more frequent in the first 5 hours.

In 90.40% of dead persons were observed the penetrating wounds of skull and brain; considerably more rarely were encountered the nonpenetrating wounds of the bones of skull and the closed injury of skull.

The reasons for death of those wounded the skull, that was killed in route/path from PMP to DMP, were distributed as follows:

(1) Причины смерти	(2) Процент
(3) Разрывы и разрывы оболочек мозга . . . . .	80,9
(4) Оболочечные кровоизлияния . . . . .	17,4
(5) Наружное кровоизлияние . . . . .	1,7
(6) Итого . . . . .	100,0

Key: (1). Reasons for death. (2). Percentage. (3). Decomposition of brain. (4). Membrane hemorrhages. (5). External hemorrhage. (6). In all.

As can be seen from these data, in all cases lethal outcomes were caused by the changes, connected with the direct activity of injury.

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The cases of death from the infectious complications of the wounds of skull and brain in the sector of evacuation route in question were not encountered.

In the overwhelming majority of the cases was established/installed the decomposition of brain, incompatible with life. The study of the pathoanatomical changes, discovered in dead persons in route/path from PMP to DMP, it showed the extreme severity of wounds. In 26.90/o, i.e., two times more frequently than in dead persons in the therapeutic installations of immediate rear, were found the especially heavy, perforating bullet wounds of skull and brain. The damages of cerebral ventricles with extensive hemorrhages in their area were noted in 27.10/o, i.e., almost so frequently as in those killed on the field of battle. In a number of the cases the damage of the integrity of the wall of ventricles was not connected with their straight/direct wound, but it appeared as a result of the penetration of the contusion focus of softening, located near the wall of ventricle, into the area of ventricle.

The volume of the decomposition of the substance of brain was usually very considerable. There were observed the cases of complete destruction one of the great hemispheres, and also the wound of different departments of brain stem. In some cases was noted complete destruction of both great hemispheres with the remaining undamaged/uninjured hanger-on unit of brain. Frequently were detected the breaks of the basis of skull.

In the cases of death from the decomposition of brain frequently there were observed epidural and subdural hemorrhages of different volume. In 17.40% of dead persons in route/path from PMP to DMP from the wounds of skull tunicary hemorrhages - usually massive subdural hematomas - served as a reason of death of wounded. In all cases of death in route/path from PMP to DMP from the nonpenetrating wounds of the bones of skull by the reason for death served subdural hematomas. In a number of the cases they led to death and wounded, who obtained the penetrating wounds of skull and brain. In the cases of death in route/path from PMP to DMP as the source of subdural hemorrhages frequently served the damages of the sinuses of solid cerebral shell and wound of the average/mean tunicary artery, considerably which were being thinner/less frequent encountered in the therapeutic installations of army and front rear.

In rare cases death in route/path from PMP to DMP was caused by external hemorrhage out of the damaged sinuses of solid cerebral shell.

The given morphological data testify about the considerable resemblance of the pathoanatomical changes, discovered in dead persons in route/path from PMP to DMP and in those killed on the field of battle. This shows that in the days of the Great Patriotic War the carrying out of those wounded in skull and head brain from the field of combat and evacuation from PMP to DMP they were very well organized.

II. Route/path from army therapeutic installations to army KhPPG. The analysis of the cases of death in the sector of evacuation route indicated has particularly important value in connection with the fact that wounded they evacuated from DME and KhPPG of the first line where there was already a possibility to carry on a struggle with the growing phenomena of the compression of brain, and also there were conditions for hospitalization heaviest, nontransportable wounded.

In dead persons in route/path from the therapeutic installations

of immediate rear into army KhPPG, as in dead persons in the preceding/previous sector of evacuation route, in the overwhelming majority of the cases (into 90.9o/c) were discovered the penetrating wounds of skull and brain. Considerably more rarely were encountered the nonpenetrating wounds of the bones of skull and the closed injury of skull.

The reasons of death of dead persons in route/path from the therapeutic installations of immediate rear irtc army KhPPG were following.

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(1) Причины смерти	(2) Процент
(3) Разрушение головного мозга . . . . .	51.8
(4) Туниковые кровоизлияния . . . . .	31.8
(5) Инфекционные осложнения . . . . .	11.4
(6) Всего . . . . .	100.0

Key: (1). Reasons for death. (2). Percentage. (3). Decomposition of brain. (4). Tunicary hemorrhages. (5). Infecticus complications. (6). In all.

These data show that, as in the preceding/previous sector of evacuation route, the reason of death of the majority of wounded, dead persons from the wounds of skull, was the decomposition of the substance of brain, inccmpatible with life.

The at the same time specific gravity/weight of the decomposition of brain among other reasons for death in route/path from DMP into specialized KhPPG of army rear was considerably less than in the cases of death in route/path from PMF to DMP.

In dead persons in route/path from army therapeutic installations the damages of skull and brain were less extensive than in dead persons in route/path from PMF to DMP, the perforating wounds of skull and brain were encountered almost two times less frequent, the volume of the decomposition of the substance of brain was usually less considerable. Complete destruction of both or one of the great cerebral hemispheres it was not observed, the wounds of the hanger-on unit of brain were encountered considerably less frequent; comparatively rarely they were noted the breaks of the basis of skull. In a number of cases the decomposition of the substance of brain was caused not by its direct crushing on the course of the wounding shell or fragments of the bones of skull, but by the formation of the extensive contusion foci of softening. Especially important value these foci acquired in the cases of death from the nonpenetrating wounds of the bones of skull or closed injury. Sometimes contusion focus encompassed the wall of cerebral ventricle. In some cases the decomposition of brain was escorted/tracked by the expressed phenomena of traumatic edema of brain. Wounded killed in route/path from the therapeutic installations of immediate rear into

army KhPPG from the decomposition of brain, frequently lived more than days after wound, sometimes even about 3 days.

Tunicary hemorrhages were into 31.80/o of cases the reason for death of those wounded the skull, the dead persons in evacuation route from army therapeutic installations. The specific gravity/weight of tunicary hemorrhages in this sector of route/path was considerably higher than among of dead persons in route/path from PMP to DMP. This has special importance in connection with the fact that primary task of DMP was precisely the struggle with the intracranial pressure increase in those wounded in skull, in particular, with tunicary hemorrhages. In all cases of death in route/path from DMP and KhPPG of the first line into army specialized KhPPG subdural hematomas were not identified with life and wounded were not operated. This was responsible the most frequently for the fact that in wounded before their designation/purpose for evacuation had "bright gap/interval" in the clinical manifestation of hematoma.

Infectious complications from the side of shells and substance of brain were the reason for death 11.40/o of those wounded into skull, dead persons in route/path from DMP into army specialized KhPPG. Infectious complications usually were encountered in wounded, previously delayed on DMP in connection with nontransportable condition. In the overwhelming majority on autopsy was detected

secondary purulent leptomeningitis, that complicated festering unremoved/uneliminated subdural hematoma; was considerably more rarely observed by that spilled purulent encephalitis.

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In a number of the studied cases infectious complications in those wounded in the skull, dead persons in route/path from the therapeutic installations of immediate rear, by the doctors of DMP were not distinguished. In other cases of wounded with the established/installed infection complications on the conditions of combat circumstances it was necessary to evacuate from army therapeutic installations, in spite of the presence of complications.

III. Route/path from GBA to GBF. In the cases of death on evacuation routes from KhPPG of army rear into therapeutic installations GBF lethal outcome attacked/advanced in army medical leaflet, in army medical train, in aircraft, sometimes in the motor vehicle or on steamship.

The penetrating wounds of skull or brain were encountered in 66.60/o of dead persons, the nonpenetrating wounds of the bones of skull - in 33.40/o. In comparison with the preceding/previous sectors of evacuation route considerably increased the specific

gravity/weight of the nonpenetrating wounds of the bones of skull.

Are given below the reasons for death of those wounded the skull and the head brain, dead persons in route/path from GBA to GBF.

(1) Причины смерти	(2) %, всего
(3) Разрушение головного мозга . . . . .	25,0
(4) Оболочечные кровоизлияния . . . . .	41,6
(5) Инфекционные осложнения . . . . .	33,4
(6) Всего . . . . .	100,0

Key: (1). Reasons for death. (2). Percentage. (3). Decomposition of brain. (4). Tunicary hemorrhages. (5). Infectious complications. (6). In all.

The cases of death from the decomposition of brain were encountered much more rarely than in the preceding/previous sectors of evacuation route.

The volume of the decomposition of brain in dead persons in route/path of army specialized KhPPG into evacuation hospitals GBF was usually considerably less than in dead persons in the preceding sectors of route/path. However, sometimes nevertheless were observed the wounds of ventricles and hanger-on unit of brain. Lethal outcome in wounded, who was killed from the decomposition of brain in route/path from KhPPG of army rear into evacuation hospitals of GBF, usually attacked/advanced not later than 3 days from the moment of wound. Some of these wounded passed all the preceding/previous stages

of evacuation during 24 hrs.

The specific gravity/weight of tunicary hemorrhages in dead persons in route/path from GBA to GBF was still higher than in dead persons in route/path from army therapeutic establishments. Together with extensive subdural hematomas sometimes, especially in the cases of the nonpenetrating wounds of the bones of skull, were observed also massive epidural hematomas. In all studied cases tunicary hemorrhages were not identified by the doctors of KhPPG, and wounded did not undergo surgical intervention.

The specific gravity/weight of the infection complications in dead persons in evacuation route of army KhPPG into front line evacuation hospitals was considerably higher than in dead persons in evacuation route from DMF. Most frequently was detected purulent leptomeningitis, less frequent - spilled purulent encephalitis, sometimes - the abscess of brain, which was complicated by periventricular purulent encephalitis (ependymitis) or purulent leptomeningitis.

Thus, the study of the results of the autopsies of those wounded the skull and the head brain, having died on evacuation routes, showed that the basic reasons for death they were: the decomposition of brain, tunicary hemorrhages and infectious complications from the

side of shells and substance of brain.

Comparative data, which characterize the specific gravity/weight of the basic reasons for death of those wounded the skull, dead persons in different sectors of evacuation route, are represented in Table 15.

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From Table 15 it follows that the most frequent reasons for death of those wounded the skull in all sectors of evacuation route in the limits of front were destruction of brain and tunicary hemorrhages. The specific gravity/weight of the cases of death from the decomposition of brain in those wounded the skull, the dead persons on evacuation routes, descended in proportion to the distance/separation of wounded from PMP.

Although the specific gravity/weight of the cases of death from membrane hemorrhages in proportion to the removal of wounded from army area steadily grew/rose however an absolute number of these cases sharply was decreased in connection with the decrease of a total number of lethal outcomes on evacuation routes from army therapeutic installations. Great value the cases of death from tunicary hemorrhages acquired exactly on those the sectors of

evacuation route where it is possible to prevent them. The relative frequency of tunicary hemorrhages in dead persons on evacuation route emphasize also V. L. Byalik and T. I. Stankevich. Extremely important fact was nonrecognition of tunicary hemorrhages in the evacuating therapeutic installation. The experiment/experience of war shows that the basic method of warning/preventing the cases of death from tunicary hemorrhages on evacuation routes was a steady improvement in the quality of medical diagnosis in the therapeutic installations of army and army rear. In a number of cases with the autopsy of dead persons from subdural hematomas under shells were detected the accumulations of the fresh blood. This it forces to recognize the possibility of the onset of tunicary hemorrhages during the evacuation of wounded, which was removed in the course of of war via an improvement in the conditions of the transportation of these wounded the skull.

Infectious complications in those wounded the skull, the dead persons in route/path, were observed in the sectors of evacuation route from army ones and it is considerably more frequent of the army therapeutic installations.

Letnal outcomes in these cases were caused by the complexity of the combat circumstances, which forced sometimes urgently evacuate such wounded, and also by the defects of medical diagnosis, connected

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with the difficulty of the identification of some infection complications from the side of shells and substance of brain under conditions DMP and KhPEG.

In a number of cases precise establishment of the character/nature of the pathological processes from the side of shells and substance of brain in field circumstances was virtually impossible.

Table 15. Distribution of the reasons for death of those wounded in the skull, dead persons in different sectors of evacuation route (in percent).

(5)	(1) Сектор маршрута эвакуации	(2) С ДМП до ДМП	(3) С ДМП в ХППГ армейского тыла	(4) Из армейского ХППГ в ГБФ
(6) Разрывы тканей головного мозга	50,0	56,8	25,0	
(7) Наружные кровотечения	1,7	-	-	
(8) Туниковые кровотечения	17,4	31,8	31,9	
(9) Инфекционные осложнения	-	11,4	35,4	
(10) Всего	100,0	100,0	100,0	

Key: (1). Sector of evacuation route. (2). From DMP to DMP. (3). From DMP to KhPPG of army rear. (4). From army KhPPG to GBF. (5). Reason for death. (6). Decomposition of brain. (7). External hemorrhage. (8). Tunicary hemorrhages. (9). Infection complications. (10). In all.

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It should be pointed out that the studied material death of those wounded the skull as a result of the decomposition of brain as a whole composed 50.00% of all lethal outcomes, which advanced during route/path from the therapeutic installations of army and army rear. Consequently, in half of lethal outcomes on evacuation routes from DMP and from army KhPPG no medical measures could stave off the

offensive of death.

Disagreements of clinical and anatomical diagnosis with the wounds of skull and brain.

For the best identification of the pathological processes, which appear with the wounds of skull and brain and, consequently, also for the more successful recovery of those wounded the skull huge value has the careful study of the cases of the disagreements of clinical and anatomical diagnosis.

As is known, the disagreements of diagnoses in the specific percentage of the cases are encountered also in peacetime. Literature data attest to the fact that in peacetime the disagreements of diagnoses with the wounds of skull and brain are encountered even in the most qualified therapeutic installations - special neuro-surgical scientific research institutes and clinics.

Under conditions of army in the field the clinical diagnosis of the wounds of skull and brain, and also pathological processes, which appear during these wounds, was especially difficult.

On the quality of clinical diagnosis great effect exerted the manning status of therapeutic installations by doctors, the

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qualification of the doctors the presence in state/staff of the therapeutic installations of the neurosurgeons, neuropathologists and other specialists. Particularly important value for the diagnosis of the wounds of skull and brain it had the opportunity of applying the supplementary x-ray and laboratory examinations. The presence in state/staff of the hospital of the x-ray room and laboratory substantially affected the quality of medical diagnosis.

The most important fact, which had great effect on the activity of therapeutic installations and, consequently, also to the quality of clinical diagnosis, were the conditions of combat and medical-tactical circumstances. Very important moment was the degree of the job load of therapeutic installations wounded the skull and the head brain. When for one doctor it was necessary to conduct a great quantity of wounded, the possibility of their detailed study was restricted, which inevitably was reflected in the quality of diagnosis. Considerably complicated diagnosis one-time entries into the therapeutic installations of a great quantity of wounded. In a number of cases by condition strength of the combat and medical-tactical circumstances appeared the need for guiding those wounded into skull and head brain into the unspecialized hospitals where it was not doctor- neurosurgeons and it was not conditions for the full/total/complete specialized examination/inspection of wounded.

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One should remember that on the basis of some digital indicators of the frequency of disagreement of clinical and anatomical diagnosis it is not possible to make any conclusions about the activity of that or another therapeutic installation. For evaluation of the quality of medical diagnosis in the therapeutic installation of army in the field it is necessary to compulsorily consider the conditions of the combat and medical-tactical circumstances, in which passed the work of this therapeutic installation during the Great Patriotic War.

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All facts, which affect the quality of medical diagnosis with the wounds of skull and brain, to consider is very difficult. Nevertheless the study of the cases of divergence of clinical and anatomical diagnosis is of great interest, since makes it possible to better analyze the material and to pay the attention of the doctors in attendance to the study of the most difficult for a clinical diagnosis pathological processes, which are encountered with the wounds of skull and brain.

Are given below the bases of information the which characterize the cases disagreements of diagnoses with the wounds of skull and brain in the therapeutic installations of army in the field during the Great Patriotic War. Information these is based on the study of maps/charts/cards and protocols of the sections of dead persons from the wounds of skull and brain. One should emphasize that all given numbers reflect the frequency of the disagreement of diagnoses only in the attitude of dead persons and do not give the law/right to make any conclusions relative to the quality of diagnosis in the overwhelming majority of wounded, individuals who have become

healthy, and discharged of therapeutic installations.

The disagreements of diagnoses with the wounds of skull and brain were established/installed only into 15.2c/o of studied cases of autopsies, produced in the therapeutic installations of army, army and front rear.

The frequency of the disagreements of clinical and anatomical diagnosis in the therapeutic installations, arranged/located from different stages of evacuation, was dissimilar (Fig. 44).

In the hospitals of front rear the cases of disagreeing the diagnoses with the wounds of skull and brain were encountered considerably thinner/less frequent than in army KhPPG. This law is caused by calmer circumstances of work less by loading front line hospitals and by their more modern equipment.

For explaining the reasons for the disagreements of clinical and anatomical diagnosis with the wounds of skull and brain the great value has study of the duration of stay of those wounded the skull and the head brain with the not identified with life most important pathological processes in latter/last therapeutic installation.

In many instances it was not possible to establish/install

correct clinical diagnosis in view of the insignificant period, which passed from the entry of wounded into therapeutic installation to the moment of death. In 56.5% of cases of the disagreements of diagnoses the wounded were situated in the latter/last therapeutic of the installation of less than 3 days; in half these cases the wounded did not stay in hospital even 24 hours.

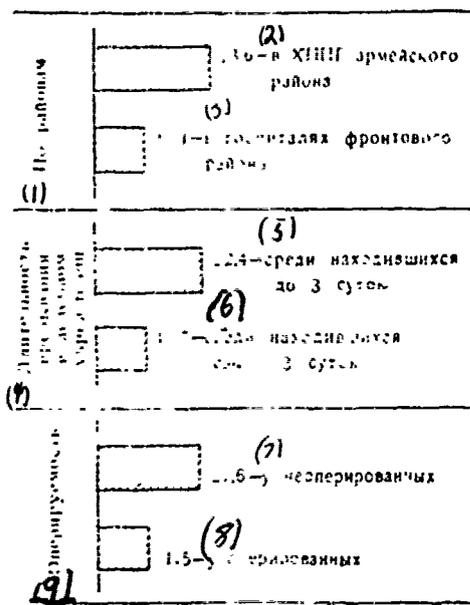


Fig. 44. Frequency of the cases of the disagreements of clinical and anatomical diagnosis with the wounds of skull and brain depending on different factors (in percentages).

Key: (1). By areas. (2). in KhPEG of army area. (3). in hospitals of front line area. (4). Duration of stay in therapeutic installation. (5). to medium of those locating to 3 days. (6). among those locating it is more than 3 days. (7). in those not operated. (8). in those operated. (9). Operability.

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This shows that more than in half the cases of the disagreements of

diagnoses the wounded entered hospitals in extremely heavy, frequently preagonal condition, which is logical, impeded the establishment of correct clinical diagnosis.

The separate determination of the frequency of the cases of the disagreements of clinical and anatomical diagnosis in wounded the skull those lived in latter/last therapeutic installation is less than 3 days and in those lived in the latter/last therapeutic installation of more than 3 days, it makes it possible to establish/install very important law. In wounded dead into the first 3 days after entry into latter/last therapeutic installation, the cases of disagreement diagnoses were encountered more than twice more frequently than in wounded, who stayed in latter/last therapeutic installation longer time (Fig. 44). Thus, completely distinctly is established/installed the dependence between the duration of the stay of those wounded into skull in latter/last therapeutic installation and the quality of medical diagnosis.

In connection with the fact that during surgical process/operations apropos of the wounds of skull and brain created supplementary possibilities for the more detailed research of the wounds of skull, there is known interest in explaining the specific gravity/weight of those operated among wounded with the established/installed disagreement of clinical and pathcanatomical

diagnosis.

More than in half the cases of the disagreements of diagnoses (55.30/o) those wounded the skull did not undergo surgical intervention, which, it is doubtless, even more impeded the establishment of correct clinical diagnosis.

The dependence between the use/application of surgical intervention apropos of the wound of skull and of brain and the frequency of the disagreements of clinical and pathcanatomical diagnosis is confirmed by the separate determination of the frequency of the disagreements of diagnoses in the groups of the operated and unoperated wounded (Fig. 44). In the operated wounded the disagreement of diagnoses is established/installed on autopsies almost doubly less frequent than in wounded, not undergoing surgical intervention.

All this substantially affected the general/common/total level of clinical diagnosis.

The most important moments, which impeded the establishment of correct diagnosis in individual those wounded the skull, they were:

- 1) the absence of anamnesis or the presence inaccurate

anamnestic data in connection with heavy condition of those wounded into skull. In those wounded the head brain this frequently was encountered in connection with the special features/peculiarities of localization of the wound;

2) the extremely heavy condition of wounded, not made it possible to conduct his careful research;

3) incorrect evaluation of the data of objective clinical research, laboratory analyses and results of X-ray analytical research.

The study of maps/charts/cards and protocols of the sections of dead persons from the wounds of skull and brain showed that the cases of disagreeing the diagnoses concerned in essence of localization and character/nature of wounds, and also establishment of the presence of lethal tunicary hemorrhages, basic infectious complications from the side of shells and substance of brain, and pneumonia, which served as a reason for death of those wounded into skull.

The distribution of the cases of disagreeing the diagnoses according to their character/nature is represented below.

(1) Характер расхождения диагнозов	(2) Процент
(3) Не установлено ранение черепа . . . . .	0.7
(4) Не определен проникающий характер ранений черепа и головного мозга . . . . .	6.6
(5) Не диагностированы оболочечные кровоизлияния, явившиеся причиной смерти . . . . .	27.6
(6) Не диагностированы основные инфекционные осложнения . . . . .	57.9
(7) Не диагностирована пневмония, обусловившая смерть . . . . .	7.2
(8) Всего . . . . .	100.0

Key: (1). Character/nature of the disagreement of diagnoses. (2). Percentage. (3). Not established/installed wound of skull. (4). Is not identified penetrating character/nature of wounds of skull and brain. (5). Not diagnosed tunicary hemorrhages, which are the reason for death. (6). Are not identified basic infecticus complications. (7). Not diagnosed pneumonia, which caused death. (8). In all.

Hence it is apparent that during wounds and damages of skull by the most characteristic cases of the disagreements of diagnoses in the therapeutic installations of that operating army was the lack of recognition of basic infectious complications from the side of shells and substance of brain, and also meningeal hemorrhages.

In army KhPPG the cases of disagreeing the diagnoses more frequently concerned the identification of tunicary hemorrhages and basic infectious complications from the side of shells and substance of brain, in front line therapeutic installations - identifications of basic infectious complications from the side of shells and

substance of brain.

In the days of the Great Patriotic War of substances the therapeutic installations of army in the field, it is more frequent in the therapeutic installations of army and army rear rarely were encountered the cases when with heavy multiple wounds, for example, with the simultaneous penetrating wound of skull and the combined penetrating wound by head and abdominal area, was not distinguished the wound of skull, which was basic. This was observed mainly when wounded perished soon after wound.

The sometimes identified wound of skull was underestimated when, in one and the same wounded, other heavy wounds are present,. In this case the as basic wound was considered the wound of another area, more frequent than the breast, stomach or pelvis. However, during the autopsy it was explained, that the lethal outcome was caused by wound or damage of skull, and the wounds of other organs/organs had only associated value. The disagreements of the diagnoses of the character/nature indicated in the therapeutic installations of the Red Army were observed exclusively rarely. In certain cases clinically was underestimated the previously transferred wound or the damage of skull and brain, but infectious complications from the side of shells and substance of brain, which appeared a long time after the injury of skull, were estimated as the diseases, not having

straight/direct relation to injury.

On the studied material this underestimation was encountered only into 0.10/o of all sectional cases of wounds and damages of skull. As an example can serve following, comparatively rare, the observation.

M - suddenly sickened 4/I 1945. Temperature rose to 39°, it appeared sharp headache and meningeal phenomena. In the same day was hospitalized in heavy condition in front line evacuation hospital.

During March 1942 it was wounded by the fragment of shell into head, apropos of what then was produced the trepanation of skull. After clinical recovery the wounded was discharged into unit in 1942.

5/I 1945 in hospital was produced the bacteriological research of cerebro-spinal fluid, whereupon was discovered pneumococcus. The analysis of the blood: 10200 leucocytes per 1 mm<sup>3</sup>, other changes no. Is roentgenologically established/installed a trepanation defect in left frontal bone.

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With the progressive deterioration in the condition of patient

it died 19/I 1945.

The clinical diagnosis: purulent pneumococcal encephalitis. Meningitis. Communications with the past wound of skull is denied.

Pathoanatomical diagnosis: the abscess of the left frontal fraction/portion of brain in the area of the available wound. Purulent ependymitis. Basal purulent leptomeningitis.

Decisive importance for treatment and the outcome of the wounds of skull and brain had the correct determination of the character/nature of wound. On the studied material into 1.10/o of all autopsies of dead persons from the penetrating wounds of skull and brain the penetrating character/nature of the wound of skull was not identified.

The penetrating character/nature of the wounds of skull sometimes was not distinguished not only in the therapeutic installations, arranged/located on the foremost stages of evacuation, but also in the hospitals of front rear. Almost in half of the cases of the disagreements of diagnoses the identification of the penetrating character/nature of wound was impeded by the fact that the inlet was arranged/located in the area of face skull. Frequently inlet was very little.

According to the data of the maps/charts/cards of sections, the majority of wounded with unrecognized penetrating wounds of skull was not operated. As the reason for death more frequently served infectious complications from the side of shells and substance of brain, less frequent - the changes, connected with the direct activity of injury.

According to clinical diagnoses, unrecognized penetrating wounds of skull were estimated with life as the nonpenetrating wounds of the bones of skull, and sometimes - as the wounds of the soft tissues of skull or the closed injury of head.

The tunicary hemorrhages, which were the reason for death of those wounded into skull, were not identified in a comparatively large number of dead persons. More frequent the cases of undiagnosed tunicary hemorrhages were observed in the therapeutic installations of army rear. Death from tunicary hemorrhages usually attacked/advanced into the first 5 days after wound; however, in a number of cases wounded lived longer time.

On autopsy were detected massive subdural hematomas, which were being sometimes combined with small epidural accumulations of the

bleed or moderately expressed traumatic edema of brain. The evacuation of wounded contributed to further increase in hematomas. One third of the wounded died, without having stayed and days in latter/last therapeutic installation.

Undiagnosed subdural hematomas were observed in the various forms of wounds and damages of skull; however, considerably more frequent they were established/installed with the penetrating wounds of skull and brain.

Surgical interventions in these wounded were conducted in third of cases. The identification of subdural hematomas was impeded by the fact that with the treatment of the nonpenetrating wounds of the bones of skull, which were being escorted/tracked by massive subdural hematomas, was not revealed the solid cerebral shell. With the penetrating wounds of skull and brain, when the reason for death were unrecognized tunicary hematomas, was processed only bone wound, whereas the surgical processing of the wound of cerebrum was not conducted.

The study of the histories of the disease/sickness/illness/malady of dead persons from unrecognized tunicary hemorrhages shows that in a number of cases the clinical phenomena of the compression of brain were not distinctly expressed.

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The clinical diagnoses, established/installed in the cases of unrecognized subdural hematomas, indicate that most frequently the severity of the condition of wounded was related due to extensive damages to the brain and somewhat thinner/less frequent due to infectious complications from the side of shells and substance of brain, not confirmed on autopsy. The careful neurologic examination/inspection of wounded, it is doubtless, would help better to recognize tunicary hemorrhages in those wounded the skull and the brain.

Infectious complications from the side of shells and substance of brain, proving to be reason deaths of those wounded the skull and the head brain, were not identified with life into 13.20/o of all cases. The disagreements of diagnoses concerned different forms/species of infectious complications from the side of substance and shells of brain - primary purulent leptomeningitis, primary purulent encephalitis, purulent meningoencephalitis, abscess of brain and anaerobic infection of the wounds of the brain.

The distribution of the individual forms/species of undiagnosed

infectious complications on the therapeutic installations of army and front rear is represented in Table 16.

The given numbers show that for army KhPPG are more characteristic the disagreements of diagnoses, which concern diffuse suppurations - leptomenigitis and encephalitis, and also anaerobic infection of the wounds of the brain; for the hospitals of front rear - disagreement of diagnosis, which concerns the abscesses of brain.

The indicator of the frequency of the disagreements of diagnoses was various for the individual forms/species of infectious complications. On diagrams are represented the data about relative frequency of the disagreements of diagnoses with respect to all cases of autopsies with which as the reason for death were established/installed the corresponding complications both identified and unrecognized (Fig. 45).

When as the reason for death was established/installed purulent meningoencephalitis, the disagreements of diagnoses, which concern this complication, were encountered rarely. This fact, probably, was connected with the fact that purulent meningoencephalitis was escorted/tracked by the clinical phenomena, caused by changes both in the shells and the substance of brain, and therefore it was more available to clinical identification. Most frequently was not

distinguished the anaerobic infection of the wounds of brain which to the Great Patriotic War was insufficiently studied.

Should be noted some special features/peculiarities of the basic forms/species of undiagnosed infectious complications.

Table 16. Distribution of unrecognized infectious complications on GBA and GBF the dead persons have from the wounds of skull and brain (and percentages).

(1) Вид инфекционного осложнения	ГБА	ГБФ	(2) Итого
(3) Гнойный лептоменингит . . .	19,2	7,9	27,2
(4) Вылитый гнойный энцефалит . . .	15,9	10,2	26,1
(5) Гнойный менингоэнцефалит . . .	2,3	2,3	4,6
(6) Абсцесс мозга . . . . .	3,4	19,3	22,7
(7) Анаэробная инфекция . . . . .	12,5	6,9	19,4
Всего . . . . .	53,4	46,6	100,0

Key: (1). Form/species of infectious complication. (2). Altogether. (3). Purulent leptomeningitis. (4). Spilled purulent encephalitis. (5). Purulent meningencephalitis. (6). Abscess of brain. (7). Anaerobic infection. (8). In all.

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Purulent leptomeningitis, diagnosed with life, it was observed in all forms of wounds and damages of skull. In the overwhelming majority of the cases these wounded did not undergo surgical intervention. The severity of the condition of wounded in the cases of undiagnosed purulent leptomeningitis according to the data of clinical diagnoses, was most frequently explained by the extensive damage of the substance of brain, thinner/less frequent - by meningeal hemorrhages, and sometimes - by traumatic edema of brain or

by erroneously diagnosed pneumonia. One of the reasons for similar errors was the observed during the Great Patriotic War "atypical" form of meningitis, which flowed/occurred/lasted without ordinary tunicary symptom complex.

The purulent encephalitis, diagnosed with life, on the studied material it was observed only with the penetrating wounds of skull and brain. The severity of the condition of wounded, according to data of clinical diagnosis, was treated in the majority of the cases as the result of the extensive damage of the substance of brain in a number of cases it was explained by traumatic edema of brain or by erroneously diagnosed pneumonia.

The abscesses of brain, not identified with life, were early, single and they were arranged/located usually on the damaged side. More frequent undiagnosed abscesses were detected in frontal and temporal fraction/portion. Almost in all cases in the tissue of brain on autopsy were detected foreign bodies. By direct cause death most frequently served periventricular purulent encephalitis (ependymitis), somewhat less frequent - purulent leptomeningitis, and sometimes - spilled encephalitis and secondary edema of brain, which complicate coursing of the abscesses of brain. Unrecognized abscesses of brain rarely were encountered in dead persons in the therapeutic installations of army rear and considerably more frequently they were

detected in wounded, dead persons in the hospitals of front rear (Table 16). In the majority of the cases the wounded were situated in the latter/last therapeutic installation of more than 15 days.

In clinical diagnoses with undiagnosed abscesses of brain were usually noted the diffuse suppurations (leptocerebritis, were usually noted the diffuse suppurations (leptomeningitis, encephalitis, meningoencephalitis). In the single cases of the wounds of skull, complicated by the abscess of brain, infectious complications with life completely were not suspected. This illustrates the following observation.

S on II/IX 1944 was wounded into frontal area by the fragment of the artillery shell. There was the loss of consciousness immediately after wound was delivered on PMP, where to it was introduced antitetanic serum and was superimposed bandage with streptocide 12/IX it entered on DMP, was cleaned the wound and again applied bandage with streptocide. During this day the wounded was delivered into the army evacuation hospital where was produced the revision of wound 15/IX wounded was delivered into the front line evacuation hospital where was carried out conservative treatment by sulfanilamide preparations with the progressive deterioration of general condition, wounded died 11/ 1944 (after 25 days after entry into hospital).

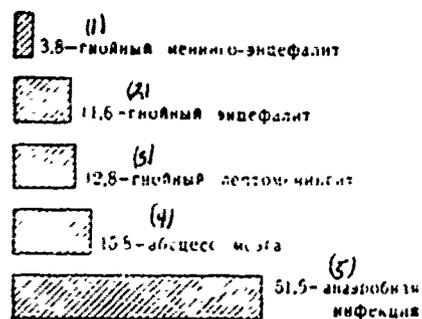


Fig. 45. Comparative frequency of disagreements of clinical and anatomical diagnosis with the infectious complications of skull and brain (in percentages).

Key: (1). purulent meningoencephalitis. (2). purulent encephalitis. (3). purulent leptomeningitis. (4). abscess of brain. (5). anaerobic infection.

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The analysis of the cerebro-spinal fluid: cerebrospinal fluid transparent/hyaline of Pandy's reaction positive, Nonne-Apelt reaction was negative. Protein 0,66%. Cytosis 4. Single erythrocytes in the field of view.

Clinical diagnosis: blind fragmentation wound by right frontal region with the damage of bones. Hemorrhage into brain. Epidural and

subdural hematoma.

Pathoanatomical diagnosis: the blind-end fragmentation nonpenetrating wound of right frontal bone with the crack of its internal plate. Abscess of the right frontal fraction/portion of brain. Spilled purulent encephalitis.

During the Great Patriotic War were observed the individual cases when with the abscess of brain was placed the clinical diagnosis of osteomyelitis of the bones of skull or hemorrhage into brain.

The anaerobic infection, not identified with life, with the injury of skull was observed only in the cases of the penetrating wounds of the skull and brain, it is more frequent - fragmentation. The disagreement of diagnosis during the anaerobic infection of the wounds of brain more frequently was encountered in the therapeutic installations of army rear, but it was observed also in the hospitals of front rear (Table 16).

Wounded perished from anaerobic infection into the first 5-10 days after wound, but in a number of cases lived more than 10 days. The severity of the condition of wounded during unrecognized anaerobic infection, according to the data of clinical diagnosis, in

the majority of the cases was related due to the diffuse purulent inflammation of substance and shells of brain (purulent meningitis, purulent encephalitis, purulent meningoencephalitis), is thinner/less frequent due to the extensive damage of the substance of brain, traumatic shock or edema of brain, in actuality which did not occur.

Pneumonia, which served as a reason for death of those wounded the skull and brain, was not distinguished in a number of cases. The disagreement of diagnoses with pneumonia was observed in the therapeutic installations, located in different stages of evacuation. Unrecognized pneumonia more frequent was bilateral, frequently croupose or abscessing.

The severity of the condition of wounded with undiagnosed pneumonia, according to clinical diagnoses, in the majority of the cases was related due to the extensive damage of the substance of brain, it is thinner/less frequent - due to the erroneously diagnosed infectious complications in substance and shells of brain.

The given data make it possible to come to some general/common/total conclusions/derivations, which characterize the disagreements of diagnoses, which were being encountered in treatment installations with wounds and damages of skull during the Great Patriotic War.

The disagreements of diagnoses more frequently were encountered in KhPPG of army rear, thinner/less frequent - in the hospitals of front rear. Most frequently were not distinguished tunicary hemorrhages, infecticus complications from the side of shells and substance of brain and pneumonia, which served as a reason for death of those wounded into skull and head brain. Sometimes with life was not distinguished the penetrating character/nature of the wound of skull.

The possibility of detailed examination/inspection and establishment of correct clinical diagnosis, naturally, depended on the duration of the stay of those wounded into skull and head brain in the latter/last therapeutic installation: in wounded, dead persons into the first 3 days on entry into latter/last therapeutic installation, the disagreements of diagnoses were encountered doubly more frequently than in wounded, who lived in latter/last therapeutic installation longer time.

Known value for the accuracy of diagnosis had also surgical intervention with the wounds of skull and brain. The disagreements of diagnoses in the unoperated wounded were encountered almost two times more frequently than in those operated.

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More than half wounded with the established/installed disagreements of clinical and pathoanatomical diagnosis they did not undergo process/operation in connection with the severity of general condition.

Unrecognized tunicary hemorrhages, usually subdural hematomas, more frequently were detected on the autopsies of dead persons in army KhPPG, although they were encountered in the therapeutic installations, arranged/located also on other stages of evacuation. On the studied material in all cases of death from undiagnosed subdural hematoma with the nonpenetrating wounds of the bones of skull the correct determination of the presence of hematoma was impeded by the fact that during process/operation was not revealed the solid cerebral shell. In the cases of the penetrating wounds of skull and brain was processed only bone wound, but wound of brain did not undergo surgical processing.

The disagreements of diagnoses, which concern the basic infectious complications of the wounds of skull and brain, were observed in the therapeutic installations of army and front rear. For

army KhPPG more characteristic were the disagreements of diagnoses, concerning purulent leptomeningitis, purulent encephalitis and anaerobic infection of brain, for front line hospitals - early abscess of brain.

Greatest diagnostic difficulties in the therapeutic installations of army in the field it presented the anaerobic infection of the wounds of brain, subdural hematomas and pneumonia in wounded. The disagreements of diagnoses in the cases of the purulent complications of the wounds of the skull and brain were encountered considerable thinner/less frequent.

In the majority of the cases unrecognized tunicary hemorrhages and infectious complications clinically were estimated as the extensive damages of the substance of brain.

The quality of clinical diagnosis in military, army and front line therapeutic installations stood in direct relation with the diverse conditions of combat and medical-tactical circumstances and it can be estimated only taking into account these conditions.

The study of the cases of disagreeing the clinical and anatomical diagnosis with the wounds of skull and brain the individual years showed that during the Great Patriotic War the

medical diagnosis of the wounds of skull and brain steadily was improved.

General/common/total characteristics of lethal outcomes with the wounds of skull and brain.

Experience of the Great Patriotic War it showed that in dead persons from the injury of skull in the overwhelming majority of the cases were encountered the bullet wounds and exclusively rarely were observed the closed damages.

With the closed injury of skull the offensive of death depended mainly on the contusion decomposition of brain and intracranial hemorrhages, thinner/less frequent - from infectious complications from the side of shells and substance of brain, but sometimes from connected pneumonia.

Among the bullet wounds of skull and brain in dead persons in the predominant majority of the cases were observed the penetrating wounds of skull and brain, it is very rare - the nonpenetrating wounds of the bones of skull and are still thinner/less frequent - the wound of the soft tissues of skull.

The reasons of death of wounded, dead persons from the penetrating wounds of skull and brain, conditionally were divided into three basic groups: 1) the changes, connected with the direct activity of the injury; 2) infectious complications from the side of shells and substance of the brain; 3) pneumonia in wounded. The specific gravity/weight of the groups of the reasons for death indicated was not identical in different stages of evacuation (Table 17).

Most frequently the reason of death of wounded in therapeutic installations were the changes, connected with the direct activity of injury, and infectious complications from the side of shells and substance of brain. Pneumonia, which was being generally frequently encountered the dead persons have in all stages of evacuation as the reason for death of those wounded into skull and brain the more modest place. In proportion to the removal of wounded from the field of combat was decreased the value of the changes, connected with the direct activity of injury, and grew/rose the specific gravity/weight of infectious complications from the side of shells and substance of brain among all reasons for death of those wounded the skull. On the field of battle were not observed infectious complications, whereas in rear hospitals usually were not encountered the cases of death

from the changes, connected with the direct activity of injury.

Is given below characteristics of the basic groups of the pathological processes, which caused death of those wounded the skull and the head brain in different stages of evacuation. For a comparison is given the information about those killed on the field of battle.

1. Changes, connected with direct activity of injury. Above has already been emphasized the conditionality of the classification of the reasons for death from the penetrating wounds of skull and brain. Most conditional is the liberation/excretion of the group of the reasons for death, caused by the changes, connected with the direct activity of injury. The careful study of the pathogenesis of these changes shows that, although their direct reason is the activity of injury, the development of these changes can be realized only by means of the leading effect of nervous system with indispensable participation of cerebral cortex.

In volume 4 (page 76) it was indicated that some forms/species of traumatic necrosis (contusion foci of hemorrhagic softening) in the majority of the cases appear not as a result of the true contusion of the substance of the brain of 5 bones of skull and the extensions of dura mater, but by other means.

Table 17. Distribution of the reasons for death with the penetrating wounds of skull in dead persons on the field of battle and in therapeutic installations (in percentages).

(1) Причина смерти	(2) Место смерти	(3) Поле боя	(4) Военные лечебные учреждения	ГБА	ГБО	(5) Тыловые лечебные учреждения
(6) Изменения, связанные с непосредственным действием травмы . . . . .	100,0	75,5	32,2	3	—	—
(7) Инфекционные осложнения со стороны оболочек и вещества головного мозга . . . . .	—	20,9	65,1	94,8	96,6	—
(8) Пневмония . . . . .	—	3,6	2,7	1,9	2,5	—
(9) Другие причины . . . . .	—	—	—	—	0,9	—
(10) Всего . . . . .	100,0	100,0	100,0	100,0	100,0	100,0

Key: (1). Reason for death. (2). Place for death. (3). Field of combat. (4). Army therapeutic installations. (5). Rear medical installation. (6). Changes, connected with direct activity of trauma. (7). Infectious complications from the side of shells and substance of brain. (8). pneumonia. (9). Other reasons. (10). In all.

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The leading moment in the onset of such contusion foci is caused by the nervous reflex mechanisms of angiospasm at the moment of injury, which calls the education of the focus of the numbness of brain tissue, and their subsequent paralytic expansion, which leads to stasis and diapedesis of erythrocytes.

Great role plays the function of nervous system in the mechanism of the onset of intracranial hemorrhages. In the significant part of the cases of hemorrhage with wounds the skulls appear via diapedesis. As indicates L. I. Smirnov (1949), such hemorrhages are developed with deep disorders of blood circulation, in his prestatic condition, caused by paralysis of vasomotor nerves.

Is particularly great the value of the function of central nervous system in the pathogenesis of the traumatic bloating of brain. It is above, in the chapter, dedicated to this question, in detail was examined the theory of the education of traumatic bloating (N. N. Burednko's school), according to which leading is the nervous reflex mechanism of the onset of the bloating of brain with wounds. The experiments of Soviet scientific B. N. Klosovskiy, who obtained during the stimulation of the specific departments of the brain of dog the instantaneous bloating of brain, convincingly confirm the validity of the positions/situations of N. N. Burdenko.

The basic means of the changes, connected with the direct activity of injury, which served as a reason for death of those wounded into skull and head brain, were the decomposition of brain and the tunicary hemorrhages (are more frequent subdural hematomas).

Less frequent the reason for death was external hemorrhage from the damaged sinuses of solid cerebral shell. Data about the frequency of traumatic edema and bloating of brain it is difficult to estimate, since the cases of death from these processes were dissimilarly treated by different anatomical pathologists.

The specific gravity/weight of the individual means of the changes indicated was dissimilar in those wounded into skull, dead persons in different stages of evacuation (Table 18).

The decomposition of brain was the reason for death in the overwhelming majority of dead persons from the wounds of skull on the field of battle. In dead persons in the therapeutic installations of immediate rear it was the basic reason for death of those wounded the skull; fairly often the cases of death from the decomposition of brain were observed also in therapeutic installations of GBA.

Great the specific gravity/weight of dead persons from the decomposition of brain in the stages of evacuation testifies about the rapid carrying out of heavily wounded from the field of combat during the Great Patriotic War. In time considerable percentage of the cases of death from the decomposition of brain, established/installed in therapeutic installations of GBA, show that the volume of this decomposition always correctly was estimated in the therapeutic installations of immediate rear.

Table 18. The specific gravity/weight of the basic means of changes, connected with the direct activity of injury, the dead persons have in the stages of evacuation (in percentages to a number of cases of death from the penetrating wounds of skull in each stage of evacuation).

(1) Причина смерти	(2) Место смерти Поле боя	(3) Войсковые лечебные учреждения	ГБА	ГБФ
(5) Разрушение головного мозга	92,1	57,0	21,2	0,8
(6) Оболочечные кровоизлияния	6,1	11,9	8,0	1,5

Key: (1). Reason for death. (2). Place for death. (3). Field of combat. (4). Army therapeutic installations. (5). Decomposition of brain. (6). Tunicary hemorrhages.

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The volume of the damages of brain in dead persons in therapeutic installations, as a rule, was decreased in proportion to removal from the field of combat. Nevertheless in those been killed in hospitals of front rear in a number of cases were detected the extensive damages of ventricles and the breaks of the basis of skull. The percentage of perforating bullet wounds was highest on the field of battle and it was decreased in the stages of evacuation, which indicated the particular severity of such wounds of skull and brain.

The specific gravity/weight of tunicary hemorrhages was sufficiently significant in dead persons in all stages of evacuation in the repartitions/conversions of army. The most frequent means of tunicary hemorrhages were massive subdural hematomas, which led wounded to death as a result of the compression of brain. In a number of cases the compression of brain was caused by small subdural hematomas, which were being arranged/located in posterior cranial pit. According to sectional data, subdural hematomas in a number of cases were not identified with life, and wounded with the phenomena of the compression of brain did not undergo surgical intervention. Not identified in the therapeutic installations of army and army rear subdural hematomas frequently led wounded to death on evacuation routes.

Experience of the Great Patriotic War it showed that death from the changes, connected with the direct activity of injury, always did not attack/advance in acute/sharp period of cursing of the injury of skull and brain. Sometimes, especially in the cases of death from the compression of brain by tunicary hemorrhages, wounded lived 7-8 days after wound and perished in the beginning of the period of early reactions and complications. Nevertheless in the overwhelming majority of the cases of death from the changes, connected with the

direct activity of injury, wounded died during the first three days after wound.

N. Infectious complication from the side of shells and substance of brain. Infectious complications greatly frequently were the reason for death of those wounded the skull. Their specific gravity/weight in the stages of evacuation was various (see Table 17). In dead persons on the field of battle infectious complications were not encountered; the specific value they acquired in the therapeutic installations of immediate rear. This was caused by the fact that during the first years of the Great Patriotic War on many DNE and in KhPPG of the first line those wounded the skull underwent surgical intervention and were held up in army area by more or less long period. In the hospitals of army and especially front rear infectious complications acquired the leading value among the pathological processes, which led to death of those wounded the skull and the head brain. In the hospitals of the deep rear infectious complications were the reason of death of the overwhelming majority of dead persons from the wounds of skull.

The infectious complications of the wounds of skull and brain were caused by pyogenic and anaerobic microflora. The specific gravity/weight of purulent and anaerobic infection in different stages of evacuation is represented in Table 19.

In all stages of evacuation in the overwhelming majority of those wounded the skull, the dead persons from infectious complications, was encountered purulent infection and it is very rare - anaerobic infection.

The cases of anaerobic infection with the wounds of skull and brain, which were being generally rarely encountered, were observed predominantly in army therapeutic installations. As a rule, anaerobic infection complicated only the penetrating wounds of skull and brain.

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The complication of the anaerobic infection of the wounds of the soft tissues of skull or nonpenetrating wounds of the bones of skull was encountered only in the single cases. The clinical diagnosis of anaerobic infection presented great difficulties for doctors. According to the data of the development of the maps/charts/cards of sections, the anaerobic infection of the wounds of skull was not identified in half the cases. The published during the Great Patriotic War observations of a number of the authors show that during the first years of war in some armies the anaerobic infection was not distinguished in an even greater percentage of the cases.

The manifestations of the purulent inflammation, which served as a reason for death of those wounded into skull, were diverse. The basic, most frequently encountered processes they were: primary purulent leptomeningitis, primary spilled purulent encephalitis and abscesses of brain. Considerably more rarely was encountered the primary periventricular purulent encephalitis (ependymitis).

Besides the abscess of brain, the specific value had some other forms/species of the restricted purulent inflammation - festering wound canal, festering subdural hematoma, etc. which, converting/transferring into the secondary diffuse purulent inflammation of shells and substance of brain, sometimes served as a reason of death of wounded.

Festering the forming scar, described during the Great Patriotic War by V. I. Smirnov, practically by prosectors' majority were not established/installed and, apparently it was treated as festering wound canal, purulent encephalitis or as the abscess of brain.

In connection with the fact that in the beginning of war some patalogoanatomists, detecting on autopsies purulent inflammation and substances, and the shells of brain, did not establish/install the

primary localization of the development of suppuration, will arise pathoanatomical diagnosis "purulent meningoencephalitis". The detailed study of the protocols of the autopsies of dead persons showed that in the majority of such cases was observed festering wound canal or purulent encephalitis, which was complicated by secondary purulent leptomeningitis.

The specific gravity/weight of the basic forms/species of the purulent inflammation of shells and substance of brain was various in the individual stages of evacuation (Table 20).

For army therapeutic installations the most characteristic form/species of the purulent inflammation, which develops with the wounds of skull and brain, it was primary purulent leptomeningitis, which acquired an even greater value in army and front line hospitals. Primary purulent leptomeningitis especially frequently complicated the wounds, which were being escorted/tracked by the breaks of the basis of the skulls, with which was created the supplementary source of infection - paranasal sinuses.

Table 19. Specific weights of the purulent and anaerobic infection of the wounds of brain (in percentages to a number of dead persons from the penetrating wounds of skull in each stage of evacuation).

(1) Характер инфекции	(2) Стадия эвакуации	(3) Подлежащие лечению учреждения	(4) Этапы лечения	
			ГВА	ГБФ
(5) Гнойная		20,0	60,8	93,7
(6) Анаэробная		0,9	4,3	1,9

Key: (1). Character/nature of infection. (2). Stage of evacuation. (3). Army therapeutic installations. (4). Rear therapeutic installations. (5). Purulent. (6). Anaerobic.

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In army KhPPG, besides purulent leptomeningitis, great value had spilled purulent encephalitis. This extremely heavy the process often was additionally complicated by secondary purulent leptomeningitis or secondary periventricular purulent encephalitis (ependymitis).

Spilled purulent encephalitis and purulent leptomeningitis always were not distinguished intravitaly. In the majority of such cases the severity of the condition of wounded was estimated by KA the result of the extensive decomposition of the substance of brain, in actuality not had place.

The abscesses of brain, which led to death of those wounded the skull, acquired definitely value already in army KhPPG. Considerably more frequent they were encountered in dead persons in the hospitals of front rear and played the decisive role among the reasons for death in the hospitals of the deep rear. By direct cause death with the abscesses of brain usually was the dissemination of purulent inflammation to the substance of brain, surrounding abscess, and to cerebral shells. In this case was developed secondary purulent leptomeningitis and secondary of that spilled or periventricular purulent encephalitis. The latter/last process sometimes appeared as a result of the adjustable on autopsy penetration of abscess into the area of ventricle. In other cases with the penetration of abscess into the ventricle of brain the fatal result attacked/advanced very rapidly and the phenomena of purulent ependymitis were not developed. In certain cases the fatal result was connected with secondary hemorrhage or secondary edema of brain, which complicated coursing of abscess.

According to the data of the development of the maps/charts/cards of sections, in the therapeutic installations of army and front rear the abscesses of the brain not recognized during life into 15.80/o of cases, and in the hospitals of the deep rear they on the average were not distinguished into 7.00/o of cases.

Table 20. The specific gravity/weight of the basic forms/species of the purulent inflammation of substance and shells of brain the dead persons have in the stages of evacuation from the penetrating wounds of skull and brain (in percentages to a number of penetrating wounds of skull in dead persons in each stage of evacuation).

(1) Вид гнойного воспаления	(2) Стад эвакуации	(3) Войско- вые лечеб- ные уч- реждения		(4) Тыловые лечеб- ные учреж- дения	
		ГБА	ГБФ	ГБА	ГБФ
(5) Первичный гнойный лептоменингит . . .		16,2	20,1	38,8	—
(6) Первичный гнойный энцефалит . . .		1,2	15,2	9,3	—
(7) Абсцесс мозга . . . . .		1,2	9,3	30,6	67,3

Key: (1). Form/species of purulent inflammation. (2). Stage of evacuation. (3). Army therapeutic installations. (4). Rear treatment installations. (5). Primary purulent leptomeningitis. (6). Primary purulent encephalitis. (7). Abscess of brain.

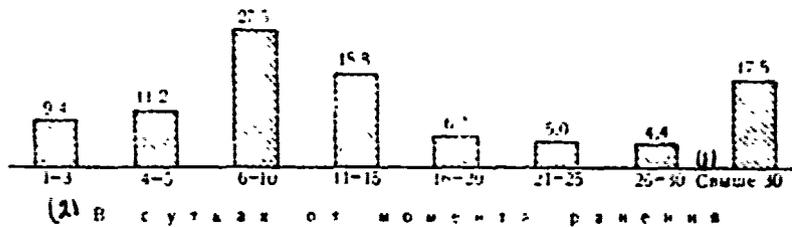


Fig. 46. Distribution of lethal outcomes from purulent leptomeningitis with the wounds of skull and brain according to periods from the moment of wound (in percentages).

Key: (1). It is more than. (2). A day from moment of wound.

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Erroneous clinical diagnosis with unrecognized abscesses of brain was usually caused by the presence of the secondary diffuse purulent inflammation of shells or substance of the brain, which complicated coursing of abscess. Most frequent clinical diagnoses in such cases they were: meningoencephalitis, meningitis, encephalitis.

Unrecognized abscesses of brain sometimes served as a reason for death of those wounded into skull, dead persons on evacuation routes from army ones into front line hospitals.

Scientific and practical value has study of periods of the offensive of death in the various forms of the infectious

complications of the wounds of skull and brain. The distribution of the periods, which passed from moment wounds to the offensive of lethal outcome, depended on the stages of the evacuation: in dead persons in the army and army therapeutic installations predominated earlier periods, and in front line and rear hospitals - the later periods of the offensive of death.

For the detailed study of the periods of the offensive of the fatal result with the basic forms/species of the infectious complications of the wounds of skull and brain was produced special analysis of sectional the material of therapeutic installations.

The overwhelming majority of lethal outcomes from purulent leptomeningitis died in the first 15 days after wound (Fig. 46), moreover most frequently the lethal outcome from purulent leptomeningitis attacked/advanced within the periods of 6-10 days from the moment of wound. Certain increase in the number of lethal outcomes from purulent leptomeningitis which was being observed within late periods (more than 30 days) after wound, was caused by the development of secondary purulent leptomeningitis.

The wounded, in whom was developed the irreversible purulent encephalitis, in the majority of the cases died into the first 20 days after wound (Fig. 47). Most frequently the lethal outcomes from

purulent encephalitis attacked/advanced 6-15 days after wound. An increase in the number of lethal outcomes after month after wound was connected with the development of secondary purulent encephalitis.

The periods of death from the abscesses of brain differed from those examined above. In the overwhelming majority of those wounded the skull, that was killed from the abscess of brain, lethal outcome attacked/advanced not earlier than the month from the moment of wound (Fig. 48). In the first 5 days after the wound of lethal outcomes from the abscesses of brain were not noted.

The overwhelming majority of lethal outcomes from the anaerobic infection of the wounds of skull and brain attacked/advanced during the first 10 days after wound (Fig. 49), the significant part of those wounded the skull perishing into the first 3 days after wound. The scarce lethal outcomes, which attacked/advanced in later periods, were, apparently they were caused by the relapses of anaerobic infection.



Fig. 47. Distribution of lethal outcomes from purulent encephalitis with the wounds of skull and brain according to periods from the moment of wound (in percentages).

Key: (1). It is more than. (2). A day from moment of wound.

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The distribution of all together undertaken cases of infectious complications according to the periods of the offensive of death shows that the small percentage of lethal outcomes from complications was observed in the acute/sharp period of coursing of the injury of skull and brain, in the period, for which generally infectious complications were not characteristic. In this period more frequent than other infectious complications they were encountered primary purulent leptomeningitis and anaerobic infection. The greatest unit of the lethal outcomes of infectious complications fell for the period of early reactions and complications (4-30 days from the moment of the wound; Fig. 50). The ordinary form/species of the

infectious complications, which were the reason for death in this period, was purulent leptomeningitis, purulent encephalitis and, less frequent, anaerobic infection. In subsequent periods of coursing of the injury of skull fell approximately third of all lethal outcomes from infectious complications. Their large part was related to the abscesses of the brain; the specific percentage were the secondary diffuse suppurations (encephalitis, leptomeningitis), which complicated festering wound canal, festering of hematoma, etc.

The given above data show that the infectious complications were the most frequent reason for death of those wounded the skull during the Great Patriotic War.

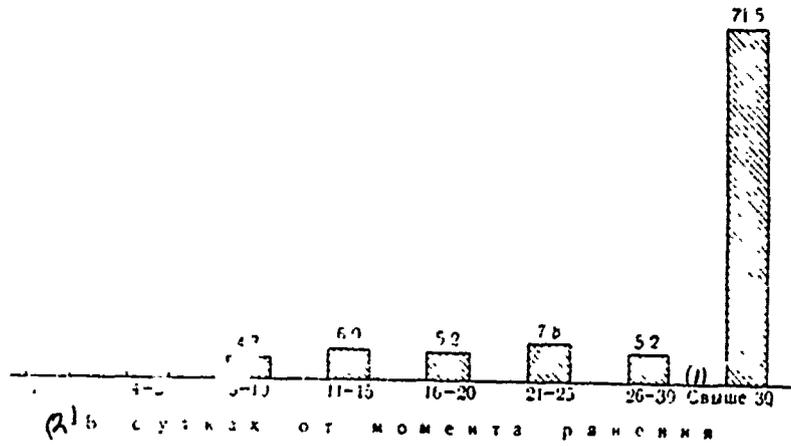


Fig. 48. Distribution of lethal outcomes from the abscesses of brain with the wounds of skull and brain according to periods from the moment of wound (in percentages).

Key: (1). It is more than. (2). A day from moment of wound.

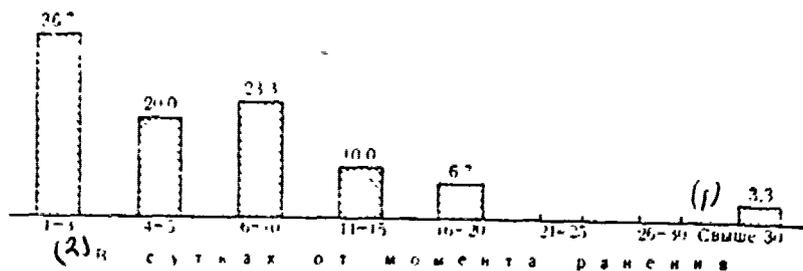


Fig. 49. Distribution of lethal outcomes from anaerobic infection with the wounds of skull and brain according to periods from the moment of wound (in percentages).

Key: (1). It is more than. (2). A day from moment of wound.

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Pneumonia in wounded. The specific place among the reasons for death of those wounded into skull occupied pneumonia, which was being observed in dead persons in all stages of evacuation. Pneumonia in those wounded into skull and head brain it was developed fairly often, but in the majority of the cases played the role only of the associated disease as the reason for death it was encountered comparatively rarely. Pneumonia, which served as a reason for death, sometimes was not distinguished with life, although it was usually bilateral and it was escorted/tracked by the massive damage/defeat of pulmonary tissue.

During the Great Patriotic War in different years, in individual combat process/operations, at different fronts were noted considerable deflections from the given numbers, which depended on many reasons; the main things of them were the conditions of combat and medical-tactical circumstances.



Fig. 50. Distribution of lethal outcomes in all forms of infectious complications with the wounds of skull and brain on periods from the moment of wound (in percentages).

Key: (1). It is more than. (2). A day from moment of wound.

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Chapter VII.

DISTANT RESULTS OF THE TREATMENT OF THE WOUNDS OF SKULL AND BRAIN.

The analysis of the direct results of the treatment of the wounds of skull, given in the preceding/previous volume, made it possible to come to light/detect/expose some laws governing the course of these wounds of the development with them of different complications and issues in the nearest after wound period. Observations of wounded in the stages of the medical evacuation gave the possibility to study in essence the first three periods of the course of the bullet injury of skull (initial, early and delimitations of infectious focus), since the average period of treatment was calculated by 2-3 months, and for the penetrating wounds by 3-5 months. The course of the bullet injury of skull in later periods - late complications and distant consequences - could be studied only during prolonged observation of wounded during many months and even years after their extraction from hospital.

The study of the distant results of the treatment of those wounded the skull has great value still and because only the prolonged observation makes it possible to most completely clarify the occurring in brain tissue processes from the point of view not only of their interconnection and conditionality, but also dynamics of these processes.

Therefore it is extremely important to trace further fate of wounded after their extraction from hospital to study the pattern of the flow of wounds in the later periods of the bullet injury of skull, to explain the possibility of the onset of one or the other complications, and to also evaluate the final issues of the wounds of the skull through several years after injury. For this purpose by that wounded into skull, that were being found under observation in all stages of evacuation, were sent letters with number of questions about their condition at present moment and with request to indicate what changes in the condition of health they were observed in them after extraction from hospital (S. P. Popov).

The study of the distant results of treatment was carried out in two groups of wounded - with those penetrating and nonpenetrating wounds of skull. The research of the distant results with the wound only of the soft tissues of skull had the smaller value, since the damage of the substance of brain with these wounds in the

overwhelming majority of the cases was insignificant.

The responses/answers of the majority of wounded were confirmed by medical conclusions. The collection of material it presented known difficulties, since in a considerable number of wounded during war changed address. However, because of the aid of village soviets, kolkhozes and rayon military commissariat, it was possible to establish/install communications about by very many wounded and to obtain from medical installations the completely reliable information about the condition of their health.

Of all obtained responses/answers were studied only 1507 most complete and reliable.

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Logically, arises question, is this quantity of responses/answers sufficient, in order by them to judge about the distant results of the treatment of all wounded with the penetrating and nonpenetrating wounds of the skull whose characteristics is given in the preceding/previous volume.

Analysis showed that the available data correctly represent the distant results of the treatment of an entire group of the observed

wounded both in the quantitative and in a qualitative respect.

The information about the character/nature of the wound of skull on the years of war on the basis of different sources is represented in Table 21.

The comparison of the data about a quantity of wounded, and also about the character/nature of wound and the wounding shell during different years of war, obtained during the development of material about the distant results of treatment, with the analogous data of the maps/charts/cards of the deepened characteristics also does not reveal/detect any disagreement and thereby confirms the authenticity of material.

Status of the health of wounded in a period of the distant consequences.

The study of the distant results of the treatment of those wounded the skull showed that after extraction from hospital the condition of their health does not remain constant. Always occur changes in the side both of the deterioration upon the appearance of one or the other intracranial complications and improvement upon the elimination of the consequences of wound and during favorable course of reduction processes in the area of wound. The status of the health

of that wounded into skull, as shows research will be to a certain degree stabilized only later several years after wound.

During observation of wounded with the nonpenetrating and penetrating wounds of skull for the duration of period up to 7 years after extraction from hospitals it was possible to explain that within this period remained in alive 97.60/o of wounded with the nonpenetrating wounds of skull and 93.40/o - with the penetrating wounds.

The general/common/total percentage of those remaining in alive wounded of both groups composes 95.8, including it is restricted of able-bodied ones in connection with the wound of skull - 55.9, and recovered (i.e. the wounded, in whom there are no complaints, connected with that transferred by wound) - 39.9 (Table 22).

Table 21. Distribution of those wounded the skull according to the years of war according to the data of different sources and the character/nature of wound (in percentages).

(1) Характер ра- вель: черепа	(2) Источники данных	(3) Год войны				(4) Всего
		(5) первая	(6) вторая	(7) третья	(8) ТМВ	
(9) Непроникаю- щие	(10) Данные разработки историй болезни . . . . .	16,0	22,6	28,2	33,2	100,0
	(11) Данные отдаленных резуль- татов лечения . . . . .	15,4	22,3	28,0	34,3	100,0
(12) Проникающие	(10) Данные разработки историй болезни . . . . .	11,5	23,3	29,0	36,2	100,0
	(11) Данные отдаленных резуль- татов лечения . . . . .	12,4	22,3	27,4	37,9	100,0

Key: (1). Character/nature of the wounds of skull. (2). Source of data. (3). Year of war. (4). In all. (5). The first. (6). The second. (7). The third. (8). The fourth. (9). Nonpenetrating. (10). data of development of histories of disease/sickness/illness/malady. (11). Data of distant results of treatment.

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As can be seen from Table 22, with the nonpenetrating wounds of skull the relative number of wounded whose condition can be described as recovery, three times exceeds a quantity of the recovered wounded with the penetrating wounds.

at the same time the percentage of wounded with the restricted ability to work with the nonpenetrating wounds of skull is almost two times less than with the penetrating wounds. In a considerable number of cases the disablement with nonpenetrating wounds was connected somewhat with the developing complications in the late and distant period of bullet injury, but also with the repeated wounds, obtained during the Great Patriotic War after extraction from hospital, and also with other diseases.

Lethality with the penetrating wounds although is small however almost it is triply more than lethality with the nonpenetrating wounds of skull, which is connected both with the heavier character/nature of injury and with the greater possibility of the development of intracranial purulent complications.

It should be noted that the given are above data being total during the period of the observation of duration of up to 7 years, do not represent the dynamics of reduction processes in the period of late complications and distant consequences of bullet injury skulls. In connection with this presents the known interest to trace separately the fate of the group of the wounded, acknowledged with extraction from hospital by those recovered and able-bodied ones, and the groups of wounded, acknowledged by disabled ones (Table 23 and 24).

Table 22. Changes in the status or the health of those wounded the skull for time after extraction from hospital (as of on June 1948 in percentages).

(2) Характер ранения черепа	(1) Отдаленные результаты	(3) Выздоровление	(4) Ограничение трудоспособности			(5) Летальность
			(6) всего	(7) в связи с ранением черепа	(8) по другим причинам	
(9) Непроникающие		56,9	40,7	28,0	12,7	2,4
(10) Проникающие		17,6	75,8	74,1	1,7	6,6
(11) Все ранения с повреждением костей черепа		39,9	55,9	48,0	7,9	4,2

Key: (1). Distant results. (2). Character/nature of wounds of skull. (3). Recovery. (4). Limitation of ability to work. (5). Lethality. (6). in all. (7). in connection with wound of skull. (8). on other reasons. (9). Nonpenetrating. (10). Penetrating. (11). All wounds with damage of bones of skull.

Table 23. Changes in the statuses of the health of those wounded the skull, acknowledged with extraction by those capable of work (for the time of observation to June 1948 in percentages).

(2) Характер ранения черепа	(1) Отдаленные результаты	(3) Выздоровление	(4) Ограничение			(5) Летальность	(6) Всего
			(7) в %	(8) в связи с ранением черепа	(9) по другим причинам		
(9) Непроникающие		67,2	21,7	21,0	10,7	2,1	100,0
(10) Проникающие		51,7	50,0	33,7	3,3	3,3	100,0
(11) Все ранения с повреждением костей черепа		63,0	35,2	25,4	9,5	2,8	100,0

Key: (1). Distant results. (2). Character/nature of wounds of skull.

(3). Recovery. (4). Deterioration. (5). Lethality. (6). In all. (7). in all. (8). in connection with wound of skull. (9). on other reasons. (10). Nonpenetrating. (11). Penetrating. (12). All wounds with damage of bones of skull.

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Attention is drawn to the fact that in the group of the wounded, acknowledged in hospitals by able-bodied ones, subsequently was observed deterioration in the health status with nonpenetrating wounds into 29.00/o, and with those penetrating - into 44.70/o of cases. Deterioration in the health status after the extraction of wounded from hospital was caused by the development of complications. In the unit of the cases of complication they were cured, and wounded got better. Thus, for instance, in the series/row of the wounded, in whom in connection with wound occurred these or other the deterioration in health status, subsequently came recovery with nonpenetrating wounds - into 1/3 cases, and with the penetrating wounds - into 1/10 cases. From these data it is evident that the complications, which arose in the distant periods, led with the penetrating wounds of skull to more stable changes in health status, since were connected with damage the substances of brain. If we consider the percentage of those recovered after complications, then the percentage of the wounded, in whom advanced stable deterioration,

it descends to 14.0 with nonpenetrating wounds and to 43.3 with the penetrating wounds of skull.

The analysis of the cases of deterioration in the condition of those wounded the skull shows that the period, within which was observed the deterioration, oscillates of up to 4-5 years; later than this period deterioration is observed considerably less frequent. At the same time into 2/3 all cases deterioration in the health attacked/advanced in the first 2-3 years after wound and only into 1/3 cases - within later periods.

On the basis of the medical conclusions, sent together with the responses/answers of wounded, it is possible to come to the conclusion/derivation that the deterioration was caused by two basic reasons: either development or relapse of the infectious process or by different processes in cerebral tissue, connected with cicatrization (violation cerebrospinal fluid and blood circulation, hydrocephalia, etc.).

Deterioration in the status of the health of wounded, not connected with the wound of the skull (noted into 10.7o/o with nonpenetrating wounds and into 5.3o/o with those penetrating), attacked/advanced most frequently as a result of the disease of internal organs/controls and repeated wounds of other areas of body.

By the latter is explained the greater percentage of deterioration precisely with the nonpenetrating wounds of skull.

The data about lethality in the group of wounded, acknowledged by the able-bodied, have great value not only for evaluation of the results of surgical treatment, but also for appraisal/review and establishment of prognosis in those wounded the skull.

In another group of wounded, acknowledged by disabled ones, the period of the distant consequences flowed/occurred/lasted somewhat otherwise (Table 24).

Table 24. Changes in the status of the health of those wounded the skull, acknowledged upon discharge as able-bodied in connection with the wound of skull (for the time of the observation until June 1948 in percentages).

(2) Характер раны или черепа	(1) Отдаленные результаты	(3) Выздо- вления	(4) Ограни- чение тру- доспо-соб- ности	(5) Леталь- ность	(6) Всего
(7) Непроницающие . . . . .		18,2	78,8	3,0	100,0
(8) Проникающие . . . . .		9,7	83,3	7,0	100,0
(9) Все ранения с повреждением ко- стей черепа . . . . .		12,0	82,1	5,9	100,0

Key: (1). Distant results. (2). Character/nature of wounds of skull. (3). Recovery. (4). Limitation of ability to work. (5). Lethality. (6). In all. (7). Nonpenetrating. (8). Penetrating. (9). All wounds with damage of bones of skull.

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The study of changes in the status of the health of the wounded, discharged with the restricted ability to work, shows that in the late and distant period of the injury of skull in the known percentage of the cases attacks/advances the recovery mainly due to the restoration/reduction of the lost after wound functions. As can be seen from Table 24, this improvement was noted with nonpenetrating wounds doubly as frequently than with those penetrating. Improvement in the condition of wounded, restoration/reduction of their ability

to work were observed mainly in time from 2 to 3 years and depended on character/nature and degree of reduction processes in the nerve tissue of the damaged area.

The comparison of lethality according to the data of the distant results of treatment shows that among wounded, acknowledged in hospitals by disabled ones i.e. in heavier group, the percentage of the lethal cases is higher than among wounded, acknowledged with extraction by able-bodied ones. This law is observed both with that penetrating and with nonpenetrating wounds.

In order to explain the reasons for changes in the status of the health of wounded in the distant period of the bullet injury of skull, should be subjected analysis the lethality of wounded in this period and the onset of the complications, connected with wound.

Lethality among wounded the skull according to data distant issues.

From a total quantity of the wounded, who were being located under observation of up to 7 years after wound, died 4.2c/o, of them in connection with the wound of skull - 1.60/c (Table 25).

As can be seen from Table 25, the percentage of dead persons with the nonpenetrating wounds of skull comprised 2.4, while with the

penetrating wounds - 6.6. Death from the reasons, not connected with the wound of skull, in the majority of the cases depended on the diseases of the internal organs/organs; were observed also lethal outcomes from accidents.

The lethality with the nonpenetrating wounds of skull, which depends on wound, composed 0.20/0. Death advanced during the periods up to 1-1 1/2 years from the moment of wound and was caused by purulent complications - abscesses of brain or meningoencephalites. These complications frequently attacked/advanced as result of the relapse of the suppurations, which occurred even in the period of the stay of wounded in hospitals.

About this tells the following observation.

Table 25. Lethality among those wounded the skull during the period of observation of up to 7 years from the moment of wound (in percentages).

(2) Характер ранений черепа	(1) Летальность	(3) Всего умерло	(4) В том числе		
			(5) в связи с ранением черепа	(6) от других причин	(7) причина смерти неиз- вестна
(8) Непроникающие . . . . .		2,4	0,2	1,3	0,9
(9) Проникающие . . . . .		6,6	3,4	1,9	1,3
(10) Все ранения с повреж- дением костей черепа		4,2	1,6	1,5	1,1

Key: (1). Lethality. (2). Character/nature of wounds of skull. (3). In all it died. (4). Among other things. (5). in connection with wound of skull. (6). from other reasons. (7). reason for death is unknown. (8). Nonpenetrating. (9). Penetrating. (10). All wounds with damage of bones of skull.

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D-v was wounded 23/IX 1942 into left sincipital-temporal area. Diagnosis: the tangential fragmentation nonpenetrating wound of left sincipital-temporal area. At the moment of wound was noted the short-term loss of consciousness. On DMP 12 hours after wound was produced the trepanation on the spot of bone defect with the autopsy of undamaged/uninjured solid cerebral shell and by the

distance/separation of subdural hematoma post-operation course was complicated by the protrusion of cerebral substance with the development of the meningoencephalitis. Subsequently was formed purulent fistula. Clinically in wounded was noted hemiplegia and total aphasia after 102 days after wound by patient was discharged from hospital in satisfactory condition. After 5 months after wound, 16/11 1943, it died of the abscess of brain with the phenomena of developing meningoencephalitis.

The analysis of lethality of nonpenetrating wounds of skull shows that death after the extraction of wounded from hospital was to known degree connected with the underestimation of the clinical picture of wound.

The lethality with the penetrating wounds of skull, which depends on wound, composed 3.40/c. Lethal outcomes attacked/advanced within different periods (of up to 5 years); however, the majority of them falls to the first two years after wound.

Lethal outcome in the majority of the cases was caused by purulent complications from the side of brain and its shells and only into 1/7 cases the reason for death was epileptic condition. Among the purulent complications, which caused lethal outcome, most frequently was encountered abscess of brain and meningoencephalitis.

The analysis of material showed that in half wounded, dead persons from purulent complications, they arose as far back as of the stay in hospital. In the remaining cases purulent complications developed for the first time in late period and in the period of distant consequences.

In the late period of bullet wounds of skull with the penetrating wounds death advanced into 0.50% of cases with the phenomena of the developing epileptic condition. The reason for death in these cases, apparently should be considered the education of extensive rough scar in the substance of brain, since in those obtained about these wounded information it is not contained indications of the development of suppuration.

In several dead persons in section was discovered hydrocephalia, that accompanied meningitis, which developed in late period after the wound of skull.

In the group of dead persons most frequently was observed the localization of wounds in frontal fraction/portion. It is possible that the insignificant neurologic symptomatology with localization of the process in this area did not place the possibility to in proper

time recognize the emergent purulent complications, and in connection with this treatment of these complications it was initiated with retardation. Thus, localization of wounds in the "silent" areas of brain must be considered during the determination of prognosis and need for further observation of such wounded.

The wounds of skull in the group of dead persons were not characterized by greater severity in comparison with wounds in those remaining alive. In the group of dead persons predominated blind-end wounds; however, from a total quantity of the wounded, discharged from hospital with the presence of foreign bodies in the substance of brain, died only 5.90/o, but 16.00/o of wounded this group are completely able-bodied and present no subjective complaints during observation of up to 7 years.

Prolonged observation of wounded, who obtained blind-end fragmentation wounds, shows that the lethality in the late period of bullet injury of skull is not connected directly with the presence of metallic foreign bodies in the substance of brain.

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Observation of wounded in hospital always did not give the possibility to predetermine the further course of the wound of skull.

Sometimes, even in the absence of the neurologic symptoms, which testify about the damage/defeat of nervous system, and smooth post-operation course in late period appeared the complications, which were concluding with lethal outcome.

In connection with this there is considerable interest in the analysis of lethality among wounded, acknowledged at the moment of the extractions from hospital by the able-bodied, i.e., the status of health of which did not suggest fears. The given below observations show, as is sometimes difficult prognosis in the similar cases.

1. S-n was wounded 14/XII 1943 diagnosis: penetrating fragmentation wound of right postcranial area. Upon being wounded he noted the short-term loss of consciousness.

Focus and general cerebral symptoms were absent. Through 2 days was produced the primary surgical processing of the wound of skull with intervention on the damaged sinus: it was removed cerebral detrite and bone scrap. Post-operation course is smooth. Patient with extraction it was recognizing able-bodied and it began the work. After 6-8 months advanced the deterioration, and in 1945 of patient it died with the phenomena of the meningocencephalitis.

2. T-v was wounded 29/VII 1943 by fragment into right

frontoparietal area. Diagnosis: blind-end fragmentation wound by the right frontoparietal of area. Consciousness it did not lose. Was noted light left-side hemiparesis. Roentgenologically was determined perforated break with the intracranial disposition of metallic and bone fragments. To the 5th day after wound was produced the trepanation of skull on the spot of bone defect with the distance/separation of bone fragments. Post-operation course is smooth. After 81 days of patient it was discharged without any limitations of ability to work. After wound in patient advanced the deterioration, OV was repeatedly hospitalized and operated apropos of the abscess of brain.

In the beginning of 1945 of patient it died with the phenomena of developed of the purulent or meningitis.

One should note, then not in all cases of death of the wounded, acknowledged in hospitals by able-bodied ones, the course of wounds was such smooth, that it did not give grounds to assume poor prognosis. In some wounded had rough organic symptoms or even developing complications of the wounds of skull and brain. These changes in the conditions of wounded within retention time of their in hospital were not properly evaluated with appraisal/review at the moment of extraction. As result of evaluation of the status of the health wounded as suitable ones for work without any limitations

could negatively pronounce subsequently on the distant results of the treatment of the wounds of skull. This confirm the given below examples.

1. S-v obtained 8/VIII 1941 blind-end fragmentation wound of left frontal area. After wound it lost consciousness. Focus symptoms it was not noted. Primary neuro-surgical processing is produced on the 3th day after wound in front line evacuation hospital. Was emptied subdural abscess, were removed bone fragments from the substance of brain. The postoperative course is smooth. After 30 days after process/operation the wound healed and wounded was acknowledged by that recovered. Subsequently the condition of wounded deteriorated, and it was repeatedly hospitalized. During March 1944, i.e., through 2 years ~~and~~ 7 months from the day of wound, it died of the abscess of brain.

2. M-vo was wounded 21/VIII 1942 diagnosis: penetrating wound of right postcranial area. were noted cerebellar symptoms, decrease in the view. Through 2 days was produced primary neuro-surgical processing - trepanation of skull on the spot of bone defect with intervention on venous sinus, dissection/separation of cerebral detritus and hematoma, and also bone and metallic fragments. In post-operation period were noted the complications - edge/boundary osteomyelitis and epidural abscess. In 5 months the wounded was discharged from

hospital and claimed to be recovered. After 4 months it felt itself badly/poorly, it was repeatedly hospitalized. During May 1943, i.e., 9 months after wound, he died of the meningoccephalitis.

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Thus, the study of lethality in late period of the bullet injury of skull makes it possible to make the conclusion that far not all wounded, who transferred purulent complications, can be acknowledged by completely able-bodied, without any limitations.

Considerable attention in light of ~~the~~ further course of wounds and warning/prevention of late complications deserve wounded, not subjected to surgical intervention.

O-n obtained 26/VI 1942 the penetrating blind-end fragmentation wound of left frontal area. With wound was noted the short-term loss of consciousness. Neurologic focus and general cerebral symptoms it was not observed. During x-ray examination is discovered perforated break with the intracranial disposition of bone and metallic fragments. The primary neuro-surgical processing of wound was not conducted. Complications within retention time in hospital it was not observed. After 69 days of patient it was discharged in satisfactory condition. During July 1944, i.e. 2 years after wound, it died of the

abscess of brain with the phenomena of the meningoencephalitis. Furthermore, in section it was discovered hydrocephalia.

The analysis of lethality, revealed during the study of the distant results of the treatment of those wounded into skull with the damage of bones, shows that with the penetrating wounds within late periods lethality, associated with skull wound is significantly higher than in nonpenetrating. The main reason for death - purulent complications, which became apparent both in the form of the repeated outbreaks of infection after complications in the period of the stay of wounded in hospitals and is primary within late periods.

The greatest lethality among those wounded the skull was observed during the periods up to 1-1 1/2 years after wound, i.e., in the period of the late complications of bullet injury, i.e. in period of later complications of bullet wound to skull.

With the penetrating wounds of skull to predetermine prognosis and moment of the extraction of wounded from hospital was extremely difficultly. This caused the need for medical observation above such wounded during 4-5 years after wound, and also the great care with the decision/solution of questions of appraisal/review.

Complications in those wounded the skull according to the data of the distant results of treatment.

Of great interest is the information about the complications, which arose in those wounded the skull after their extraction from hospital, in late period and in the period of the distant consequences of bullet the crams of skull. It is not-without-interest to also trace the fate of those wounded, in whom under conditions of hospital were observed these or cther the complications.

According to the data of the distant results of treatment, the most frequent complication, which appeared in the late periods of the bullet wound of skull was epilepsy, which was being observed in 10.00/o traumatic encephalopathology it was noted into 8.00/o of cases, purulent fistulas - into 3.10/o, mental disorders - into 1.60/o of cases.

Traumatic epilepsy. The most frequent complication of the wounds of skull, characteristic or later period, is traumatic epilepsy. Although the determination of a number of cases of traumatic epilepsy, that complicated the wound of skull, and seems simple however it is conjugated/combined with considerable difficulties.

During the determination of number of wounded with epileptic fits only on the basis of the obtained responses/answers, without the clinical examination/inspection of wounded, to traumatic epilepsy can be referred the fits of functional character/nature, at the same time the cases of effaced forms with the rarely repeating fits can be disregarded. If we moreover, take into consideration, that the epileptic fits can give the most varied clinical picture, beginning from hyster- epileptoid, epileptoid, epileptiform forms, fits of the type petit mal, night fits in the form of sleep-walking and ending with the frequent typical epileptic fits, changing in certain cases into status epilepticus, then the difficulty of the determination of the frequency of traumatic epilepsy becomes obvious.

Nevertheless the information about traumatic epilepsy, obtained during the study of the distant results of treatment, has great value, since give tentative representation about possibility onsets of this complication after the wound of skull.

During the quantitative definition of the complications of epilepsy were taken into consideration all wounded in whom were observed the fits both in the hospitals and after extraction of them. Recovery was considered stable in such a case, if fits were not

repeated more than 2 years (Table 26).

As it follows from Table 26, almost into 1/5 all cases of the penetrating wounds of skull appear epileptic fits. On by this Kh. I. Garkavi, who traced the distant issues in 1169 wounded with the penetrating wounds of skull, the frequency of traumatic epilepsy was equal to 26.20/o. Observations were conducted of wounded, who finished treatment in one of the neuro-surgical hospitals of deep rear during the periods up to 8 years from the moment of extraction from hospital.

The frequency of the onset of traumatic epilepsy with the penetrating wounds three times almost exceeds the frequency of this complication with the nonpenetrating wounds of skull. As far as staying power/persistency is concerned of epileptic fits, then between these two groups of wounds are retained the same relationships/ratios.

The reason for the most frequent onset of traumatic epilepsy with the penetrating wounds of skull with the more stable epileptic fits, which are observed during prolonged period, is the more extensive damage of the substance of brain with the subsequent education of massive rough scar.

The periods of the onset of traumatic epilepsy in those wounded into skull are represented in Table 27.

table 26. Frequency of the onset of traumatic epilepsy in those wounded into skull according to the data of the distant results of treatment (in percentages).

(2) Характер ранения черепа	(1) Эпилепсия	(4) Из них	
		(3) Всего раненых с эпилептическими приступами	(5) Эпилептические приступы прекратились
(7) Не проникающие . . . . .		6,8	3,0
(8) Проникающие . . . . .		19,4	5,1
(9) Ранения с повреждением костей черепа . . . . .		12,1	3,9

Key: (1). Epilepsy. (2). Character/nature of wounds of skull. (3). In all wounded with epileptic attacks. (4). On them. (5). epileptic fits ceased. (6). epileptic fits are. (7). Nonpenetrating. (8). Penetrating. (9). All wounds with damage of bones of skull.

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From Table 27 it follows that the epileptic fits in the overwhelming majority of the cases appeared in those wounded the skull after extraction from hospital. Most frequently they appeared during the periods up to one year from the day of wound, which was, apparently it is connected into some cases with the formation of scar, and in other cases it was the manifestation of the developing in area of motor zone different complications, so/such frequent in

these periods.

The nonpersistent epileptic fits which subsequently after expiration of the first year were not observed, appeared usually after the nonpenetrating wounds of skull during the periods up to one year, fits after the penetrating wounds appeared in time from 3 to 4 years and after this period ceased.

The appearance of stable traumatic epilepsy with the nonpenetrating wounds of skull was observed during the periods up to 3 years from the day of wound, and with the penetrating wounds - of up to 4 years (Table 28).

In the group of wounded, whose fits ceased, observation in the majority of the cases lasted prior to one year. In the small unit of the cases the duration of the period of observation was from 2 up to 4-5 years.

In the cases of stable traumatic epilepsy attacks were observed during the periods up to 7 years from day their appearances.

The given below data make it possible to come to the conclusion that the appearance of epileptic fits within late periods from the moment of wound prognostically is more unfavorable, how behaves the onset of stable traumatic epilepsy (Table 29).

Table 27. Periods of the onset of traumatic epilepsy in those wounded into skull (according to the data of the distant results and percentages).

(1) Характер осложнения: травматической болезни	(2) Характер ранения черепя	(3) время и срок возникновения эпилептических припадков от момента ранения						(8) Всего	
		(4) в период пробы на стационаре	(5) до (6) года	1-2 (6) года	2-3 (6) года	3-4 (6) года	4-5 (7) лет		5-7 (7) лет
(9) Эпилептические при- падки прекратились по истечении 1-3 лет после ра- нения	(10) Непроникаю- щие . . . . .	40,0	60,0	-	-	-	-	-	100,0
	(11) Проникающие	44,4	41,5	7,4	3,8	-	-	-	100,0
(12) Эпилептические при- падки не прекра- тились после 4 лет ранения (стойкие осложнения)	(10) Непроникаю- щие . . . . .	12,6	62,6	21,7	3,1	-	-	-	100,0
	(11) Проникающие	7,1	60,0	22,9	5,7	4,3	-	-	100,0
② Всего . . . . .	(10) Непроникаю- щие . . . . .	21,6	61,4	12,2	1,8	-	-	-	100,0
	(11) Проникающие	17,5	56,7	18,5	4,2	3,1	-	-	100,0

Key: (1). Character/nature of the complication of traumatic disease/sickness/illness/malady. (2). Character/nature of wound of skull. (3). Time and period of onset of epileptic fits from moment of wound. (4). in period of stay in hospitals. (5). on. (6). year. (7). years. (8). In all. (9). Epileptic fits ceased after expiration of 1-3 years after wound. (10). Nonpenetrating. (11). Penetrating. (12). Epileptic fits did not cease after 4 years of wound (stable complications).

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The appearance of epileptic fits of later than 4 years from the day of wound was not noted. However, for final conclusions both about the period of the onset of traumatic epilepsy and about the staying power/persistency of this complication is required, apparently more prolonged observation of those wounded the skull, since, according to published data the appearance of epileptic fits is possible in period of up to 10 years from the moment of injury.

The curtailment of epileptic fits in group with the nonpenetrating wounds of skull during prolonged observation was established/installed approximately/exemplarily into 50.00/o, and in the group of wounded with the penetrating wounds - approximately/exemplarily into 25.00/o of cases.

Epileptic fits bore, as a rule, generalized character/nature, without clear local symptomatology. Epileptiform attacks were observed into 4.30/o, fits of the type petit mal - into 2.20/o.

In the group of wounded with traumatic epilepsy most frequently the process was localized in sincipital area, in connection with which motor disorders they were observed in the great percentage of the cases.

Table 28. Duration of the observation of wounded with traumatic epilepsy (in percentages).

(1) Характер травматической эпилепсии	(2) Характер ранения черепной кости	(3) Срок наблюдения со дня появления припадков							(7) Всего
		(4) до 1 года (5)	1-2 года (5)	2-3 года (5)	3-4 года (5)	4-5 лет (6)	5-6 лет (6)	6-7 лет (6)	
(8) Эпилептические припадки пре- кратились	(9) Непроникающие	76,0	12,0	8,0	4,0	—	—	—	100,0
	(10) Проникающие	87,1	9,7	—	—	3,2	—	—	100,0
(11) Эпилептические припадки не прекращаются (стойкая осложненность)	(9) Непроникающие	—	3,1	25,0	28,1	31,3	9,4	3,1	100,0
	(10) Проникающие	1,4	8,6	12,9	34,3	20,0	21,4	1,4	100,0

Key: (1). Character/nature of traumatic epilepsy. (2). Character/nature of wounds of skull. (3). Period of observation from day of appearance of fits. (4). to. (5). year. (6). years. (7). In all. (8). Epileptic fits ceased. (9). Nonpenetrating. (10). Penetrating. (11). Epileptic fits do not cease (stable complications).

Table 29. Staying power/persistency of traumatic epilepsy depending on the period of its appearance after wound (in percentages).

(1) Срок возникновения эпилептических припадков со дня ранения	(2) Характер эпилепсии	(3) Характер эпилепсии	
		(4) стойкая стойкая травматическая эпилепсия	(5) стойкая стойкая травматическая эпилепсия
(4) до 1 год (7)	71,0	29,0	100,0
1-2 год (7)	30,5	69,5	100,0
2-3 год (7)	9,8	90,2	100,0
3-4 год (7)	—	100,0	100,0

Key: (1). Period of the onset of epileptic fits from the day of wound. (2). Character/nature of epilepsy. (3). nonpersistent epilepsy (epileptic fits ceased). (4). stable traumatic epilepsy. (5). In all. (6). to. (7). year.

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By nature the damages in the studied group of wounded were heavy; was noted great specific gravity/weight of segmental wounds, and also wounds of both hemispheres; however, the appearance of epileptic fits did not depend on the vastness of bone damages. Thus, for instance, with the nonpenetrating wounds of skull epilepsy fairly often appeared in the cases of damaging only external plate of skull. The frequency of the onset of traumatic epilepsy to greater degree was connected with the contusion of brain and gross changes in its tissue.

Very important is the fact that in wounded, who suffered

epilepsy, was noted the considerable predominance of purulent intracranial complications, in particular, the abscesses of brain.

It is necessary to also note that also with nonpenetrating wounds in the group of wounded with stable traumatic epilepsy the solid cerebral shell was revealed five times more frequently.

Comparative analysis of the groups of wounded, in which ceased the fits, and wounded with stable traumatic epilepsy shows that with the identical severity of wounds the full/total/complete curtailment of epileptic fits is more frequent occurred in the group of wounded with a considerably smaller quantity of purulent complications.

The analysis of material is shown also that the age of wounded did not have vital importance both in the onset of epileptic fits and in their elimination.

In the period of the observations after extraction from hospital, which were lasting of up to 7 years, to surgical intervention apropos of epilepsy, which was consisting in the carving of cerebral scar, it underwent by 4.80/o of wounded. Full/total/complete recovery was observed in 17.00/o of those operated. An insignificant quantity of surgical interventions apropos of epilepsy does not make it possible, however, to make any

conclusions about the effectiveness of surgical treatment.

Mental disorders. The character/nature of the mental disorders, which appear after wounds skull, and their clinical manifestations are in detail described in the general/common/total unit of the preceding/previous volume.

The onset of mental disorders with the nonpenetrating wounds of skull for elongation/extent or up to 7 years from the moment of the extraction of wounded from hospital is noted into 0.70/o of cases. The violations indicated developed in wounded with the rough damages of the substance of brain, about which testified noted almost in all cases focus symptoms - motor disorders, disorders of view, speech, etc. Should be noted the fact that in 1/3 wounded with the emergence in late period mental disorders on process/operation was produced the autopsy of the changed scia cerebral shell.

With the penetrating wounds of skull mental disorders in the period of the stay of wounded in hospital were observed into 1.10/o of cases. Further observation on this group of wounded for the length up to 7 of years showed that but one wounded at present moment no longer requires the permanent observation of psychiatrist. Attention is drawn to another fact: in 1/5 wounded in whom were observed any previously mental disorders, appeared epileptic fits.

The data about the distant results show that the mental disorders appeared also in the late period of the bullet injury of skull. Among the wounded whose psychics/psyche during treatment in hospitals did not change, in the first 3 years after extraction from hospital for the first time appeared mental disorders into 4.60/o of cases. Later the majority of wounded recovered; the insignificant disorders of psychics/psyche during observation of more than 3 years remained only in 1.0c/o of wounded.

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Traumatic encephalopathy. In particular group were isolated the patients, in whom in the late period of the wound of skull appeared the series/row of the subjective symptoms, leading to a decrease in the ability to work: persistent headaches, vertigoes, rapid enervation, weakening of memory, increased irritability, etc. For these patients, as a rule, lacked the rough local symptoms of the damage/defeat of central nervous system and to the foreground came forward the violations cerebrospinal fluid and blood circulation.

The liberation/excretion of this group of complications, which includes the clinical manifestations of the most varied pathological

processes, it is doubtless, conditionally. It is explained by the fact that the diagnosis "traumatic encephalopathy" received wide acceptance. The need of studying the distant results of treatment makes it necessary to use this, although somewhat diffuse, concept.

The frequency of traumatic encephalopathy with the nonpenetrating wounds of skull was equal to 7.00/o, and with the penetrating wounds - 8.90/o.

The analysis of the character/nature of the penetrating wounds of skull in this group of wounded indicates a somewhat greater specific gravity/weight of the wounds of sinuses, ventricles of brain, and also the greater quantity of cases with subdural hemorrhages.

The phenomena of traumatic encephalopathy were developed predominantly 1-2 years after wound.

The purulent fistulas, noted in the distant period, are also the collective concept, which includes the liberation/excretion of pus from wounds in connection with osteomyelitis or purulent pachymeningitis, and also with strictly the purulent fistulas of the soft tissues, supported most frequently by foreign body. To this collective concept it is necessary to resort in view of the specific

character of the collection of material during the study of the differential results of treatment, and also because the differential diagnosis of the nature of purulent fistulas even under conditions of the hospital not always light.

With the nonpenetrating wounds of skull purulent fistulas in period after extraction from hospital were observed in 2.7o/o of wounded. Stable recovery subsequently is noted in 0.9o/o of wounded. In 1/4 wounded purulent fistulas they were the consequence of osteomyelitic process. Most frequently the fistulas were observed on the spot of the wound of a frontal-orbital and temporal area.

With the penetrating wounds purulent fistulas appeared in period after the extraction of wounded from hospital into 3.4o/o of cases; their recovery advanced only into 0.7o/o.

In the group of wounded with purulent fistulas predominated the fragmentary, crushed breaks of the bones of skull, were sometimes produced several repeated process/operations on bones and soft tissues of skull. Evidently, the onset of purulent fistulas in the late period of the penetrating bullet wounds of skull was connected with expanse of damages with wound.

The purulent fistulas, which were being developed in wounded

during their determination in hospital, were observed with the nonpenetrating wounds of skull into 8.30/o of cases. In the overwhelming majority of the cases attacked/advanced stable recovery, and only into 0.20/o of cases in the late period of the wounds of skull were observed the purulent fistulas, caused by the relapse of the osteomyelitic process.

Purulent fistulas with the penetrating wounds of the skulls, which arose during the stay of wounded in hospitals, composed 13.80/o and in essence they were finally cured in military-therapeutic installations.

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The for a second time discovered fistulas in the wounded of this group were observed with the extensive wounds of the bones of skull and soft tissues with different complications in post-operation period, from which basic were arachnoiditis and protrusions of brain. Osteomyelitis, which were being observed in hospitals into 4.10/o of cases, subsequently were not renewed.

It is characteristic that both with penetrating and with

nonpenetrating wounds cured in hospitals purulent fistulas, as a rule, did not give relapses within the late periods of bullet injury the skulls.

In the period of the distant consequences were observed also the late abscesses of brain.

The progress of Soviet neurosurgery caused the wide application of a method of separating the abscesses of the brain with capsule, which is the best method of the treatment of these complications.

A great number of process/operations of separating the abscesses of brain with capsule, namely 197 produced V. D. Golovanov, after gathering to 1950 of the information about the distant results in 45 operated patients. In this case it turned out that the majority of them completely recovered.

Are given below 2 cases of the prolonged observation of patients, which produced the process/operation of separating the abscesses of brain with capsule (V. D. Golovanov, Moscow neuro-surgical hospital).

1. P-v of 19/I 1944 obtained fragmentation parasagittal penetrating wound of left sincipital area. To the 5th day there was

done the primary processing of the wound of skull and brain. 3 And 5 months after wound it was twice operated apropos of the unhealing purulent fistula. After the healing of wound it was acknowledged disabled. Movements in the paralyzed with the moment of wound right extremities began to be restored from the middle of 1944. During 2 years it felt itself satisfactorily, movements in extremities almost completely were restored/reduced.

During June 1946, i.e., within 2 1/2 years after wound, appeared the fits of Jackson epilepsy. It was hospitalized. At the end of September the condition of patient beginning progressively to deteriorate - grew hemiparesis, were increased headaches, were made more frequent fits. On encephalogram is discovered the compression of average/mean department and front/leading crescent of left lateral ventricle. With the puncture of brain is discovered the abscess of the left sincipital fraction/portion of brain. After the evacuation of pus the area of abscess was filled with contrast mass (Fig. 51).

5/X 1946 completely is removed the abscess of brain together with capsule. Size/dimension of the removed abscess 6x5x5 cm (Fig. 52). Post-operation period flowed/occurred/lasted without complications. During the subsequent 3 years 8 months of patient were found under permanent medical observation. General/common/total state is satisfactory. There is mildly expressed right-side hemiparesis.

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There are no headaches epileptic attacks they ceased. Is fulfilled home work (Fig. 53).

2. D-v 25/IV 1944 obtained blind-end fragmentation penetrating wound by right frontoparietal of area.

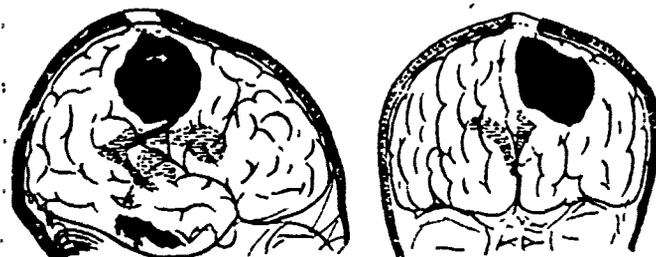


Fig. 51. Scheme encephalo- and abscessography. Compression of average/mean department and front/leading crescent of left lateral ventricle. Abscess is arranged/located in the left sincipital fraction/portion of brain parasagittal (it is filled with contrast substance).

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Prolonged loss of consciousness. To the 8th day after wound is produced the late primary processing of the wound of skull and brain. In post-operation period transferred the meningoencephalitis. During September 1944 it recovered and soon it began to work by agent on supply. It felt itself satisfactorily.

10/1 1946, i.e., through 1 year of 8 months after wound, suddenly appeared strong neadaches, vomiting, was increased the temperature, and patient was delivered in Moscow neuro-surgical hospital in heavy condition, with the phenomena of purulent

meningoencephalitis and ependymitis in connection with the penetration of abscess of brain into ventricular system. Was applied energetic sulfanilamide and penicillin therapy. The condition of patient was improved.

Encephalo- and abcessography it came to light/detected/exposed the compression of ventricular system by the large/coarse abscess of the right frontal- sincipital of the fraction/portion of brain (Fig. 54).

9/11 1946 completely is removed abscess of brain with capsule. Size/dimension of the removed abscess 10x7x6 cm (Fig. 55).

Post-operation period flowed/occurred/lasted without complications. Recovery. The distant results through 4 1/2 years: it feels itself healthy/sound (Fig. 56), he works by plasterer.

Determination of ability to work and subsequent job placement of those wounded a skull.

In light of the study of the distant results of the treatment of wounds and damages of skull and brain is drawn the importance of the determination of ability to work, what is final team in treatment and is determined in many respects further fate of wounded, since correct evaluation of ability to work to a considerable extent affects further status of the health of that wounded the skull.

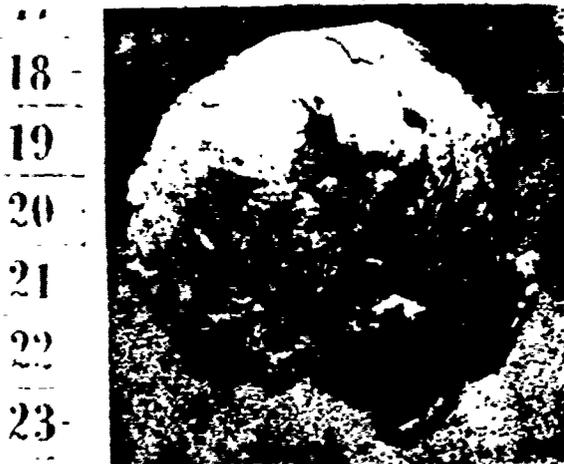


Fig. 52. Removed abscess of brain.



Fig. 53. Of sick P-v through 3 years 8 months after process/operation.

The decision/solution of these questions lays great responsibility on the doctor who must correctly estimate the severity of the damages of brain.

The experiment/experience of the Great Patriotic War showed that with evaluation of the severity of the damages, connected with the wound of skull, it is necessary to proceed not so much from the volume of the destruction of the bones of skull, as of the sizes/dimensions of the damage of the very substance of brain.

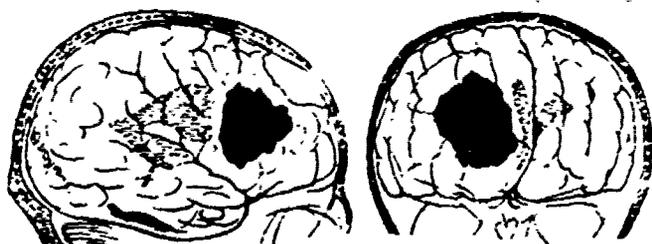


Fig. 54. Scheme encephalo- and abscessography. Displacement of ventricular system by the large/coarse abscess of right frontoparietal of the fraction/portion of brain.



Fig. 55. Removed abscess of brain.

The study of the distant results attests to the fact that only the size/dimension of trepanation defect cannot serve as criterion with evaluation of the status of the health of that wounded and skull.

The severity of wound and the condition of health of wounded are determined in essence by the volume of the damaged sector of cerebral tissue, by the transferred infectious complications and the violations of blood and fluid circulation in this or another means of wound - penetrating, nonpenetrating or wound of the soft tissues of skull. Correct evaluation of the volume of the damaged sector of cerebral tissue, localization of this damage and emergent in this case circulatory disorders is important not only from the point of view of functional fallouts. Doctor cannot be limited only to dynamic observation caused discontinuity of homogeneous series of observations of violations in motor sphere.

Correct judgment about the damage of brain is necessary for the purpose of the establishment of the prognosis of that or sometimes wound of skull, since the value of cerebral scar and the degree of its infection make it possible to judge about possible subsequently complications.

Thus, is most important evaluation of damage to cerebral tissue, developing infectious processes and subsequent after them circulatory disorders. It goes without saying that this evaluation is not always easy.

As strong points during the determination of the ability to work of those wounded into skull they must serve: the means of wound and the character/nature of wound canal, the volume of surgical intervention, the transferred complications and finally the presence of foreign bodies in brain tissue.

The experiment/experience of war showed that the careful analysis made it possible with expertise correctly to estimate not only the cases with rough neurologic symptomatology, but also the cases of the wounds of the skull where the heavy damages of the substance of brain in "silent" zones were not escorted/tracked by focus symptoms.

Medical conclusion about ability to work was based not only on the severity of the damage of brain, but also on estimate of the possibilities of the job placement of wounded taking into account his professional/occupational preparation/training.

The great value of medical appraisal/review consisted also of the fact that, controlling the correctness of treatment, it made it possible to in time signal about the individual had place errors and here to amend them. Thus, appraisal/review with the wounds of skull contributed to further improvement in the specialized neuro-surgical aid during war.

Final goals of the line-or-communication specialized treatment of those wounded the skull was the return of the larger possible number of wounded to active work. In connection with this are very important to trace the ability to work of those wounded the skull several years after wound.



Fig. 56. Sick D-v 1/2 years after process/operation.

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With evaluation of ability to work was accepted the objective criterion of determining the status of the health of that wounded in skull - the conclusion of a medical-labor appraisal/review.

Table 30 depicts the data about the ability to work of wounded in time from 3 to 7 years after wound.

Possibility to begin the work without any limitations had almost in 3/4 all wounded with nonpenetrating wounds and in 1/5 wounded with the penetrating wounds. Attention is drawn to the considerable

percentage of the invalids II and III (moderate/mild) group with the penetrating wounds of skull.

If we trace the dynamics of the ability to work of those wounded the skull in different periods after extraction, then it appears that 2-3 years after wound both with that penetrating and with nonpenetrating wounds a quantity of able-bodied ones without any limitations, i.e., quantity of the wounded, who do not consist on disablement, decreases. This descent in the ability to work can be set in communications with onset within these periods, as this was indicated above, intracranial complications (Table 31).

The data Table 31 testify that a change of the ability to work of those wounded into skull is subjected to sufficiently considerable oscillations/vibrations. If we trace the character/nature of these oscillations/vibrations, being based on the data about disablement, then will occur the following picture (Table 32).

Table 30. Work ability of wounded into skull (according to the data of the distant results of treatment in percentages).

(1) Трудоспособность (2) Характер ранения черепа	(3) Без ограничения трудоспособности	(4) Ограничение трудоспособности (инвалидность)			(5) Всего	
		(6) I группа	(6) II группа	(6) III группа		
(8) Непроникающие . . . . .	71,3	0,6	9,4	18,7	28,7	100,0
(9) Проникающие . . . . .	19,0	3,8	38,5	38,7	81,0	100,0
(10) Все ранения с повреждением костей черепа . . .	45,1	2,1	23,5	29,3	54,9	100,0

Key: (1). Ability to work. (2). Character/nature of wounds of skull. (3). without limitation of ability to work. (4). Limitation of ability to work (disablement). (5). In all. (6). group. (7). altogether of groups. (8). Nonpenetrating. (9). Penetrating. (10). All wounds with damage of bones of skull.

Table 31. Change of the ability to work of those wounded into skull after extraction from hospital (quantity of able-bodied ones in percentages).

(1) Количество трудоспособных (2) Характер ранения черепа	(3) При выписке из госпитали	(4) Через 2-3 года наблюдения	(5) По данным на июнь 1949 г.
(6) Непроникающие . . . . .	76,9	65,1	71,3
(7) Проникающие . . . . .	20,6	12,9	19,0
(8) Все ранения в череп с повреждением костей	53,1	43,2	45,1

Key: (1). Quantity of able-bodied ones. (2). Character/nature of wounds of skull. (3). With extraction from hospital. (4). Through 2-3

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years of observation. (5). According to data on June 1929. (6).  
Nonpenetrating. (7). Penetrating. (8). All wounds into skull with  
damage of bones.

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Analysis Table 32 shows that among wounded with the penetrating wounds of skull is shift/shear toward the decrease heavier I and of II groups of disablement due to increase III, lighter group than the disablement.

The same law is observed also among wounded with the nonpenetrating wounds of the skull: invalids I and of II group it becomes less, and group with the smallest limitation of ability to work - III group of disablement - numerically it grows/rises (table 33).

However, one should be specified that this shift/shear to the side of an improvement in the status of the health of those wounded the skull does not bear permanent character/nature. The detailed analysis of the dynamics of the groups of disablement shows that the march/passage of one group to another is accomplished not always on the ascending straight line, but it gives by pore known oscillations/vibrations with return into the initial, heavier group of disablement.

This is understandable. The infected scar in cerebral tissue does not remain in one condition. In it are continuously relieved degenerate and reduction processes, which clinically becomes apparent first by deterioration, then by an improvement in the status of the health of that wounded the skull. During unfavorable conditions and weakening of the resistivity of organism is possible the outbreak of the infectious process in the area of cerebral scar.

Especially unfavorable for that wounded the skull are neuropsychic factors. This is why the creation of the corresponding working conditions for those wounded the skull makes it possible not only to compensate to a certain degree the loss of ability to work, but also it is prophylaxis of the complications which can appear within late periods from the moment of the wound of skull.

Table 32. Change in the group of disablement among wounded with the penetrating wounds of skull (in percentages).

Нивелидность (1)	Изменение нивелидности (2)		По данным отдаленных результатов (4)	Сдвиг в процентах (5)
	При вы- писке из госпиталя (3)			
I группа (6)	8.2	3.8	-4.4	
II " " " " " "	53.5	38.5	-15.0	
III " " " " " "	17.3	38.7	+21.4	

Key: (1). Disablement. (2). Change in disablement. (3). With extraction from hospital. (4). According to data of distant results. (5). Shift/shear in percentages. (6). group.

Table 33. Change in the group of disablement among wounded with the nonpenetrating wounds of skull (in percentages).

Нивелидность (1)	Изменение нивелидности (2)		По данным отдаленных результатов (4)	Сдвиг в процентах (5)
	При вы- писке из госпиталя (3)			
I группа (6)	1.2	0.6	-0.6	
II " " " " " "	11.2	9.4	-1.8	
III " " " " " "	10.7	18.7	+8.0	

Key: (1). Disablement. (2). Change in disablement. (3). With

extraction from hospital. (4). According to data of distant results.  
(5). Shift/shear in percentages. (6). group.

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In our country where the work became the affair of honor, valors and heroisms, even restrictedly able-bodied person attempt to be useful for their native land; therefore the correct determination of routes/paths and possibilities of labor construction acquired exceptional value.

In the USSR is thoroughly developed and is carried out on wide scales the ordered system of the job placement of disabled war veterans. In passing by appraisal/review, wounded, if they are acknowledged capable of work, receive direction in the production where they are under permanent medical supervision. The regular reexaminations of those wounded the skull by the commissions of a medical-labor appraisal/review also help to in proper time change working conditions, if this requires the condition of their health.

Great role in the correct job placement of those wounded into skull plays the strategic formation of the artels into invalids' alliances. These organizations, which exist in our country, have available the powerful/thick medical net/system which makes it

possible to ensure the rational job placement of disabled war veterans and to carry out medical supervision during work.

The special features/peculiarities of some small productions made it possible to create in artels' series/row the special shops of one or the other medical type.

As the illustration of the job placement of those wounded the skull in the artels of disabled war veterans it is possible to give the following observations.

1. G-v was wounded 4/XI 1944 by fragment of shell into right frontoparietal area. Consciousness it lost by several minutes. Vomitings it was not. During the first day it is operated on DMP. During primary processing from the substance of brain is extracted the fragment with a weight of 35 g. post-operation period it flowed/occurred/lasted smoothly. Left-side hemiparesis, which appeared after wound, became less deep. In 4 months the wounded was discharged from hospital with the limitation of ability to work of I group. 2 Years after wound appeared convulsive fits of the type of Jacksonian epilepsy. However, after four fits epileptic attacks/seizures/paroxysms did not appear during 3 1/2 years.

With examination/inspection (March of 1950) in patient is

spastic left-side hemiparesis and considerable defect of bone in right sincipital area by the size/dimension 6x10 of cm. The area of defect will begin to fall, the pulsation of brain distinct. The particular complaints of patient it does not present, notes only the increased irritability. His former speciality - the joiner; at present - it invalid of II group, he works by sorter in the artel "Lenigrushka". The work it manages well (Fig. 57, to the left).

2. M-n was wounded 3/VII 1944 by bullet into frontal area (parasagittal wound). Consciousness it lost for 10 minutes. Nausea and vomiting it was not. Through two days in specialized KhPPG is produced surgical intervention. On process/operation is discovered the depressed break of bone and the damage of solid cerebral shell. Is removed subdural hematoma. Post-operation course is smooth. Focus fallouts it was not. 5 Months after wound it is discharged from hospital with the limitation of ability to work of II group. 2 Years after wound the general condition of wounded considerably was improved, and it was transferred into III group of disablement. With examination/inspection (March of 1950) there are no focus symptoms. In frontal area there is a subglucose trepanation defect of bone by the size/dimension 2x2 of cm. The pulsation of brain is good. Complaints of small headaches. He works by puncher in the artel "Lenigrushka". The work it manages well, fulfilling norm to 160o/o (Fig. 57, to the right).

The given above examples attest to the fact that the correct job placement makes it possible to create conditions even for those those wounded the skull, in which there are considerable functional fallouts.

It is necessary to note that the restoration/reduction of functions with the wounds of skull flows/occurs/lasts slowly. Best of all is restored motor and vocal function. So, according to A. N. Davydova's data, among 115 invalids of the Great Patriotic War with the consequences of the penetrating wounds of skull with the periods of observation of up to 3 years a quantity of plegias and paresis (in different combinations) decreased from 39.1 to 9.60/o, moreover only to 17.40/o were noted the light residual phercrena of muscular weakness in extremities.

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As an example of this full/total/complete restoration/reduction of motor function can serve the following observation.

T-v was wounded 2/IX 1942 by the fragment of mine into left temporoparietal area. During 3 days it was without consciousness.

Roentgenologically was determined the perforated break of left temporal bone and metallic fragment in the left temporal fraction/portion of brain. Neurologic were noted monoparesis of right upper extremity, motor aphasia. In the first twenty-four hours after the wound was performed in specialized KhPPG radical primary processing with the distance/separation of metallic and bone fragments. Post-operation course is smooth. 1 1/2 months after wound appeared small movements in right hand and began to be restored speech. Up to the moment of extraction from hospital, 8 months after wound, the speech completely was restored/reduced, there were residual phenomena of monoparesis. Gradually the volume of movements increased, grew muscular force. Since 1944 it is transferred into III group of disablement. Movements in right upper extremity fully, muscular force is sufficient. Is noted an insignificant increase in the periosteal and tendinous reflexes to the right. With examination/inspection (March of 1950) notes certain enervation, the noise in head. He works by puncher. Work requires the considerable physical load of right hand which after wound was paralyzed. It is one of the best workers, norm is fulfilled to 3600/o (Fig. 58).

From the given observation it is evident that the motor function after 7 years after the wound of skull was restored/reduced completely, and wounded performs by the paralyzed previously hand the basic working class movements with this profession.

Somewhat more badly are restored rumor and view. The study of distant results showed that, after arising with injury, these functional violations are retained comparatively stably. However, correct selection of profession, training in series/row the new work habits give possibility to those wounded the skull, in which there are stable fallouts of functions after wound, to perform feeds the complicated labor processes.

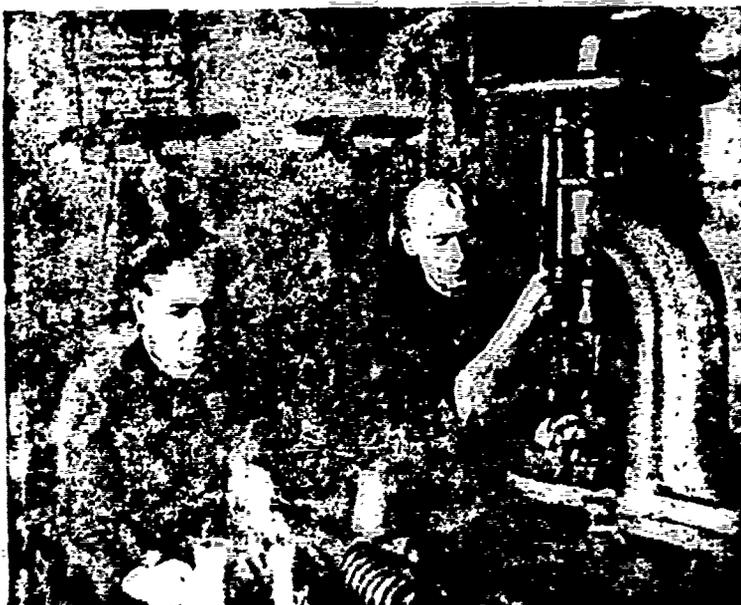


Fig. 57. Work of puncher (wounded G-v).

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9. Thus, the correct job placement of those wounded the skull compensates the functional defects, which arose after wound. The following observation can serve as an example of this rational job placement.

O-v on 10/VI 1944 obtained the closed injury of skull with the break of antitank mine. Consciousness was absent more than days. Was noted hemorrhage from ears and nose. Is roentgenologically established/installed crack of temporal bone to the right, that goes to the basis of skull. Neurologic were noted full/tctal/complete amaurosis, considerable decrease in the rumor, mainly to the right, and partial motor aphasia. Subsequently the course of injury was complicated by meningitis. It was treated by punctures and sulfanilamide preparations. In a year it is discharged from hospital. Up to moment the extractions of the phenomena of motor aphasia passed, the rumor to a considerable extent restored, but patient remained blind. With examination/inspection (March of 1950) the visual acuity of left eye is equal to the light-perception; invalid of I group. He works as packer in the artel "Ienigrushka"; norm is performed to 250-300o/c (Fig. 59).

The permanent concern of party/batch and government about the invalids of Great Patriotic War, medical supervision, realized by the periodic reexaminations of those wounded the skull with the restricted ability to work, and also medical observations of these wounded in production itself, and correct decision/solution of questions of the job placement of such wounded caused the considerable percentage of workers among those wounded the skull during the Great Patriotic War (Table 34).

Table 34. Job placement of those wounded the skull according to the data of the distant results (in percentages).

Характер рана- мья черепа (1)	Трудоустройство (2)	Не рабо- тает (3)	Работает (4)	Выполненная работа (5)		
				менее сложная (6)	более сложная (7)	более сложная (8)
Непроникающие (9)		7.2	92.8	7.0	11.4	21.4
Проникающие (10)		19.4	80.6	15.7	31.7	28.2
Все ранения с поврежде- нием костей черепа (11)		12.5	87.5	1.3	52.2	24.0

Key: (1). Character/nature of the wounds of skull. (2). Job placement. (3). It does not work. (4). It works. (5). Performed work. (6). less complicated. (7). Former. (8). more complicated. (9). Nonpenetrating. (10). Penetrating. (11). All wounds with damage of bones of skull.

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The obtained from wounded responses/answers make it possible to judge about the performed by them work. It is substantial that among wounded the skull with damage bones works by 87.50/o, the majority performing previous or even more complicated work. The unit of the wounded learns in higher educational institutions. All this testifies

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about good results of the specialized treatment of those wounded the skull and is the consequence of that vast attention, which the party/batch and government give to the invalids of patriotic war. This about them spoke V. M. Molotov at the conference of the Moscow City Council on 6 November, 1945,; "it is necessary that the concern about people which fought and they now return from army home, and also the concern about disabled war veterans was considered the as most important responsibility of Soviet and professional union, party and Komsomol organizations, and also kolkhozes and their organizations in village".

And precisely because the concern about the invalids of the Great Patriotic War in our country was raised to level of one of the most important state tasks, in execution by which, besides all state organs/controls, it took the hotter part and Soviet community, distant results of the treatment of those wounded into skull proved to be so/such favorable. It is necessary to emphasize that the great role in the establishment of the understanding of the essence of the processes of reduction of functions during the damage of brain belongs to Russian physiologists.



Fig. 59. Work of packer (wounded O-v).

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Being based on I. P. Pavlov's exercise, Soviet scientists subjected to analysis the great material of the Great Patriotic War, relating to the problem of the restoration/reduction of the functions of brain after bullet wounds. Although the nature of the restoration/reduction of functions after the decomposition of cerebral tissue, until now, is not completely yet explained however have already been drawn the basic ways of resolution of this problem.

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Most important of them - the route/path of the deep rebuilding when the restored function begins to be realized with the aid of the remaining undamaged/uninjured sectors of brain.

Restoration/reduction of the lost functions after the injury of skull to occur because of the high plasticity of the brain of man, and also in connection with the functional ambiguity of the cerebral cortex.

These data of Soviet physiologists are further development of I. P. Pavlov's exercise and they make it possible, in particular, to understand the remarkable cases of restoring the motor function and the speeches, which were being observed with the bullet wounds of brain.

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#### CONCLUSION.

The immense experience, accumulated by Soviet medicine in the Great Patriotic War on the study of wounds and damages of skull, was in detail dismantled/selected in the preceding/previous chapters. This experiment/experience makes it possible at present better to understand entire pathology of bullet wounds and damages of skull, it makes it necessary to in a new way reexamine the value of different methods of their treatment and to manufacture the most rational forms of an organizational-therapeutic provision of those wounded the skull. This experiment/experience plans the routes/paths on which must go further progress of rendering aid to this group of wounded.

Special features/peculiarities of the pathology of the bullet wounds of skull and brain during the Great Patriotic War.

Observations during the Great Patriotic War showed that in soldiers, who fell on the field of battle, the wounds of skull comprise 30.90/o and are encountered considerably more frequently than the wound of breast, stomach and extremities. In the overwhelming majority of these wounds (92.10/c) were observed such

damages and decomposition of brain, which inevitably had to lead to death.

Wounds into skull in remaining in alive ones and carried out from the field of combat wounded differed in terms of the great variety: from the light wounds of the soft tissues of head to the heavy damages of the substances of brain as a result of which the unit of the wounded perished in the nearest stages of evacuation.

The suppressing number of damages of skull during the Great Patriotic War was related to bullet wounds.

The study of the experiment/experience of the Great Patriotic War showed that among the bullet wounds of skull the bullet wounds composed altogether only 17.0%, and 82.7% were related to a number of fragmentation wounds.

Should be compared these data, based on the study of a great quantity of histories of disease/sickness/illness/malady, with the data, obtained during the study of the form/species of the wounding shell, which caused death on the field of battle. In the latter case the percentage of fragmentation wounds descends to 69.8-66.7, and bullet it grows/rises to 30.2 and even to 31.9.

The relationships/ratios indicated between fragmentation and bullet wounds are the averages, which characterize the wounds of skull during all year of the Great Patriotic War. In the individual periods of war in connection with the special features/peculiarities of tactical situation these relationships/ratios underwent considerable oscillations/vibrations. So, under conditions for close combat in great cities bullet wounds sharply predominated above fragmentation ones. Secondary magnification in the bullet wounds to 75.00/o was noted by V. L. Byalik in Breslau.

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Comparing the given data with the materials of the preceding/previous wars, it should be noted that in Russo-Japanese war (1902-1905) a quantity of the bullet wounds of skull was more than fragmentation ones, but in the first world war, on the contrary, a quantity of bullet ones was already considerably less than fragmentation wounds.

During the combat operations of the Soviet troops/forces against the Japanese in Khasan lake (1938) bullet wounds composed 37.40/o, fragmentation - 51.40/c and other - 11.20/o. During combat in Khalkhin-Gol (1939) the bullet wounds of skull were encountered into 17.70/o of cases, fragmentation - into 68.60/c, other - into 13.70/o.

In phase of combat with White Finns (1939-1940) bullet wounds were observed in 50.50/o of wounded, and fragmentation - in 49.50/o.

Thus, if we do not consider soldiers with White Finns, had series/row of specific special features/peculiarities and escorted/tracked by an especially great quantity of bullet wounds, then it is possible to say that in all wars, beginning with the first world, fragmentation wounds more and more greatly predominate above bullet wounds.

From the point of view of the consequences of the wounds of skull and brain it should be pointed out that the bullet wounds, among which predominated diametric and segmental wounds, prove to be most severe.

The fragmentation wounds, which present smaller danger from the point of view of the direct threat of the life of wounded, especially frequently cause infecticus complications and subsequent heavy course, giving a comparatively high percentage of disablement. The severity of fragmentation wounds was complicated even and by the fact that they were frequently set. Based on materials of the Great Patriotic War, such wounds of the skull and other organs/controls were encountered into 30.10/o of cases.

The having great basic and practical value subunit of the wounds of skull for three basic groups - the wound of soft tissues, the nonpenetrating wounds of bones and the penetrating wounds of skull and brain - did not find even at the beginning of the Great Patriotic War of repulsing in the official forms of account. In connection with this in report documents the wounds of skull continued to subdivide only into two groups: "with damage to bone" and "without damage to bone". As a result during the development of the materials of the Great Patriotic War it was necessary to thoroughly study a great quantity of histories of disease/sickness/illness/malady in order to give the correct subunit of the wounds of skull. In this case it turned out that the wounds of the soft tissues of skull composed 54.60/o, the nonpenetrating wounds of the bones of skull - 17.50/o, the penetrating wounds of skull and brain - 28.10/o.

The given basic classification of the wounds of skull makes it possible to judge about those pathological changes which causes in the integuments of skull and the substance of brain the wounding shell; it makes it possible to also foresee those complications which can arise with different groups of wounds. This classification orients in the necessary methods of the treatment of each group wounded and organizational measures for their medical support in different therapeutic installations.

It is necessary to indicate that, besides the given basic subunits, wound the skulls and brain during the Great Patriotic War were in even more detail classified both from the point of view of the mechanism of wound and direction of wound canal and in the relation to the roentgenologically established/installed details of the damage of skull and disposition of metallic and bone fragments. All these details of the classification of the wounds of the skulls, in detail given in the appropriate chapters of volume 4 of "Work", have very great value during the determination of the severity of the wound of skull and the necessary in each given case therapeutic measures.

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One should also indicate that within the time of the Great Patriotic War they underwent the most detailed study and those all pathoanatomical changes which occur in soft tissues, bones of skull, substance of brain and its shells as a result of wounds and different damages. These changes are thoroughly studied from the moment of injury to the full/total/complete healing of the wound of brain and encountered sometimes distant consequences of injury in the presence of the already formed scar. In spite of entire diversity of encountered in this case pathological processes, it proved to be possible to conditionally combine them into three basic groups: 1)

the changes, connected with the direct activity of injury, 2) jet changes in substance and shells of brain to injury even 3) the infectious processes, which complicated the course of injury.

It should be noted that three groups of the processes indicated in the known periods of the course of the bullet wound of brain, being combined, gave very complicated pathological pictures. Thus, for instance, with the nonpenetrating wounds of skull were encountered the deep contusion foci and the hemorrhages in the substance of brain against the background of which sometimes were developed infectious complications. With the penetrating wounds frequently it was possible to simultaneously observe the changes, connected with the direct activity of injury, and jet changes, and infectious complications. The changes, connected with the direct activity of injury, were observed with all wounds of skull. In a number of cases they were incompatible with life as a result of the extensive decomposition of brain and damages of its vital departments. Other changes, connected with the direct activity of injury, in the form of tunicary hemorrhages, traumatic edema and bloating of brain in many instances were removed by timely therapeutic measures.

The changes, connected with the direct activity of injury, in a number of cases led to death of those wounded the skull and the head

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brain. The value of the changes indicated among other reasons for death was dissimilar in dead persons from the wounds of skull in different therapeutic installations. In army area (DMP, KhPPG of the first line) the changes, connected with the direct activity of injury, were the reason of death of majority (75.50/o) of dead persons as a result of wounds of skull and brain. Smaller role they played in army KhPPG (32.20/o), considerably more rarely they were encountered in dead persons in front line hospitals (3.30/o) and in no way were observed in the hospitals of the deep rear.

Most important of the reasons for death of those wounded into skull, caused by the changes, connected with the direct activity of injury, were the decomposition of brain and tunical hemorrhages. The specific gravity/weight of these changes was sufficiently considerable in all therapeutic installations within the limits of army. So, the decomposition of brain was the reason for death in army therapeutic installations in 57.00/o, and in army KhPPG - in 21.10/o of all dead persons. This comparatively great specific gravity/weight of the cases of the decomposition of brain among dead persons in foremost therapeutic installations testifies about the rapid carrying out of wounded from the field of combat and their evacuation with P&P during the Great Patriotic war. In this case it should be noted that in army therapeutic installations it is not always possible to establish/install the volume of the damage of the substance of brain.

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This is confirmed by the fact that in the unit of the dead persons on evacuation routes from army area with autopsy was established/installed the considerable decomposition of brain, not recognized in DMP or in KhPPG of the first line.

Especially great value among the reasons for death of those wounded the skull and the head brain had the tunicary hemorrhages, which were being expressed predominantly in the form of subdural hematomas which were the reason for death of those wounded into skull and head brain in army area in 11.90/o, on GBA - in 8.00/o and on GBF - in 1.50/o of all dead persons. Subdural hematomas, which caused death, in the unit of the cases were not distinguished with life, especially in army therapeutic installations. The development of the maps/charts/cards of the sections of dead persons from tunicary hemorrhages showed that surgical intervention apropos of the compression of brain was conducted on DMP and in KhPPG of the first line only in 6.50/o, but in the army hospitals - in 19.00/o of wounded. Unrecognized tunicary hemorrhages, which were being reinforced during the transportation of wounded, were in a number of cases the reason for death on evacuation routes and composed 31.80/o

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of dead persons in route/path of army into army area and 41.6c/o of dead persons in route/path from army into front line area.

Reactive changes in substance and shells of brain to injury were observed during all damages of brain, with exception of the cases of instantaneous death of wounded. Most important of these changes they were: 1) the processes of the healing of wound defect in substance and shells of brain up to the education of scar, consisting of connective tissue and glia; 2) the jet phenomena, which appeared in distance from wound canal, which were being morphologically expressed in nonpurulent, apparently aseptic, inflammation of shells and substances of the brain; 3) focus and diffuse reactions to the presence of foreign bodies in brain tissue and its shells.

Infectious complications in all forms of wounds and damages of skull composed 17.00/o. In the overwhelming majority of the cases in this case was observed purulent infection, is considerably thinner/less frequent - anaerobic.

The manifestations of the purulent inflammation, which complicated the wounds of skull and brain, were diverse in the time of onset, morphology, localization and extent. It was observed both restricted, local festering and diffuse purulent inflammation. To the development of purulent inflammation frequently contributed

unremoved/uneliminated foreign bodies and hematomas. The basic forms/species of the restricted purulent inflammation they were: festering wound canal, festering the forming scar, abscesses of brain, restricted external purulent pachymeningitis and festering of the granuloma of foreign body.

Diffuse suppurations in substance and shells of brain, being terrible complication injuries of skull and brain, in a number of cases appeared without the preceding local festering and became apparent in the form of primary purulent leptomeningitis, primary spilled purulent encephalitis and, it is considerably thinner/less frequent, primary periventricular purulent encephalitis (ependymitis). In other cases diffuse purulent inflammation appeared from the focus of the local festering; in this case was observed secondary purulent leptomeningitis, the secondary spilled purulent encephalitis and secondary periventricular purulent encephalitis (ependymitis). Frequently in one and the same case were combined different forms/species of local festering and diffuse purulent inflammation.

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Infectious complications, as the changes, connected with the direct activity of injury, were one of the most important reasons for

death of those wounded the skull and the head brain. Their specific gravity/weight in different therapeutic installations was dissimilar. Infectious complications comparatively rarely (20.9o/o) were encountered in dead persons in army therapeutic installations, they gained importance (65.1o/o) in army KhPPG and played the decisive role in the hospitals of front (94.8o/o) and rear (96.6o/o).

The most important infectious complications, which frequently served as a reason for death of those wounded into skull and head brain, were primary purulent leptomeningitis, primary purulent encephalitis and abscesses of brain. The specific gravity/weight of these complications in those wounded the skull in therapeutic institutions was various. The cases of death from primary purulent leptomeningitis fairly often were observed in the therapeutic installations both of army and army, and front line area. Primary purulent encephalitis played considerable role in the therapeutic installations of army and front line area. For front line and especially for a service area most typical infectious complication were the abscesses of brain.

The study of the periods of death from different forms/species of infectious complications, which almost completely encompasses all periods of the course of the wounds of skull and brain, showed that the lethal outcomes from primary purulent leptomeningitis most

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frequently were noted into the first 15 days after wound, from primary purulent encephalitis - into the first 4-20 days after wound and from the abscesses of brain - after 30 days after wound. The study of the periods of death with all together undertaken infectious complications showed that the greatest unit of the lethal outcomes came not the period of early reactions and complications and approximately third - for later periods.

The given data about the most important pathological processes are the averages, obtained as a result of generalizing all experiment/experience of the Great Patriotic War. However, frequently in limits of one and the same stage of evacuation the specific gravity/weight of the groups of the pathological processes in question in substance and shells of brain oscillated in very wide boundaries, which depended on the local conditions of combat and medical-tactical circumstances. For example, infectious complications in army area of one of the fronts, according to V. L. Byalik's data, were encountered into 4.40/o, in other, according to G. M. Mnukhina's data, into 53.00/o, etc.

For different forms/species of the injury of skull are typical the specific pathological processes. so, with the closed injury more frequently are encountered the changes, connected with the direct activity of injury in the form of contusion fcci and tunicary

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hemorrhages. With the penetrating wounds of skull considerable role play infectious complications from the side of shells and substance of brain, with nonpenetrating wounds the specific value acquire the infectious complications, which appear in the bones of skull and on the external surface of solid cerebral shell and, etc.

With the injury of skull, besides the pathological processes, which appear in substance and shells of brain, the specific value have the changes, which appear in other organs/controls. Most important of them are pneumonia, fairly often which were being observed in those wounded the skull and aggravating the course of wounds and their issue. In connection with this successful struggle with pneumonia in those wounded the skull during the Great Patriotic War, together with the highly skilled neuro-surgical aid, considerably improved the issues of wounds and damages of skull and brain.

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Soviet scientific great merit during the Great Patriotic War was the fact that they in a new way threw light on numerous questions of the pathology of wounds and damages of skull and brain and created the clear and clear exercise about the observed with them pathological processes. On the experiment/experience of the Great

Patriotic War it was, furthermore, is for the first time given universal description of all changes, which were being observed during wounds and damages of skull and brain.

The experiment/experience of the Great Patriotic War will make it possible to also in detail study the course of the wounds of skull and brain. Different periods of the course of these wounds, up to their full/total/complete healing and development of the distant consequences, found within the time of war their reflection in the series/row of the original classifications which underwent detailed discussion and they were joined under MA of VII session of neuro-surgical advice/council in the uniform classification, accepted during the composition of this section.

According to this classification, all the course of the injury of skull and brain conditionally is shared into the following periods.

The first - initial, or is acute/sharp, period which envelops the first 3 days after injury and is characterized by the changes, connected with the direct activity of injury and the incipient reactive changes in the area of damage. In this initial period of wound great value had a condition of the soldier before wound, depending on character/nature and tension of combat, the conditions

of climate and locality, duration of the stay under conditions of combat circumstances, etc. There is no doubt that the sharp overvoltage of the nerve of systems had its effect on the general condition of wounded and to further course wound.

It should also be noted that in the initial period of the wound of brain occurred different pathological processes in internal organs/controls, which were being developed as a result of the violation of the character/nature of the controlling effect of traumatized synthesis analyzers of the cerebral cortex. In the small percentage of the cases in this period were observed infectious complications. Usually during this period wounded were situated undergoing medical treatment in army and army therapeutic installations; however, under the specified local conditions they were encountered also in front line hospitals. In Leningrad the front where the front line hospitals were arranged/located in immediate proximity to the field of combat, the first period of the course of injury frequently was observed in wounded located in therapeutic installations of GBF.

The second period - period of early reactions and complications (infection and discirculation), that follows after acute/sharp period and continuing approximately approximately one month, is characterized by further development of the infectious complications:

local festering, primary diffuse purulent inflammation and is considerably thinner/less frequent - anaerobic infection. During this period in the unit of the wounded were observed pneumonia, considerable oscillations/vibrations of blood pressure, change in the frequency of pulse and series/row of other disorders, which were the result of the effect of the damaged brain on internal organs/controls. This period usually was observed in wounded, located in therapeutic installations GBA and GBF.

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The third period - the period of the elimination of early complications and tendency toward the limitation of infectious focus - followed within the preceding/previous period and continued about 3-6 months after injury. It is characterized by the expressed phenomena of healing of wound defect, by limitation and elimination of the infectious processes, which arose in the preceding/previous period. The third period usually was observed in wounded, who were being located undergoing medical treatment in the front line treated installations or in the hospitals of the rear.

The fourth period (period of late complications) followed preceding/previous and it was involved/tightened in a number of cases of up to 2-3 years after injury. In this period usually concluded

formation of scar and occurred the full/total/complete elimination of infectious complications, but sometimes was observed the aggravation also of the infectious process with the education of the late abscesses of brain. In the late period of the course of injury the wounded in the majority of the cases were situated in rear hospitals; however, in certain cases when evacuation into the rear was impossible, as this was, for example, at Leningrad Front, the wounded in this period continued treatment, also, in the hospitals of front.

The fifth period - the period of the distant consequences, which envelops many years after injury, was characterized by the presence of the formed scar, which was sometimes proving to be the source of epilepsy or series/row of other symptoms from the side of brain (headache, vertigo, weakening of memory, decrease in hearing, vision, etc.), and also different diseases of internal organs/organs. These processes frequently were observed in rear hospitals, and in a number of cases was caused the need for repeated hospitalization of wounded.

The great number of bacteriological research of the wounds of skull and brain, produced within the time of the Great Patriotic War, again confirmed that expressed into 1894 by Russian surgeon P. S. Kochanovskiy position/situation, that any bullet wound of head was contaminated by microbes. At the same time these detailed bacteriological research during last of the war explained in all

details different means of the microbial contamination of the wounds of skull and brain and made it possible to trace their modifications within different periods after wound both during the normal course of wound and with different complications. Should be paid particular attention to the fact that the bacterial contamination of different layers of wound, beginning with the first day, subsequently progressively increased (Table 35).

Further bacteriological research established that during the normal course of wound a quantity of anaerobes and hemolytic streptococcus, sciling the wound of brain, is decreased with each ten-day period/decade after wound, whereas a number of nonhemolytic streptococci, intestinal and *Pseudomonas pyocyanea* grows.

Table 35. Microbial contamination of the individual layers of the wound of skull and brain within different periods after wound (in percentages) (according to S. V. Kryznancvskaya).

Срок после ранения (1)	Слой раны (2)		
	Кожа (3)	Кость (4)	Мозговой детрит (5)
1-е сутки (6)	96,9	74,3	60,9
2-3-и сутки (7)	99,0	70,1	68,4
4-6-е "	100,0	74,8	80,7
7-е " и позже (8)	100,0	87,3	86,0

Key: (1). Period after wound. (2). Layer of wound. (3). Skin. (4). Bone. (5). Cerebral detrite. (6). 1st day. (7). 2-3-and days. (8). and it is later.

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During the insufficient processing of the wound of brain pathogenic flora long is held up in the wound of brain, the putrefactive microorganisms beginning to be developed especially rapidly. Early evacuation frequently contributes to the dissemination of pathogenic microflora on shells and to the substance of brain.

It is necessary, however, to emphasize that the microbial contamination, which was being observed in all cases of the open

damages of skull, yet always does not lead to the development of the infectious process. The development of the latter with the penetrating wounds of skull and brain was observed only into 45.70/o of cases. The given observations attest to the fact that for the onset of the infectious process, besides bacterial contamination, enormous value have many other factors, somehow: the vastness of the damage of the substance of brain, its shells, bones of skull and soft tissues, period and procedure of the primary surgical processing of wound, period and character/nature of evacuation, character/nature of the subsequent neuro-surgical treatment and the general/common/total reactivity of organism.

However, in the military medical service of the Red Army for dealing with the bacterial contamination of the wounds of skull and for the purpose of prophylaxis of infectious complications from the first days of the Great Patriotic War widely were applied sulfanilamide preparations, which in combination with timely surgical processing proved to be highly efficient. Even more impressive results gave in this case use/application in the end of the war of antibiotics, first of all of penicillin.

The conducted investigations made it possible to select the most rational periods of the primary processing of the wounds of skull and the best method of the medical evacuation provision of the

corresponding group of wounded.

During the study of the pathology of the wounds of skull and brain during the Great Patriotic War considerable attention Soviet scientists gave to edema and sludging of brain, and also to disorders of the circulation of cerebro-spinal fluid. All these specific questions of the pathology of brain underwent not only further scientific development, but also widely they were considered in the practice of the treatment of the bullet wounds of brain. Within the time of the Great Patriotic War the use/application of the dehydrating substances composed the integral part of the therapeutic measures in all neuro-surgical separations/sections, beginning with foremost therapeutic installations. The use/application of an encephalography in the later periods of the course of brain wounds was widely used to account for the state of the liquor spaces and correct identification of the occurring in cerebral tissue processes.

To accounting and early identification of all varied pathological processes, which develop in brain after bullet wound, there was devoted within the time of Great Patriotic War the great number of research of the representatives of the series/row of adjacent clinical disciplines - neuropathologists, psychiatrists, ophthalmologists, otorhinolaryngologists, neuroroentgenologists and therapists. Generalization of the immense number of observations,

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made within the time of war, allowed, furthermore, anew to reexamine and to give new evaluation to the series/row of symptoms and syndromes, appearing with the wound of skull and brain, and to also manufacture the clearer ways of the correct identification of the developing in brain pathological processes. The interpretation of occurring in brain and in entire organism processes acquires particular illumination from the point of view of I. P. Pavlov's exercise about the leading role of the function of the cerebral cortex of brain. The great value of these all research for the selection of the most correct methods of treatment and most effective aid by wounded with the bullet damages/defeats of brain is subject to no doubt.

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Effect of primary surgical processing and subsequent treatment on the issues of the treatment of those wounded the skull.

Recognizing that any bullet wound of skull is bacterially contaminated, surgeons have already have long ago raised a question about its early operational treatment. To this position stood up Russian surgeons, as soon as at the end of the past century won acceptance the antiseptic and aseptic method of operation.

Active surgical methods the treatments of the bullet wounds of skull were adopted even from the time of Russo-Japanese war. Its further development this method obtained during the first world war. However, it should be noted that, although Russian surgeons' series/row during this war voiced and tried to carry out the completely correct principles of the treatment of the bullet wounds of skull, military surgeons adhered to extremely diverse views relative to periods and methods of processing the wounds of skull. It is necessary to indicate that no general/common/total principles and leading ideas in regard to this to the very end of the war it was manufactured, no uniform organizational system of treatment and evacuation of this group of wounded there existed.

The experiment/experience of the first world war advanced several principles, valuable for the subsequent development of the problem of the treatment of the bullet wounds of skull.

Here are related observations, that those wounded the skull after operational processing especially badly/poorly withstand the subsequent evacuation. In connection with this logically appeared the requirement, so that the operational processing of the wound of skull would be conducted under such conditions, when to wounded after it there can be provided prolonged subsequent treatment on the spot.

Here must be referred the observations, which confirm that the operational processing of the wounds of skull proved to be most effective and protected from the subsequent infectious complications when it was sufficient radical and at the same time sufficient delicate, completely considering special feature/peculiarity of the reactions of brain to injury and infection. So that it is better to be oriented in the disposition of bone and metallic fragments in the depth of cerebral wound, logically appeared thought about the preoperation X-ray analysis of skull, and to clearer account for the neurologic symptomatology of the occurring in the zone of brain pathological processes acknowledged by desirable the detailed neurologic research of that wounded into head brain.

In view of these requirements, which caused the most effective surgical processing of the bullet wounds of skull and brain, at the end of the first world war arose the thought about the need for concentrating those wounded in skull in the particular hospitals where would be created all necessary conditions for their surgical treatment.

At the same time, during the first world war Russian surgeon A. V. Britnev advanced the new principle of the treatment of the bullet wounds of skull - suturing of wound after operating processing tightly in order to shield the wound of brain from the secondary

bacterial contamination whose danger under conditions of line-of-communication treatment was exclusively great. Suturing of the wounds of skull after their operational processing tightly found during the first world war a known number of supporters among the surgeons of all countries and under conditions of positional warfare in many instances it proved to be very effective. It deserves reference, that the positive results of the imposition of the anechoic suture of skin with the wounds of skull forced some surgeons during the first world war to go in the relation to operationally processing the wounds of skull still further in the sense of its approximation/approach to the conditions of the neurosurgery of peacetime.

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Russian and foreign surgeons' series/row attempted to perform processing wounds skulls by great flap sections/cuts. some surgeons after processing of the wounds of skull not only sewed skin tightly, but also they produced, furthermore, even and the plastic occlusion of solid cerebral shell to bone wound. These individual attempts found, however, either supports or wide acknowledgements under conditions of military field surgery.

In contrast to this after first world war under conditions of

peacetime during the open damages of skull and brain processing the wounds of skull according to the principles of neurosurgery with subsequent suturing of wound tightly and sometimes even with the plastic occlusion of bone found universal acclaim and demonstrated its high effectiveness.

It is necessary to indicate that already after the beginning of the Second World War the chief/leading French neurosurgeons, being based on their experiment/experience of the first world war when those wounded in skull entered during 2-3 days from front into the rear hospitals where they concluded treatment, again came forward by the hot defenders of extensive neuro-surgical process/operations with bullet wounds skulls and brain. Process/operation this must consist, in their opinion, in wide flap osteoplastic trepanation and carving from the substance of the brain of all sector of the damaged tissues according to the type of the distance/separation of the neoplasm of brain and subsequently suturing of wound tightly. Only such a method of processing the wounds of brain could guarantee, in their opinion, wounded not only from all possible infectious complications, but also from the subsequent epileptic fits. These propositions of Martel and Vensan although were lustroously confirmed in series/row the operated by them in Parisian clinics wounded, they did not meet sympathy even in their compatriots, who noted that similar process/operations cannot be recommended for mass use/application under military field

conditions.

To indicate these bases of idea and direction of surgical tactics with respect to the operational processing of the wounds of skull is necessary, because they were related to the eve of the Great Patriotic War.

During the occurred to the Great Patriotic War military engagements of the Red Army with the Japanese (in lake Khasan and rivers Khalkhin-Gol) and especially during war with White Finns Soviet surgeons attempted to use the principles of the neurosurgery of peacetime indicated, also, during processing of the bullet wounds of skull and brain with suturing of them tightly. For this, it seemed, were known prerequisites/premises in the form of the approximation/approach of surgical aid to foremost line, great quantities of the surgeons and possibility of the early processing of the wounds of skull. However, in this case completely was not considered the great value of the necessary abandonment of such wounded on the spot of production in the process/operation. However, under conditions of the rapid evacuation of wounded the attempt to sew the wounds of skull was escorted/tracked by so considerable a quantity of severe infectious complications, that GVSU of the Red Army it was constrained forbid to sew wounds after their processing tightly.

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During the study of the experiment/experience of the Great Patriotic War the materials of the development of the maps/charts/cards of the deepened characteristics show that within the time of war with the penetrating wounds of skull surgical interventions were produced in 70.50/o of wounded, moreover to each wounded into 59.00/o of cases it came on one, into 10.00/o - on two and into 1.50/o - on three it is more than surgical interventions.

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With the nonpenetrating wounds of skull the operability was equal to 81.60/o, moreover during the first year of war it composed only 66.20/o, the secondly - 76.90/o, and into the third and the fourth it rose to 82.8 and 87.7c/o.

The operational processing of the wounds of the soft tissues of skull, which was being barely conducted in past wars, during the Great Patriotic War began to be applied by Soviet surgeons all on large and great scales, after achieving during the first year of war 21.00/o, the secondly - 23.60/o, into the third - 25.20/o and into the fourth - 30.20/o.

#### PRIMARY SURGICAL TREATMENT OF THE WOUNDS OF SKULL.

On an extremely important question about the permissible periods of the surgical processing of the wounds of skull Soviet neurosurgeons in the course of war arrived at the sufficiently specific conclusion that the bullet wounds of skull are subject to

surgical processing independent of the periods, past from the moment of wound. This conclusion/derivation not at all rejects, but, on the contrary, it completely confirms installation that the most favorable periods of the surgical processing of the wounds of skull are the 2nd and 3rd day from the moment of wound, with exception of the cases of the threatening life hemorrhages and increasing the intracranial pressure when process/operation should be performed immediately on the delivery/procuring of wounded on DMP. However, this conclusion is found necessary to enlarge the periods of surgical intervention on skull when was passed most favorable early periods processing, finding by completely permitted and advisable for these cases the so-called deferred processing - during 4-6 days and even later process/operations. It goes without saying that the necessary prerequisites/premises of such deferred and late processing of the wounds of skull must be the accounting of developing in these periods infectious process, the detailed accounting of the condition of wounded and the corresponding technique of operational processing.

The characteristic features of that manufactured by Soviet neurosurgeons within the time of the Great Patriotic War of processing technique the wounds of skull they were: its simplicity, small traumaticity and sufficient radicality. In the majority of the cases it provided the sufficiently careful cleaning/purification of all layers of wound and led usually to the smooth and comparatively

rapid healing of wound.

The typical processing of the wound of skull consisted in carving under the local anesthesia of soft tissues and trepanations on the spot of defect of bone before the appearance of the unchanged solid cerebral shell. The surface of the latter in the periphery of defect was cleaned from blood clots and bone fragments, from wound aperture carefully were extracted the scrap of bone, after which they emptied and cleaned wound canal in the depth of brain tissue. For this purpose were applied the methods of an artificial increase in the intracranial pressure (tussiculation, straining of wounded, etc.) and the cautious washing of wound canal with warm antiseptic solutions/openings. Particular attention was given to the distance/separation of all bone fragments which under the very cautious control of the tip of little finger extracted by delicate forceps or by spoon. Metallic foreign bodies were driven out only when they were easily attainable or they were located in risky neighborhood with the ventricles of brain or large/coarse tanks. Much attention during the primary processing of wounds skulls gave to the careful cessation of hemorrhage from the damaged vessels of brain and cerebral shells.

Wound after processing they slightly powdered by the powder of sulfanilamide or they moistened by sulfanilamide emulsion and was laid on it aseptic bandage. To insert in the depth of the wound of brain gauze turundae or any drainages was considered counter-indicative.

The typical processing technique of wound indicated sometimes was modified depending on the character/nature of wound; however, its fundamental foundations remained invariable/unchanged and consisted in the cautious carving of the wound of soft integuments, the easiest method of the trepanation of the damaged bones and especially in the sparing and careful cleaning/purification of the wound of solid cerebral shell and cerebral substance with the subsequent conduct of wound under long-term bandage.

In the cases of late periods after wound and sharp bacterial contamination of tissues it was necessary to be limited to processing only the wound of soft tissues and bone in order to create most favorable conditions for the outflow of pus from the depth of the wound of brain.

With the nonpenetrating wounds of skull with damage to bone after the carving of the wound of soft tissues was conducted forcep cutting or cleaning/purification by the acute/sharp spoon of the

damaged sectors of bone. Particular attention was necessary to turn in this case to the trepanation of bone during the isolated/insulated damage of one internal plate alone. Judging by the accumulated for the time of the Great Patriotic War experience, readings to the autopsy of undamaged/uninjured solid cerebral shell must be considerably narrowed and permitted only with the threatening the life of wounded the intracranial pressure increase.

With the wound of the soft integuments of skull, according to the experiment/experience of the Great Patriotic War, was manufactured the tactics on which only the surface tangential damages of one skin without the disagreement of the territories of wound did not require the surgical treatment, since they rapidly healed also without process/operation. All remaining wounds of soft tissues with the violation of the integrity of the aponeurosis and deeply lying parts must be for explaining the condition of the integrity of the bones of skull compulsorily subjected to surgical processing, with splitting up or carving of the territories of wound and careful cleaning/purification and examination/inspection of its bottom. During processing of the wounds of the soft tissues of skull particular attention turned to care of periosteum, moreover they tried to avoid the exposure of bone for considerable elongation/extent, which draws the threat of the development of subsequent osteomyelitis.

It is necessary to emphasize that during the Great Patriotic War during processing of the wounds of skull the Soviet neurosurgeons applied either flap sections/cuts or extensive craniotomies, having been advocated by some neurosurgeons in the West.

Particular discussion deserves the question about dressing of the processed wounds of skull tightly. As it was already shown above, in spite of the successes of this method, proposed in the first world war by Russian surgeon A. V. Eritnev, and despite the fact that in the traumatological practice of peacetime the anechcic suture of the processed wound of skull is the "method of selection", the leadership/manual of military medicine it entered the Great Patriotic War with the directive prohibition of stitching after the surgical processing of wounds, considering that for its use/application in military circumstances necessary is the series/row of completely particular conditions. Only after in Soviet medicine created was the ordered system of the specialized neuro-surgical aid that wounded the skull with their evacuation according to designation/purpose after processing the wounds of skull began to produce the qualified neurosurgeons under the condition of the prolonged post-operation hospitalization of wounded under the observation of the operated surgeon, were created the conditions, favorable for the imposition of

anechoic sutures on the surgical processed wound.

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In connection with this from second half war the method of dressing of the processed wounds again began to enter into the practice of therapeutic aid with the bullet wounds of skull with a strict, however, accounting of all contraindications to its use/application. Contraindications was the condition of wound - its considerable contamination with the explicit signs/criteria of infection, and also the late periods of the processing when the extensive dissemination of the infectious process makes impossible the radical cleaning/purification of wound with the distance/separation from it of all bone splinters, and finally medical-tactical circumstances, which does not allow/assume prolonged observation of wounded on the spot for process/operation.

The great value during the treatment of the bullet wounds of skull during the Great Patriotic War acquired the systematic use/application of sulfanilamide preparations both locally to the wound and inside, and also the introduction of the corresponding solutions/openings to cerebrospinal canal and carotid artery. In the end of the war the arsenal of antiseptics was enriched, as is known, by still this powerful/thick antibiotic substance as penicillin. All

these methods of efficient prophylaxis and therapy of so terrible a complication of the bullet wounds of skull as the development with them of the infectious process, can be estimated as "new epoch" in the treatment of the bullet wounds of skull. It suffices to say that because of the use/application of the substances indicated the results of the treatment of such severe complications as meningitis, encephalitis and abscess of brain, they proved to be more effective than in previous wars.

The following valuable contribution to the treatment of the bullet wounds of skull during the great Patriotic war was the systematic and skillful use/application of dehydrating solutions which they widely used in all neuro-surgical separations/sections for dealing with this risky complication of these wounds as an excessive the intracranial pressure increase.

Finally, one should particularly emphasize that with development in the course of of the war of the ordered system of the specialized aid wounded the skull in all neuro-surgical separations/sections took root a strict observance it guided to maintain/withstand all wounded, operated apropos penetrating wounds of skull, not less than 3 weeks on cot. This system ended the so/such extended in previous wars premature evacuations of those wounded the brain, their caused rapid deterioration conditions, and it is, it is doubtless, the great

achievement of Soviet military medicine in a matter of therapeutic aid by that wounded the skull.

Within the time of the Great Patriotic War on the great material of the penetrating wounds of skull (2617 cases), that were being observed in the rear specialized hospital in Gor'kiy, was in detail studied a question about the periods of the primary treatment of the wounds of skull, moreover it proved to be (Table 36) <sup>1</sup>, that a great quantity of wounded (44.30/o) was subjected to this treatment during the first 3 days after wound, the deferred treatment in time from 3 to 6 days was produced in 18.20/o, and within later periods in 27.60/o of cases.

FOOTNOTE <sup>1</sup>. In this and some subsequent tables are given the materials of the rear specialized hospital in Gor'kiy, taken from Kh. I. Garkavi's work "Craniocerebral wounds", the awarded at All-Union competition on the study of experience Soviet medicines in Great Patriotic War 1941-1945. ENDFOOTNOTE.

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For judgment about the most advisable periods of the treatment of the bullet wounds of skull and brain it is necessary to compare different periods of this treatment with the two most important

factors, which lay their impression on further fate of wounded - by lethality and by development of the subsequent infectious complications.

Comparing based on materials of the Great Patriotic War the periods of the operational treatment of the wounds of skull and lethality among wounded, it is necessary to be stopped at Fig. 62.

The given above data indicate, in the first place, to the paradoxical, it would seem, fact that treatment of the wounds of skull in the first 24 hours gives the greater percentage of lethal outcomes. Such results stand in doubtless communications with that fact that those wounded the skull in the first twenty-four hours after wound in view of the severity of their condition frequently were operated on DMP; furthermore, these wounded after the recently transferred transportation were particularly sensitive to stimulations and they heavily transferred each additional, connected with process/operation, injury.

Table 36. Periods of perfecting the drooping wounds of skull (in percentages to those operated).

(1) Характер раны	До 12 часов (2)	От 12 по 24 часов (3)	От 1 по 3 суток (4)	От 3 по 6 суток (5)	От 6 по 10 суток (6)	От 10 по 15 суток (7)	От 15 по 30 суток (8)	До и больше 30 суток (9)	Срок не выявлен (10)	Обработка не проводилась (11)
(8) Проникающие раны черепа	4,0	15,7	24,6	18,2	11,2	6,5	4,9	5,0	1,9	3,0

Key: (1). Character/nature of wound. (2). To 12 hours. (3). From 12 hours. (4). From 1 to 3 days. (5). 30 and more days. (6). Period is not revealed. (7). Treatment was not conducted. (8). Penetrating wounds of skull.

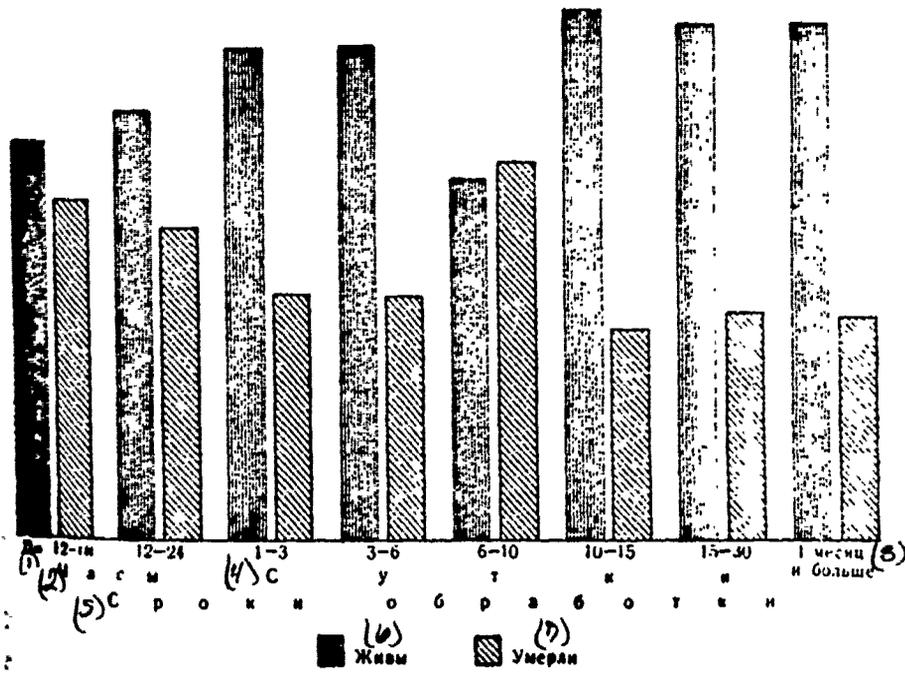


Fig. 62.

Fig. 62. Issues of treatment of bullet wounds of skull depending on periods of operational treatment of wounds (according to data of deepened development of histories of disease/sickness/illness/malady).

Key: (1). To 12. (2). hours. (3). month and more. (4). Days. (5). Periods of treatment. (6). They are alive. (7). They died.

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In connection with this as a result of accumulated within the time of war experience the neurosurgeons gave to those wounded the skull after their entry certain rest before beginning the operational treatment of wounds. Received, thus, gap/interval was utilized for conducting of the conservative over-all strengthening measures, the more careful neurologic and x-ray examination of wounded and his preparation for surgical intervention.

These data show further that treatment of the wounds of skull of later than 24 hours after wound gives the best results in the sense of the decrease of lethality, if it is conducted in time from 1 to 3 days and from 3 to 6 days, completely justifying, thus, the correctness of those accepted by Soviet neurosurgeons of the most rational periods of the early (1-3 days) and deferred (3-6 days)

treatments of the wounds of skull.

Treatment of the wounds of skull of later than 6 days gives, judging by diagram, the worst results, which is explained, doubtlessly, on one hand, by sharp development in these periods of the infectious process, which captures all layers of the wound of skull and brain, but on the other hand - decrease of traumatic edema of brain. From this point of view new paradox in the diagram indicated is a decrease in the lethality during the treatments of the wounds of skull in time 10-15 days after wound and it is later. The explanation to this is necessary to search for, it is doubtless, in the fact that late surgical interventions were conducted in rare cases from particular readings and treatment with them it was limited only to the creation of free outflow from the depth of cerebral canal by expanding of bone aperture and extraction of fragments from the wound of solid cerebral shell.

On the interrelation between the periods of the primary treatment of the wounds of skull and the development of the subsequent infectious complications in the form of meningitides, meningoencephalites and abscesses of brain sufficiently specific representation gives Table 37, comprised on the basis of the detailed radiation/emission of the results of the treatment of the penetrating wounds of skull on the material of rear hospital (g. Gor'kiy).

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One should be specified that the frequency of infectious complications, according to data of Table 37, proves to be considerably higher than according to the data of the maps/charts/cards of the deepened characteristics, since into rear hospitals in essence they guided wounded with complications.

During analysis Table 37, first of all, rushes into eyes the sufficiently high percentage of infectious complications with the early periods of the treatment of the wounds of skull in the first 12 hours after wound. It is necessary to emphasize that this high percentage of complications is found in full/total/complete contradiction with the results of processings of the wounds of skull in peacetime when treatment of wounds in the first 12 hours gives the best results.

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Table 37. The specific gravity/weight of infectious complications with the penetrating wounds of skull within different periods of the treatment of wounds (in percentages).

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1942	1943	1944	1945	1946	1947	1948	1949	1950
49.0	39.5	37.9	44.4	53.1	59.1	55.5	71.1	

Key: (1). Period of treatment. (2). From 12 hours. (3). From 12 to 24 hours. (4). From 1 to 3 days. (5). 30 days and more. (6). Infectious complications.

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It is completely obvious that the high percentage of complications indicated is explained by the circumstances of rendering aid in war.

The fact is that the condition of the nervous system of those wounded the skull in war and the victims in peaceful circumstances as a result of production and household damages of skull sharply is distinguished, since wound in war it usually precedes physical overwork, severe climatic conditions, improbable overvoltage of the nervous system and of frequently sleepless nights.

All this, it is doubtless, is laid extremely unfavorable impression on the effectiveness of therapeutic measures in the army area which cannot be insufficiently considered.

It is further necessary to bear in mind, that the treatment of the wounds of skull in the first 12 hours after wound was conducted usually in the army area where there are no necessary for this condition. There is no doubt of the fact that the insufficiently radical distance/separation of bone fragments, in connection with the absence of X-ray apparatus, especially the early evacuation of those operated, was in these cases the reason for the great percentage of infectious complications.

Early treatments during the first 3 days and deferred to 6 days distances, judging by Table 37, a smaller quantity of infectious complications. Later treatments, after 6 days, was escorted/tracked by the progressive increase in the infectious complications.

As further illustration of the effect of the periods of the operational treatment of the wounds of skull on development of one of the most severe infectious complications - abscess of brain, with the reservation to the specific character of the artificial selection of

wounded in the rear, can be given Table 38.

Finally, it should be noted that during the analysis of the lethality of wounded with the penetrating wounds of skull in rear hospitals, depending on the periods of the primary treatment of their wound, are revealed/detected the laws, given in Tables 39.

Approximately analogous the penetrating wounds of the skull effect on the fate of wounded have the periods of treatment, also, with the nonpenetrating wounds of skull.

On the basis of the development of the maps/charts/cards of the deepened characteristics are obtained the following data given in Tables 40 and 41.

Table 38. The specific gravity/weight of the abscesses of brain in rear hospital in Gor'kiy depending on the periods of the treatment of the penetrating wounds of skull in foremost therapeutic installations (in percentages).

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Срок обработки	от 12 часов до 24 часов	от 12 до 24 часов	от 24 часов до 72 часов	от 3 до 6 суток	от 6 до 15 суток	от 15 до 30 суток	от 30 суток и более	всего
(4)	4,7	3,2	4,6	6,7	9,5	18,1	20,0	17,7

Key: (1). Period of treatment. (2). To 12 hours. (3). From 12 to 24 hours. (4). From 3 to 6 days. (5). 30 days and more. (6). Abscesses of brain.

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With penetrating and nonpenetrating wounds of skull most favorable results given processing not in the first 12-24 hours from the moment of wound, but within the periods of 1-3 days. These data, it would seem, are in conflict with the data of the results of the surgical treatment of the wounds of other areas where the best effect is obtained within the earliest periods of treatment.

This law with the wounds of skull is explained by that condition of wounded which is caused by the sharp overvoltage of the nervous system before wound, and by the acute/sharp braking processes in cerebral cortex, especially sharply pronounced in the first hours after injury.

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Thus, the comparison of all given data, obtained during analysis extensive materials the treatment of the wounds of skull for the time of the Great Patriotic War, makes it necessary to arrive at the conclusions/derivations that the manufactured by Soviet neurosurgeons periods of the surgical treatment of the wounds of skull and brain are completely substantiated.

Table 39. Lethality with the penetrating wounds of skull in rear hospitals depending on the periods of the primary treatment of wound (in percentages).

(1) Срок лечения	(2) до 12 часов	(3) до 24 часов	(4) от 1 до 3 суток	(5) от 3 до 6 суток	(6) от 6 до 10 суток	(7) от 10 до 15 суток	(8) от 15 до 30 суток
(5) Проникающие ранения черепа . . . . .	6,6	2,3	2,6	3,6	3,4	4,0	4,7

Key: (1). Period of treatment. (2). To 12 hours. (3). From 12 to 24 hours. (4). From 1 to 3 days. (5). Penetrating wounds of skull.

Table 40. The specific gravity/weight of infectious complications with the nonpenetrating wounds of skull depending on the periods of treatment (in percentages).

(1) Срок лечения	(2) до 24 часов	(3) от 1 до 3 суток	(4) от 3 до 6 суток	(5) от 6 до 10 суток	(6) Свыше 10 суток
(5) Непроникающие ранения черепа . . . . .	14,1	14,2	18,7	16,1	40,6

Key: (1). Period of treatment. (2). To 24 hours. (3). From 1 to 3 days. (4). It is more than 10 days. (5). Nonpenetrating wounds of skull.

Table 41. Dependence of the issues of the nonpenetrating wounds of skull on the periods of primary treatment (in percentages and to a

number of wounded on each period).

(1) Срок операции	(2) До суток	(3) От 1 до 3 суток	(3) От 3 до 6 суток	(3) От 6 до 10 суток	(4) Свыше 10 суток
(5) Выход среди оперированных					
(6) Выздоровление	60,8	71,2	69,1	68,7	67,7
(7) Временно потерявшие трудоспособность	26,3	24,9	28,2	28,5	31,8
(8) Прочие вопросы	3,9	3,9	2,7	2,8	2,5

Key: (1). Period of treatment. (2). Up to days. (3). From 1 to 3 days. (4). It is more than 10 days. (5). Issue among those operated. (6). It recovered. (7). It temporarily lost ability to work. (8). Other issues.

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As is shown by accumulated experience, in field conditions the treatment of the wounds of skull without particular to that readings in the first 12 hours after wound is not always advisable, whereas the best early periods of treatment are 12-24 hours; however deferred treatments during the first 3 days gives completely good results and can be acknowledged by completely advisable. What treatments are concerned late - to 6 days, then them on the basis of the given materials also should be recognized completely permitted and appropriate ones, if on any reasons are passed earlier periods.

Further course of the wounds of skull depends, besides the

periods of the primary treatment of wounds, from the quality of this treatment. In the relation to the surgical treatment of the wounds of skull the neurosurgeons even in the first world war required so that with the greatest delicacy in the relation to the damaged cerebral substance this treatment would be at the same time and most radical in the sense of the distance/separation of foreign bodies and all damaged tissues. The fact that it is not carried out during this treatment immediately, proved to be missed forever and irreparable - was such the principle of the operational treatment of the penetrating wounds of skull, established/installed in the preceding/previous wars.

For the purpose of the maximum conducting of this principle of an improvement in the quality of the primary treatment of the wounds of skull GVSU from the very beginning of the Great Patriotic War forbade to process the wounds of skull in army area and withstood this treatment into the specialized KhPPG of army so that the treatment of the wounds of skull, produced by the qualified neurosurgeons taking into account the x-ray examination of skull, could be and it is sufficient delicate, and it is sufficient radical.

The basic index of quality of the operational treatment of the wounds of skull is the completeness of distance/separation from the wound canal of the bone fragments, which are the main foci of the

development of the subsequent infectious complications, which lay great impression on all subsequent issues.

Latter/last position/situation very graphically illustrates Table 42, comprised based on materials of the development of the histories of disease/sickness/illness/malady.

As is shown to Table 42, lethality in the presence of unremoved/uneliminated foreign bodies was almost two times higher than with the removed bone fragments. Is explained this, on one hand, by greater severity in the first group of the very wound of brain, and on the other hand - by severe infectious complications, which appeared in connection with the abandonment of foreign bodies in brain.

Based on materials of rear hospitals, the distance/separation of bone fragments with the penetrating wounds of skull as follows is reflected in the frequency of the subsequent abscesses of brain in wounded (Table 43).

Table 42. Issues of the wounds of skull depending on the distance/separation of foreign bodies during the treatment of the wounds of skull and brain (in percentages).

(6) Удаление инородных тел	(1) Исход	(2) Трудо- способ- ны	(3) Нетрудо- способ- ны	(4) Умерло	(5) Прочие исходы
(7) Не производилось . . . . .		7,6	19,9	72,2	0,3
(8) Произведено вне полости черепа		24,5	42,2	33,3	—
(9) Произведено из полости черепа .		15,0	44,6	39,7	0,7

Key: (1). Issue. (2). They are able-bodied. (3). They are disabled. (4). It died. (5). Other issues. (6). Distance/separation of foreign bodies. (7). It was not conducted. (8). It is produced out of area of skull. (9). It is produced from area of skull.

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The given tables show quality value of the primary treatment of the wounds of skull for the subsequent issue of wounds. It is characteristic that the lethality from the abscesses of the brain in wounded, which completely removed bone fragments, proved to be 10 times less than with unremoved/uneliminated fragments.

Metallic foreign bodies in the area of skull do not have this great value in the origin of the foci of the infectious process as

the fragments of bones, and therefore their distance/separation, very desirable during treatment, it is not so/such necessary. The extraction of metallic foreign bodies is shown only when they are comparatively easily attainable in order to exclude the excessive traumatization of cerebral substance. Otherwise any too energetic manipulations in the area of the infected tissues of wound canal will unavoidably involve the aggravation of the infectious process and threat for the life of wounded. Study in this respect of a considerable quantity of penetrating wounds of skull (1962 operated cases) at Leningrad Front made it possible to come to light/detect/expose the following laws (B. A. Samotokin) (Table 44).

Table 44 indicates that the distance/separation of metallic foreign bodies from brain is generally advisable and that this distance/separation of metallic foreign bodies can be effective only with the simplest type of the wound canal when the wounding shell is located in the same fraction/portion of brain.

Table 43. Effect of the distance/separation of bone fragments during the primary treatment of the wounds of skull on the development of the abscesses of brain in rear hospitals (in percentages).

(1) Удаление костных осколков из мозга	(2) Абсцессы мозга
(3) Было произведено . . . . .	3,9
(4) Не произведено . . . . .	14,4

Key: (1). Distance/separation of bone fragments from brain. (2). Abscesses of brain. (3). It was produced. (4). It is not produced.

Table 44. Lethality depending on distance/separation during the primary treatment of metallic foreign bodies with the blind-end penetrating wounds of skull (in percentages).

(4) Характер слепых ганглиозных каналов в веществе мозга	(1) Летальность	(2) В случаях когда металл лический осколок был удален	(3) В случаях когда металл лический осколок не был удален
(5) Простой . . . . .		8,8	19,2
(6) Радиальный . . . . .		25,5	22,1
(7) Сегментарный . . . . .		30,0	24,4
(8) Диаметральный . . . . .		—	43,1
(9) Всего . . . . .		16,9	25,2

Key: (1). Lethality. (2). In cases when metallic fragment was removed. (3). In cases when metallic fragment was not removed. (4). Character/nature of blind wound canals in substance of brain. (5). Simple. (6). Radial. (7). Segmental. (8). Diametric. (9). In all.

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With the more complicated types of canal - radial and segmental, when foreign body is arranged/located in crescent-shaped extension or it passes through two fractions/portions of brain, causing the more extensive decomposition of cerebral substance, the distance/separation of metallic foreign bodies does not descend, but considerably increases lethality.

With the selection/analysis of a question about the quality of the primary treatment of the wounds of skull in the sense of the completeness of distance/separation from the wound canal of bone fragments deserves attention the comparison of the quality of this treatment with the periods of the treatment of the wounds of skull. Table 45 gives this comparison based on materials of rear hospital (Gor'kiy).

As is shown to Table 45, the best quality of the primary treatment of the wounds of skull with the most complete removal of bone fragments is related to period from 1 to 6 days. This, it is doubtless, it depends on the fact that the treatment within this period was conducted in specialized neuro-surgical KhPPG. The

progressive decrease of the volume of the surgical treatment of wound within the later periods depended on the considerable development by this time infectious process, which made it necessary to maximally limit manipulations in the field of wound and to be satisfied only by the creation of free outflow from wound canal.

Above has already been noted that during the Great Patriotic War the processed wounds of skull, as a rule, conducted under different bandages by the so-called open method, and only from second half war under appropriate conditions were adopted bandaging of wounds skulls tightly. In connection with this on entire material of the wounded the skull for war data about the use/application of a suture it is incommensurably less than about the so-called open conduct of the wounds of skull. Furthermore, these data are distinguished also by quality, since all heaviest damages of skull were treated openly, whereas for applying the suture were selected/taken only the most favorable cases. Only with these stipulations for the purpose of general/common/total alignment can be given the table of comparative results of the open treatment of wounds and bandaging of wound after processing (Table 46).

Table 46 makes it possible to draw only the one conclusion that under appropriate conditions of the specialized neuro-surgical aid and medical-tactical circumstances the bandaging of the tightly

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processed wounds of skull can present great advantages and be completely advisable. Table indicates also the advisability of using the method of primary-deferred suture.

Table 45. Completeness of the distance/separation of bone fragments from the wound of brain within different periods of primary treatment (in percentages to each group).

(6) (1) Срок обработки	(2) От 12 до 12 часов	(3) От 12 до 24 часов	(4) От 1 до 3 суток	(4) От 3 до 6 суток	(4) От 6 до 10 суток	(4) От 10 до 15 суток	(4) От 15 до 30 суток	(5) 30 суток и более
(7) Полное удаление костных осколков . . . . .	62,5	65,8	69,6	69,8	65,8	62,5	56,5	61,5

Key: (1). Period of treatment. (2). To 12 hours. (3). From 12 to 24 hours. (4). From 1 to 3 days. (5). 30 days and more. (6). Radicality of treatment. (7). Full/total/complete removal of bone fragments.

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Besides the use/application of an anechic suture for the defense of the processed cerebral wound from secondary microbial contamination and its traumatization with dressings, One should indicate the advisability of the widely applied at Leningrad Front long-term bandages and method of the cover of the protrusion of brain by cellophane plates. Both these of method, without possessing disadvantage of anechic suture, provide the great defense of the wound of brain, than the ordinary method of its post-operation conduct with periodic, frequent dressings. From the point of view

indicated deserves attention the table of comparative results of conducting the processed wounds of skull under long-term bandage or anechoic suture, comprised on the basis of the study of a considerable quantity of cases of the wounds of skull at Leningrad Front (B. A. Samotokin) (Table 47).

Especially important value acquires stitching after the treatment of wound with nonpenetrating wounds and wounds of soft tissues, since in these cases with the state of preservation of bone or solid cerebral shell the danger of development under the anechoic suture of the heavy infectious process in the substance of brain is immeasurably less, but rapid and full/total/complete recovery is more possibly.

However, also it is here necessary to observe all prerequisites/premises for bandaging of wound, namely the completeness of this treatment and further observation of wounded.

Under conditions of the Great Patriotic War, especially into its first years, bandaging of the processed wounds it was conducted in the very restricted quantity of cases.

Table 46. Ability to work up to the moment of the termination of treatment in hospital with the penetrating wounds of skull depending on the post-operation conduct of wound (in percentages).

(4) Послеоперационное ведение раны	(1) Трудоспособность	(2) Полная трудоспособность	(3) Временная нетрудоспособность и прочие исходы
(5) Так называемый открытый способ . . . . .		9,1	90,9
(6) Частично швы на кожу . . . . .		16,6	83,4
(7) Глухой шов на кожу . . . . .		23,5	76,5
(8) Первично-отсроченный шов на кожу . . . . .		36,4	63,6

Key: (1). Ability to work. (2). Full/total/complete ability to work. (3). Temporary/time disablement and other issues. (4). Post-operation conduct of wound. (5). So-called open method. (6). Partially sutures to skin. (7). Anechoic suture to skin. (8). Primary-deferred suture to skin.

Table 47. Complications and lethality during the treatment of the processed wounds of skull via long-term bandage and anechoic suture (in percentages to a number of those wounded the brain).

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(1) Способ лечения проникающих ран черепа и мозга	(2) Инфекционные осложнения	(3) Летальность
(4) Долгосрочная повязка . . . . .	35,9	16,6
(5) Глухой шов . . . . .	31,3	15,7

Key: (1). Method of the treatment of the penetrating wounds of skull and brain. (2). Infectious complications. (3). Lethality. (4). Long-term bandage. (5). Anechoic suture.

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Table 48 shows that different from/species the sutures were used with the wounds of the soft tissues of the skull of altogether only into 14.60/o of cases. Percentage this is necessary to consider it insufficient, even if one takes into account, which about 30.00/o of surface wounds of soft tissues (only skin) completely did not require the operational treatment and that during calculation for those remaining 70.00/o of wounds of soft tissues the percentage of the use/application of sutures grows/rises to 20.0-21.0.

Further, as indicate data this table, primary adhesion after stitching was obtained only in half the cases. This it forces to assume that the complicated conditions of the combat and

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medical-tactical circumstances during the Great Patriotic War, and also periods and quality of finish of wound and subsequent hospitalization of wounded in half the cases did not make it possible to completely utilize all advantages of stitching.

Table 48. Use/application of sutures with the wound of the soft tissues of skull and character/nature of the healing of wounds (in percentages).

(5) Вид швов	(1) Характер за- живления ран	(2) Первичным натяжением	(3) Вторичным натяжением	(4) Всего
(6) Ранние . . . . .		2,2	2,0	4,2
(7) Частичные . . . . .		0,3	3,6	3,9
(8) Первично-отсроченные . . . . .		0,2	0,2	0,4
(9) Вторичные . . . . .		4,7	1,4	6,1
(10) Всего . . . . .		7,4	7,2	14,6

Key: (1). Character/nature of the healing of wounds. (2). By primary tension. (3). By secondary tension. (4). In all. (5). Form/species of sutures. (6). Early. (7). Partial. (8). primary- deferred. (9). Secondary. (10). In all.

#### TREATMENT OF THE SUBSEQUENT COMPLICATIONS.

The timely and correctly produced, sufficiently radical primary treatment of the bullet wounds of skull, together with the wide application of contemporary antiseptics and antibiotics and sufficiently prolonged bed regime with the observation of the operated surgeon of wound created during the Great Patriotic War the best conditions for prophylaxis of the such terrible complications of the bullet wounds of skull as the subsequent infectious processes in

the importance of brain and his snells. Besides this, it should be noted that the methods of the treatment of these infectious complications during the Great Patriotic War were more successful than in past wars.

Here great role played the methods of the composite examination/inspection of the corresponding wounded by neurosurgeons jointly with neuropathologists, roentgenologists, ophthalmologists and other specialists, which made it possible to better and timely distinguish the development of the various kinds of complications. Great value had also promptness the procedure of the corresponding methods of surgical treatment and subsequent care of wounded. Finally, extremely great role in the treatment of infectious complications during the Great Patriotic War played wide application with them of sulfanilamide preparations, and in the end of the war - and penicillin.

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Under the effect of all frequency factors indicated of the abscesses of brain with the penetrating wounds of skull it was possible within the time of the Great Patriotic War to lower to 12.20/o, whereas in the first world war it reached, according to the observations of the individual authors, to 70.00/c.

It should be noted that during the Great Patriotic War the frequency of the abscesses of brain in connection with an improvement in the methods of their prophylaxis gradually descended: during the first year of war they were encountered in 15.90/o of the cases, the secondly - into 15.70/o, into the third - into 11.10/o and into the fourth - into 9.60/o of cases. During the correct treatment of the early abscesses of brain the recovery attacked/advanced in 71.80/o of cases, while with the late abscesses of brain - in 63.40/o of cases.

The best results with the late abscesses of brain were obtained by Soviet neurosurgeons during the use/application of developed during the war of method distance/separation by their rear sight together with capsule. However, method this is applicable not in all cases and has its readings and contraindications.

That most widely used during war was the previous method of the autopsy of the area of abscess with the subsequent draining. Although the results of this method proved to be worse than full of distance/separation ulcer however to autopsy and draining of abscess there was not contraindications and they did not require such high neuro-surgical technology. In the especially heavy condition of patient with the abscess of brain within the latter/last period of

war was used the two-moment method of intervention. At the first moment produced the puncture of abscess, the suction of it of pus and the washing of the area of abscess with antiseptic solutions/openings, which improved the condition of patient, and at the second moment abscess they revealed and drained.

The used by Soviet neurosurgeons methods of the treatment of the abscesses of brain and the results of this treatment are represented in Table 49.

If we compare the given in Table 49 results of the treatment of the abscesses of brain with the results of their treatment during the first world war when lethality with them, according to different statistical data, achieved 60.0-70.00/o, then it is necessary to recognize that during the Great Patriotic War the issues became two times better.

Less favorable results were, they were obtained with meningitides and meningencephalites, although the prognosis and with these, especially heavy forms of the infectious process is no longer so/such hopeless, as this was during the first world war.

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Table 49. Frequency of the use/application of different methods of the treatment of abscesses and their results (in percentages).

(1) Способ оперативного вмешательства	(2) Частота применения	(3) Итоги	
		(4) выздоровление	(5) летальность
(6) Пункция абсцесса	4,5	43,3	56,7
(7) Пункция и вскрытие	48,5	69,2	30,8
(8) Пункция и вскрытие	9,6	53,9	46,1
(9) Дистанция с капсулой	33,8	76,9	23,1

Key: (1). Method of surgical intervention. (2). Frequency of use/application. (3). Issues. (4). recovery. (5). lethality. (6). Puncture of abscess. (7). Autopsy of abscess. (8). Puncture and autopsy. (9). Distance/separation with capsule.

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With primary meningitides the correctly carried out treatment brought in 59.00/o of cases to recovery. With secondary meningitides the lethality proved to be higher, but nevertheless and here 19.70/o of wounded recovered.

Finally, it deserves to be noted, that within the time of the Great Patriotic War they ceased to bear the previous hopeless character/nature even wound of the ventricles of brain and the dissemination on them of the infectious process. During correct

treatment it was possible to achieve recovery of a certain quantity of wounded both with liquor fistulas and with spindymitis. These, until now only beginning to show successes open/disclose the new prospects for the treatment of the heaviest consequences of the bullet wounds of brain.

Developing in the late period of the bullet wounds of brain tunicary-cerebral scars, arachnoiditis, cysts, hydrocephalus and ruptures of the ventricles of brain, just as confronting in connection with them traumatic epilepsy, they were in detail studied and in a new way illuminated on the extensive material of the Great Patriotic War by Soviet neurosurgeons and neuropathologists. The explanation of pathogenesis, symptomatology and diagnosis of these all late complications of the bullet wounds of brain made it possible to manufacture the methods of their more rational treatment. Developed by Soviet neurosurgeons corresponding surgical interventions made it possible to obtain with the complications indicated considerably best results, than during the first world war.

Thus, for instance, with traumatic epilepsy radical surgical intervention gave into 35.00% of cases good results and into 21.00% - satisfactory, i. e., doubly better than the results, obtained during the first world war.

## NEAREST AND DISTANT RESULTS OF TREATMENT.

Uniting all given data about the treatment of the penetrating wounds of skull, it is possible to boldly say that this area during the Great Patriotic War Soviet scientists and wide mass of practicing doctors paid extremely considerable attention. By this are explained considerable achievements both in the sense of periods and qualities of the primary surgical treatment of wounds and necessary post-operation conduct of wounded and in the sense of prophylaxis and treatment of all subsequent complications.

However, at the same time, it is necessary to indicate that the penetrating bullet wounds of skull in significant part cause such great changes in the area of brain and its shells and are caused such heavy infectious processes, that, in spite of all therapeutic measures, they give in comparison with nonpenetrating wounds a great quantity of lethal outcomes.

Furthermore, even with recovery in the unit of such wounded as a result of the transferred injury and infection can arise in the substance of brain and its shells such secondary pathological processes, which during many years after wound cause new aggravations and new manifestations of morbid symptom complexes, causing the disablement of those transferred the penetrating wound of brain.

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The study of the results of the treatment of wounded with the penetrating wounds of skull based on materials of the Great Patriotic War showed that, thanks to the exceptional attention, revealed to this group of wounded, and to the successes, achieved during their treatment, the general/common/total results of treatment proved to be considerably better than in the preceding/previous wars.

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Completely recovered or only temporarily lost ability to work 46.80/o of this group of wounded.

Treatment of the nonpenetrating wounds of skull gave an even greater effect. In this group there recovered and completely maintained ability to work by 72.10/o of wounded, whereas different degree of disablement was noted only in 24.30/o.

The even better results were obtained during the treatment of those wounded into the soft integuments of the skulls from which it maintained ability to work by 96.60/o of wounded, disabled it proved to be altogether only 3.00/o.

Of considerable interest are the data about the results of treatment on the years of the wars, which testify about the steady progress of formulating of therapeutic aid by that wounded into skull. In particular, in the heaviest group of wounded with the damage of brain comparatively high lethality of the first year of war considerably was lowered to its last year. With the nonpenetrating wounds of skull with damage to bone the lethality also progressively descended. During the first year of war it composed 5.70/o, during the second and third year of war it was lowered to 3.20/o, while in last year of war it was equal to 3.10/o.

One should remember that the given on the basis developments of the histories of disease/sickness/illness/malady the data about lethality present the result of the accounting dead of those wounded the skull in all stages of evacuation, beginning from quite advanced ones and ending with the hospitals of the deep rear. It is logical that any comparisons of data with results of treatment of individual authors are incorrect, since the latter defined the results of their work only in some stage of evacuation and we could not consider a quantity of dead persons in more foremost therapeutic installations, just as they did not know about the fate of wounded after their evacuation deeper into the rear.

Another brightest indicator of the results of the treatment of those wounded the skull during the Great Patriotic War is their recovery.

Table 50. Nearest results of the treatment of the bullet wounds of skull depending on the character/nature of damage (in percentages).

(5) Характер ра- нения черепа	(1) Исходы	(2) Полное выздо- рование	(3) Временная утрата тру- доспособ- ности	(4) Прочие исходы
(6) Ранения мягких тканей . . . . .		96,6	3,0	0,4
(7) Непроникающие ранения . . . . .		72,1	24,3	3,6
(8) Проникающие ранения . . . . .		12,7	34,1	53,2
(9) В среднем .		68,5	14,9	16,6

Key: (1). Issues. (2). Full/total/complete recovery. (3). Temporary/time loss of ability to work. (4). Other issues. (5). Character/nature of wounds of skull. (6). Wounds of soft tissues. (7). Nonpenetrating wounds. (8). Penetrating wounds. (9). On the average.

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The expanded/scanned during war wide net/system of the specialized agencies, joined in its work under uniform Soviet military medical doctrine about the treatment of wounded with evacuation according to designation/purpose, and also the timely primary treatment of the wounds of skull contributed so that in the group of the nonpenetrating wounds of skull with damage to bone the

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percentage of full/total/complete recoveries constantly grew/rose and from 66.7 during the first year of war achieved to its last year 73.4.

Are still more exponential the data about the recovery of those wounded the soft tissues of skull. During the first year of war their full/total/complete recovery is noted into 94.3c/o, the secondly - into 94.9o/o, into the third - into 96.2o/o and in last year - into 96.5o/o of cases.

These data testify about a steady increase in the quality of the specialized aid by that wounded the skull and accumulation of considerable experience in work, which led to the recovery of those almost all wounded into the soft tissues of skull and more than 2/3 of those obtained nonpenetrating wounds with the damage of the bones of skull.

On the extensive material of the wounds of skull for the Great Patriotic War it was possible to in detail study not only the nearest results of the treatment of the wounds of skull, but also to explain the fate of wounded into further 4-7 years after wound. This study of the distant fate of those wounded the skull on sufficiently great from the point of view of statistical authenticity material was undertaken for the first time in the history of military medicine and

therefore it deserves particular attention.

Based on materials of the study of the distant results, the subsequent during 4-7 years fate of wounded with the penetrating and nonpenetrating wounds of skull is represented in the following form (Table 51).

Table 51 shows that for the length of the subsequent years after the extraction of those wounded the skull of the hospital their condition somewhat was improved. Wounded with the heaviest penetrating wounds of skull for the length of 4-7 years completely recovered and in 17.60% became able-bodied, in 74.10% of wounded this group unit they remained, and by unit developed by the soil of the postponed by them wound of brain different morbid disorders, somewhat limiting their ability to work. In 6.60% of cases after the penetrating wounds of skull as the distant results is noted the lethal outcome, which, however, only into 3.40% of cases stood in direct connection with the transferred wound of brain. In the analogous group of wounded with damage to bone, but without the damage of cerebral shells and brain tissue within this period lethal outcomes were observed into 2.40% of cases, moreover only 0.20% of them were connected with the transferred wound.

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Table 51. Changes in the status of the health of those wounded the skull for time after extraction from hospital to middle 1949 (in percentages).

(8) Характер ранения	(1) Отдаленные результаты	(2) Здоровы и трудоспособны	(3) Ограничение трудоспособности			(7) Летальность
			(4) всего	(5) в связи с ранением черепа	(6) по другим причинам	
(9) Непроникающие ранения черепа . . .		56,9	49,7	28,0	12,7	2,4
Проникающие ранения черепа . . .		17,6	75,8	74,1	1,7	6,6
Все ранения с повреждением костей черепа . . . . .		39,9	55,9	48,0	7,9	4,2

Key: (1). Distant results. (2). They are healthy/sound and able-bodied. (3). Limitation of ability to work. (4). in all. (5). in connection with wound of skull. (6). on other reasons. (7). Lethality. (8). Character/nature of wounds. (9). Nonpenetrating wounds of skull. (10). Penetrating wounds of skull. (11). All wounds with damage of bones of skull.

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Table 51 indicates also a considerable improvement in the subsequent fate of those obtained the nonpenetrating wounds of skull. 56.90/o of them recovered and they completely maintained ability to work, in 28.00/o of wounded this group as a result of wound have nevertheless the series/row of the symptoms, several which limit their ability to work.

The more detailed study of the distant results showed that after the extraction of wounded from hospital advanced as the consequence of the transferred wound to some degree deterioration in the condition of their health; this was observed with the penetrating wounds into 44.70/o, and with nonpenetrating ones - into 20.00/o of cases. This deterioration in the condition of wounded depended on late complications.

One should also indicate that in certain group of wounded after extraction from hospital advanced further improvement in the condition of their health, it is doubtless, in connection with further development of reduction processes. This improvement in the

health was noted with the penetrating wounds into 9.7o/o, and with nonpenetrating ones - into 1.82c/o of cases.

Regarding that, on what depends the subsequent deterioration in the status of the health of those wounded the skull after their extraction from hospital, the study of distant results showed that with the penetrating wounds of skull it most frequently (into 19.4o/o) was caused by traumatic epilepsy. The following reasons for deterioration (8.9o/o) were the various forms of post-traumatic encephalopathy, which became apparent in the series/row of the complaints, caused by the violation cerebrospinal fluid and blood circulation in the zone of brain. Finally, into 3.4c/o of cases deterioration in the health of wounded stood in connection with the development of osteomyelitis and the formation of purulent fistulas, into 4.6o/o it was expressed by psychological disorders.

With the nonpenetrating wounds of skull most frequently the reason of the subsequent deterioration in the health of wounded were post-traumatic encephalopathies (7.0o/o), then epilepsy (6.8c/o) and finally osteomyelitis and purulent fistulas (2.7o/o).

Should be noted the revealed during the study of the distant results law, that following by deterioration in the health of those wounded the skull after their extraction from hospital in them is

frequently observed the period of improvement. About this testifies  
table 52.

The led oscillations/vibrations in the ability to work of  
wounded with the bullet damages of skull depend, unquestionably, also  
on the indicated above complications, which develop in the late and  
isolated period, and from the attackers following with this of  
reduction processes.

Table 52. Change of the ability to work of those wounded into skull after extraction from hospital (in percentages).

(1) Характер ранений	(2) Количество трудоспособных	(3) При выписке из госпиталя	(4) Через 2-3 года наблюдений	(5) По данным на июнь 1949 г.
(6) Непроницающие ранения черепа . . .		76,9	65,1	71,3
(7) Проницающие ранения черепа . . .		20,6	12,9	19,0
(8) Всего раненных в череп с повреждением костей . . . . .		53,1	43,2	49,2

Key: (1). Character/nature of wounds. (2). Quantity of able-bodied ones. (3). With extraction from hospital. (4). Through 2-3 years of observation. (5). According to data on June 1949. (6). Nonpenetrating wounds of skull. (7). Penetrating wounds of skull. (8). In all wounded skull with damage bones.

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Such oscillations/vibrations are found in complete agreement with the dynamics of the pathoanatomical processes which on the duration of very long time are developed following with the wound of the tissues of brain and which so in detail were studied during the Great Patriotic War by Soviet neuropathoanatomists (L. I. Smirnov et al.).

The given laws make it necessary, on one hand, to greatly

carefully be related to prognosis with all wounds of skull with the damage of bones, taking into account the possibility with them of very late complications. The special features/peculiarities of the pathology of the wounds of skull indicated require great care with the appraisal/review of similar wounded and is made itself with necessary the stay of such wounded under particular medical observation. On the other hand, laws governing the development of late complications indicated and possibility of further restoration/reduction after them of the functions of brain made it necessary to organize the subsequent treatment such of wounded, but not to look at their fate that is hopeless, as this make some foreign authors.

The study of the distant results of the treatment of those wounded the skull showed that their large part (87.50/o) after extraction from hospitals continues useful work, moreover only comparatively insignificant percentage (11.3), is found on the less qualified work, whereas the majority (52.2) fulfills the work by which they were occupied also to war. Mac that, considerable percentage of wounded (24.0) fulfills now more complicated work, and some it is successfully started in higher educational institutions (table 53).

Effect of the character/nature of combat process/operations,

conditions of climate and locality on the results of the treatment of the wounds of skull.

Varied and complex conditions in which it was necessary to carry out the treatment of wounded in combat circumstances, laid, naturally, great impression for entire therapeutic aid by wounded and her results. From this point of view the selection/analysis of the treatment of those wounded the skull during individual combat process/operations deserves particular attention, especially as the combat process/operations, selected for study, they were characterized by the varied conditions of medical-tactical circumstances, season, climate and locality.

Table 53. Job placement of those wounded the skull according to the data of the distant results (in percentages).

(1) Характер ранений черепа и мозга	(2) Состояние раненых	(3) Нетрудоспособны	(4) Трудоспособны	(5) Из них выполняют работу		
				(6) менее высокой квалификации	(7) прежнюю	(8) высшей квалификации
(9) Непроникающие . . . . .		7,2	92,8	7,9	64,4	21,4
(10) Проникающие . . . . .		19,4	80,6	16,7	35,7	28,2
(11) Всего раненых с повреждением костей . . . . .		12,5	87,5	11,3	52,2	24,0

Key: (1). Character/nature of the wounds of skull and brain. (2). Condition of wounded. (3). not difficult-they are capable. (4). Able-bodied. (5). From them is fulfilled work. (6). Lower skills. (7). previous. (8). highest qualification. (9). Nonpenetrating. (10). Penetrating. (11). In all wounded with damage of bones.

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Among these combat process/operations there were the defensive actions, as Stalingrad and the initial period of Orel-Kursk battle, and offensive operations with heavy fighting as this was with the rout of the Germans in the environs of Moscow, with the blockade break-through of Leningrad and during Berlin process/operation, and routed enemy's pursuit, which achieved sometimes unprecedentedly rapid rates/tempo, as this was during the liberation of Belorussia and in process/operation a Vistula-Oder.

The studied combat process/operations occurred also in severe winter weather (rout of Germans in the environs of Moscow, battle in the environs of Stalingrad, blockade break-through of Leningrad), and during summer hot days (Orel-Kursk battle, liberation of Belorussia) and by spring (Berlin process/operation).

Process/operations these occurred also in wooded country (rout of Germans in the environs of Moscow), and in locality with a great quantity of swamps/marshes and creeks and extremely poor roads (liberation of Belorussia), and in plain with large/coarse water obstacles (process/operation Vistula-Oder), and on that crossed by enemy hilly ground (Orel-Kursk battle), and in plain with the asphalted highways (Berlin process/operation).

For participating in these combat process/operations therapeutic installations was necessary to be accommodated first in mud huts and tents in view of the complete destruction of living quarters by enemy (blockade break-through of Leningrad, liberation of Belorussia, first stage of process/operation Vistula-Oder), then in the half-wrecked houses, sheds and cottages (rout of the Germans in the environs of Moscow, Stalingrad battle, Orel-Kursk battle), then finally in the maintained equipped buildings of hospitals and sanatoriums (second

stage of process/operation Vistula- Oder, Berlin process/operation).

Thus, the concrete/specific/actual circumstances, in which proved to be first aid by that wounded the skull, in these all combat process/operations was most diverse and, it concerned, it had to have great effect on the results of the treatment of those wounded the skull.

For explaining that, such as value had in actuality all factors indicated, should be compared the basic points, which affect the fate of those wounded the skull as, for example, a relative quantity of wounds of skull and their special feature/peculiarity, carrying out of those wounded from the field of combat, their movement along medical installations and possibility of obtaining the specialized aid. Furthermore, great value acquires the comparison of therapeutic aid by that wounded the skull with various kinds the combat process/operations, on one hand, similar, and on the other hand - different in its conditions.

#### EFFECT OF THE VARIED CONDITIONS OF THE COMBAT CIRCUMSTANCES ON THE TREATMENT OF THOSE WOUNDED IN SKULL.

Different form/species and character/nature of wounds to a considerable degree depend on the conducted combat

process/operations, but from form/species and character/nature of wounds depends in turn, all subsequent treatment of wounded. Furthermore, the conditions of combat circumstances have great effect also on the promptness of the need to first aid by wounded, and to the speed of their carrying out from the field of combat, and to the promptness of conducting the qualified treatment.

The materials of the studied combat process/operations showed that a quantity of wounds of skull in these process/operations greatly strongly oscillated. If we accept the average/mean relationship/ratio of those wounded the skull to all wounded during the Great Patriotic War for 100, then this relationship/ratio on the studied armies in the direction of main attack will be the following:

(1) Разгром немцев под Москвой . . . . .	60,2	(2) Освобождение Белоруссии . . . . .	115,4
(3) Сталинградская битва . . . . .	52,0	(4) Операция Висла — Одер . . . . .	125,0
(5) Прорыв блокады Ленинграда . . . . .	153,8	(7) Берлинская операция . . . . .	113,4
(6) Орловско-Курская битва . . . . .	115,4		

Key: (1). Rout of the Germans in the environs of Moscow. (2). Liberation of Belorussia. (3). Stalingrad battle. (4). Process/operation vistula-Oder. (5). Blockade break-through of Leningrad. (6). Berlin process/operation. (7). Orel-Kursk battle.

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Thus, during defensive actions as this was in Stalingrad battle,

a quantity of wounds of skull proved to be considerably smaller than in the period of offensive combat operations (blockade break-through of Leningrad, liberation of Belorussia, Vistula-Oder and Berlin process/operation). However, a great quantity of wounds of skull is established/installed with the blockade break-through of Leningrad (153.80/o), small - with defensive operations during Stalingrad battle. An increase in the wounds of skull during Orel-Kursk battle in comparison with Stalingrad can be explained by the fact that during this process/operation occurred not only defensive actions with withdrawal/departure to the second line of defense, but also period of the counteroffensive, with combat process/operations of which a quantity of wounds of skull had to increase.

Only exclusion from laws governing the increase in the wounds of skull indicated with offensive operations and their decrease in defense is the first of the studied process/operations - rout of the Germans in the environs of Moscow, when, in spite of the rigid offensive combat, quantity of wounds of skull it was comparatively small (60.20/o). To explain this decrease of the wounds of skull during the combat process/operation indicated in the valueless time is possible only supposedly, considering that here could have a value such factors as wooded country, more systematic, than usually carrying by the soldiers of protective helmets, or perhaps the particular severity of those finding in unconscious condition, that

and their timely carrying out from the field of combat in severe frost of winter 1941/42.

To a natural question, on what depended an increase in the quantity of wounds of the skull from offensive operations their decrease in defensive ones, it is possible to answer also only supposedly, namely that during offensive combat our soldiers sometimes dropped protective helmets, in consequence of which a number of fragmentation wounds of head increased. A great quantity of those wounded the skull during the blockade break-through of Leningrad must be set in communications with the fact that for our troops/forces during this process/operation it was necessary to conduct offensive according to the continuously shot through by enemy in different directions plain with the scanty forest vegetation, almost completely annihilated by artillery fire.

The study of a question of rendering of first aid is most heavy to wounded as their carrying out from the field of combat, it showed that both these important for further fate of the wounded of moment also are found in considerable dependence on the character/nature of combat process/operations. So, with heavy defensive actions during Orel-Kursk battle in connection with aidmen's great loss/depreciation rendering of first aid was conducted mainly via self-help and mutual assistance. However, in offensive combat during the liberation of

Belorussia and especially with process/operation a Vistula-Oder and Berlin process/operation, in spite of the rapid advance of the troops/forces forward, rendering of first aid and the order/formation of self- and mutual assistance was restricted to 25.7-23.10/o of cases, but rendering aid by aidmen, medical instructors and fieldshers increased to 72.8-75.2c/c.

The carrying out of wounded from the field of combat presented particular difficulties during street fightings in Stalingrad and during those stressed to break in Poznan when in a number of cases to wounded it cannot be approached to the offensive of night.

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The conditions for combat process/operations, the raids of hostile aviation and shelling to a considerable extent affected also the delivery/procurement of wounded to the first stages of evacuation. In process/operation a Vistula- Oder and in Berlin process/operation, in spite of the difficulty of offensive combat, 80.7 and 86.40/o of heavily wounded were delivered on PMP for the first 4 hours after wound. However, sometimes periods these considerably were lengthened. So, during assault crossing of river Oder and capturing the bridgehead/beachhead on the hostile shore when enemy, after exploding dam, flooded/ignited the unit of the

bridgehead/beachhead and the crossing across the spilling and  
oppressed by ice floes river was for a certain period of time  
impossible, the delivery/procurement of wounded on PMP was delayed  
sometimes up to several days.

During some combat process/operations the surgical work,  
conducted on DMP, to a considerable extent was violated depending on  
combat circumstances.

During Stalingrad battle during July - August 1942 DMP it was  
necessary to keep close to its divisions, which considerably limited  
their surgical work. During September - December 1942, when combat  
conducted in city itself, DMP were located on other side of Volga and  
guided into city only operations surgical groups. Through 3-4 weeks  
when to leave wounded in Stalingrad, in view of continuous fire,  
became absolutely impossible, these surgical groups had to be  
switched exclusively to evacuation work.

During Orel-Kursk battle in the beginning of July 1943 many DMP  
underwent shelling and bitter air raids, which forced their units to  
change deployment and considerably impeded their work. Some DMP  
within the time of defense and counterattack changed for this combat  
process/operation their location to 14 times. During offensive  
operation on the liberation of Belorussia individual DMP they were

relocated to 20 times. During the rapid advance of the troops/forces, following the enemy, during process/operation a Visla-Oder DMP, following for elongation/extent 500-600 km the troops/forces, to 21 times changed their location.

The given examples confirm, what great effect had the varied conditions of combat circumstances for the frequency of the wounds of skull and to entire system of rendering aid to wounded soldiers.

Effect of the varied conditions of locality, season and climate on the results of the treatment of those wounded the skull.

The results of the treatment of those most heavily wounded into skull are located in great dependence on that how soon these wounded obtained first aid, as rapidly they were carried out from the field of combat and as subsequently occurred their movement along foremost therapeutic installations up to that point/post where they rendered qualified medical aid. All moments indicated in turn, are tightly closely related not only with the character/nature of combat circumstances, but also with conditions of locality and season with which it was necessary to render aid by this wounded.

So, during the study of the character/nature of the wounds of skull in different combat process/operations it is possible to note

peculiar oscillations/vibrations in the distribution of the wounds of soft tissues and bones of skull. Based on materials of the maps/charts/cards of the deepened characteristics, these relationships/ratios within the time of the Great Patriotic War were equal to 54.6:45.4.

During the study of individual combat process/operations they are distributed as follows (Table 54).

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As is shown to Table 54, the relationship/ratio of the wounds of soft tissues and bones of skull most of all approaches average numbers in the period of the blockade break-through of Leningrad and liberation of Belorussia. This relationship/ratio somewhat is deflected/diverted from average numbers during process/operation a vistula-Oder and it is still more during Orel-Kursk battle and Berlin process/operation.

During the rout of the Germans in the environs of Moscow and the Stalingrad battle is observed the great deflection: the relationships/ratios of the wounds of soft tissues and bones of skull sharply diverge from average numbers for always of the Great Patriotic War. Within the time of these combat operations a quantity

of wounds of the soft tissues of skull three times almost exceeded a quantity of wounds of the bones of skull.

To explain the nonconformities indicated only by the character/nature of combat process/operations is impossible, since with the rout of the Germans in the environs of Moscow process/operation was offensive, and battle in the environs of Stalingrad bore the character/nature of hard positional defense. Furthermore, should be considered changes in the armament of the armies of the enemy, occurred in the course wars. In second half war the enemy began to apply "Faust-patrol", large/coarse after all and the self-propelled guns of the type "Ferdinand", "Panther", and with assaults with our troops/forces of its strong points also and fire/light from heavy-calibre fortress/self guns.

Important effect on the relationship/ratio of these two different in severity groups of those wounded the skull had also the speed of carrying out from the field of combat of those extremely heavily wounded the skull and the brain. During the rout of the Germans in the environs of Moscow and the Stalingrad battle the conditions for the rapid carrying out of wounded and their delivery/procurement into therapeutic installations were very difficult.

The rout of the Germans in the environs of Moscow occurred in the period of the severe frosts, which achieved  $-36^{\circ}$ , with abundant snowfalls and snowstorms, in the locality, covered partly with dense forests/scaffolding. Research during the short winter days of those heavily wounded into skull, that were being located in unconscious condition, especially in the presence on them of white camouflage suits and sheepskin coats, naturally, under these conditions of locality and season was extremely difficult.

In the period of Stalingrad battle when furious fighting conducted among the destroyed buildings, the filled up streets, scalariform marches/passages, blocked quarters and even individual houses or floors in buildings, timely the carrying out of those heavily wounded the skull from the firing lines presented great difficulties. During the barbarous raids of hostile aviation to the substances of the crossing through Volga some wounded into skull, that were being located in the unconscious state, drowned during the bombing of medical steamships, barges, boats and rafts by enemy.

Table 54. Relationship/ratio of the wounds of soft tissues and bones of skull in different combat process/operations (in percentages).

(1) Характер ранений черепа	(2) Госские операции	(3) Ранения немцев в Москве	(4) Сталинградская битва	(5) Штурм блокады Ленинграда	(6) Орловско-Курский битва	(7) Свободное движение русских войск	(8) Висло-Одер	(9) Берлинская операция
(10) Ранения мягких тканей черепа . . . . .	68,6	75,0	56,6	62,7	53,0	60,0	61,3	
(11) Ранения костей черепа . . . . .	31,4	25,0	43,4	37,3	47,0	40,0	38,7	

Key: (1). Character/nature of the wounds of skull. (2). Combat process/operations. (3). Rout of Germans floor/sex by Moscow. (4). Stalingrad battle. (5). Blockade break-through of Leningrad. (6). Orlovsk-Kursk battle. (7). Liberation of Belorussia. (8). Vistula-Oder. (9). Berlin process/operation. (10). Wounds of soft tissues of skull. (11). Wounds of bones of skull.

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The comparison of the combat process/operations indicated with the very similar process/operation of the blockade break-through of Leningrad proves, that the decrease of a quantity of wounds of skull with the damage of bones during the process/operations indicated, besides the severity of the obtained damages, depends also on climate and locality. The blockade break-through of Leningrad occurred as two preceding/previous process/operations, in winter months, moreover

conducted the bitter offensive combat on capture in the enemy of the strongly fastened/strengthened and shot through from different directions locality on other shore of Neva. This caused an increase in the number of heavy wounds of the bones of skull and brain. However, Leningrad combat process/operation differs from the Moscow and Stalingrad in that frost in the period of this process/operation from 12 January through 16 February were comparatively small, yellow pears southern and southeastern winds, snow cover it did not exceed 20 cm, but a comparatively small area of combat presented plain with the cut and broken by artillery trees/wood. All this made it possible more rapidly to find and to remove those heavily wounded the skull from the field of combat, and a quantity of wounds of the bones of skull into this process/operation proved to be almost two times more than in Moscow and Stalingrad process/operations, sufficiently corresponding precisely to the percentage of the wounded of this genus for always of the Great Patriotic War.

A relative descent in the wounds of the bones of skull in Orel-Kursk battle (37.3o/o) and Berlin process/operation (35.7o/o) is explained by the fact that the soldiers more frequently bore protective helmets, which in significant part protected them generally from the wounds of skull or lowered the severity of these wounds.

During the liberation of Belorussia and process/operation a Vistula-Oder a comparatively great percentage of entry on DMP of heavily wounded the skull with damage bones is explained, besides very heavy wounds (with the taking of the defensive units of enemy on rivers Berezina, Niemen, Oder and the city Pcznan), also by the fact that, because of the rapid advance of our troops/forces on 30-40 km in days, all extremely heavily wounded into skull and brain rapidly entered approached DMP. The periods of the entry of wounded on DMP within the time of these offensive operations greatly sharply were shortened.

As far as rendering is concerned to the timely qualified medical aid by that wounded the skull and their deliveries/procurements according to designation/purpose into specialized hospitals of army, then in this respect the conditions of locality and climate especially unfavorable they were during combat in the environs of Stalingrad.

The specially isolated operational-surgical groups of DMP and evacuation points rendered in city urgent surgical aid by that wounded the skull and crossed them to another shore. In all crossings were dug out the dugouts for wounded and were created feeding-heating points/posts. During November 1942, in connection with the approximation/approach of ice formation in Volga, was created the

threat of the full/total/complete curtailment both the evacuation of wounded on DMP and possibility of the rendering with it of medical aid. For preventing this DMP they were divided into two echelons, and their first echelons with surgical groups and reserve of equipment and surgical dressing substances were directed to city. In the dead area, shielded from artillery fire, under the cover of the steep/abrupt shore of river were shortly dug out the dugouts and in them were equipped operating, surgical dressing and hospital separations/sections for wounded. This made possible during ice formation to render medical assistance by wounded in immediate proximity (150-400 m) from the firing line. When ice finally became and sufficiently it became stronger, it proved to be possible to cross wounded to another shore on stretchers and manual sleighs, but from the end of December the condition of ice made it possible to already use horse, and thereupon truck transport.

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DMP and KhPPG of the first line, located on the left shore of Volga, were located in the sphere of hostile artillery fire and activity of aviation.

Peculiar conditions were created also during break of the blockade of Leningrad for the evacuation of wounded on ice of the

freezing Neva. Since for the elongation/extent of all crossing area river was shot through from several points/posts by the fire/light of enemy, then was created the great threat of the incidence/impingement of crossed through Neva wounded into the formed in ice holes from shells. To avoid this were organized the particular "ice" teams of the porters with sleighs on wide runners. The delivery/procurement of wounded on DMP and in KhPPG was conducted along the broken by tanks and artillery roads and partially on corduroy road.

More favorable were locality conditions for the carrying out of wounded from the field of combat in the period of Orel-Kursk battle when, in spite of the permanent raids of hostile aircraft and shellings, wounded it was possible to conceal in numerous ravines and beams/gullies. Shellings and air raids upset the operation of foremost therapeutic installations, whereas forcing them frequently to be relocated, the way of evacuation to specialized KhPPG were found in a good condition, and working conditions for its they were favorable.

During the liberation of Belorussia the wooded country with numerous rivers and bogs and extremely poor roads created in the series/row of sectors considerable difficulties for the evacuation of wounded, deployment and redislocation of therapeutic installations. Are especially unfavorable were unfavorable these conditions in the

initial situation, when it was necessary to deploy therapeutic installations in tents in the locality, covered with continuous swamps/marshes, and when by certain DMP and KhPPG of the first line it was necessary itself to eliminate siding tracks.

During process/operation a Vistula-Oder most difficult conditions for the timely of the export of wounded were formed in Poznan and on the western shore of Oder when enemy exploded on the river of dam.

In Berlin combat process/operation in view of a good condition of highways of wounded within the shortest periods they delivered into the bushes of specialized KhPPG; the carrying out of wounded from the field of combat and their rapid delivery/procurement on DMP were wonderfully organized.

For the timely carrying out of heavily wounded from the field of combat under difficult conditions of climate and locality the medical service of the participating in combat process/operations armies applied the most diverse methods, beginning with the carrying out of wounded by aidman "on itself", on stretchers, on overcoat, poncho, on ski installations or in boat-drags, and also on wheel-stretcher installations and on canine harnesses. The latter/last method of the export of wounded at some fronts played sufficiently great role,

thus, for instance, during Orel-Kursk battle one detachment of sled dogs exported from the field of combat a considerable number of wounded.

Further advance of those wounded the skuli to PMP, DMP and specialized KhPPG frequently proceeded along extremely poor roads with the gotten soaked from rain clayey soil, on pits and bumps or hummocks of marshy and wooded country, and also in the period of deep snowdrifts. Along these roads near from the field of combat of wounded they transported on carts or sleighs, and subsequently in the motor vehicles of ambulance transport DMP or, less frequent, on reverse empty car.

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With DMP and KhPPG of the first line of those wounded the skull they delivered usually by medical motor transport, and in the individual sections of front and by ambulance aircraft.

The experiment/experience of war shows that the transportation of wounded in army and army area were realized more frequently on soil than along iron roads, since the latter were usually destroyed in progress of combat.

Thus, it is there be no any doubt that the conditions of locality, weather and climate were during different combat process/operations the factors which in a number of cases affected both the fate of those heavily wounded the skull on the field of battle and for the periods of their carrying out from the firing line, to the rendering by it of medical aid, for evacuation into specialized KhPPG and subsequent qualified treatment.

THERAPEUTIC AID TO INDIVIDUALS WOUNDED IN THE SKULL UNDER CONDITIONS FOR DIFFERENT COMBAT OPERATIONS.

In order to more precisely establish/install the effect, exerted for the treatment of those wounded into skull by that entire complex sum of factors which was created with various kinds combat process/operations, should be compared the movement of those wounded the skull along army, army and front line therapeutic installations, comparing the appropriate data of the combat process/operations both of similar and different character/nature.

There is particular interest in a comparative selection/analysis of data of the treatment of the wounds of skull during the following combat process/operations:

- 1) defensive actions and counteroffensive under varied

conditions (Stalingrad and Orel-Kursk battle);

2) defensive actions and offensive under winter conditions (Stalingrad battle and blockade break-through of Leningrad);

3) defensive actions and offensive under summer conditions (Orel-Kursk battle and liberation of Belcrussia); 4) rapid offensive operations in different seasons (liberation of Belcrussia and process/operation Vistula-Oder);

5) offensive operations in the beginning and end of the war (rout of the Germans in the environs of Moscow and Berlin process/operation).

THERAPEUTIC AID TO INDIVIDUALS WOUNDED THE SKULL IN THE PERIOD OF DEFENSIVE ACTIONS AND COUNTEROFFENSIVE DURING STALINGRAD AND OREL-KURSK BATTLE.

Cruel defensive actions on routes of approach to Stalingrad and in city itself, and counteroffensive also conducted by the dismantled by us army from 23 July, 1942, through 3 February, 1943.

During Orel-Kursk battle the period of the bitter defensive actions of army with that following counterattack before the

restoration/reduction of initial position continued from 5 to 20 July, 1943.

The movement of the wounded the skull during period combat process/operations indicated on the army and army therapeutic installations of the dismantled by us armies and to front line hospitals is represented in the following form (table 55).

In given Table 55 should be focused attention on the percentage of the operated wounded with damage bones and lethality among those operated in army area. A quantity of those operated and subsequent lethality during Stalingrad battle three times almost exceeded the corresponding numbers during Orel-Kursk battle.

How to explain this difference in the issues of the wounds of skull in these combat process/operations?

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They cannot be explained only by severity and duration of combat in the environs of Stalingrad and by climatic conditions (winter), since comparatively high lethality was observed in Stalingrad process/operation not only with the wounds of skull with the damage of bones, but sometimes and with the wounds of some soft tissues

alone of skull.

For a response/answer to the presented question it is necessary to in somewhat more detail illuminate the conditions of rendering to medical aid by that wounded the skull in both dismantled combat process/operations.

During Stalingrad battle the readings to surgical interventions to skulls on DMP were considerably expanded; with the wound of the bones of skull it was there operated by 17.50/o, moreover lethality among those operated was equal to 16.60/o. In army area therapeutic aid by that wounded the skull rendered KhPPG of general-surgical profile/specialty in composition of which it was not one neurosurgeon. In particular, in one of KhPPG of the first line it was operated by 54.00/o of those wounded the skull with the damage of bones, moreover lethality among those operated was about 33.00/o.

Others were the conditions of rendering to therapeutic aid with the wounds of skull during Orel-Kursk battle. At this time the volume of operational aid by that wounded the skull in army therapeutic installations was abbreviated/reduced on the basis of the accounting of the acquired experiment/experience. On the average on DMP it was operated by 4.50/o of wounded the skull with damage bones; lethality among them composed only 3.60/o. In army area during Orel-Kursk

battle there was more narrowly of two specialized KhPPG with the staff its specialists, who included, besides the chief/leading neurosurgeon, two neuro-surgical groups of OFMU and X-ray apparatus. Those wounded the skull from army therapeutic installations they guided, as a rule, into one of these specialized KhPPG, where they underwent surgical processing. Another specialized hospital was at this time almost convoluted and finished/prepared for advance forward, but its state/staff of specialists reinforced one of KhPPG of the first line. In view of the overloading of first specialized KhPPG wounded into skull, that were being located in transportable condition, then they guided, without operating, into front line hospital with the aircraft which managed to in proper time and rapidly evacuate all wounded.

Table 55. Movement of wounded the skull with damage bones (in percentages).

(1) Район, в котором проходило лечение раненных в череп	(2) Движение раненных в череп	(3) Находи- лось на излече- нии	(4) Вы- здоро- вело	(5) Эва- купи- рола- но	(6) Оставлено в лечебных учреждениях и прочие исходы	(7) Опери- ровано из числа лечив- шихся	(8) Па- ли зачерло
(9) Сталинградская битва							
(10) Войсковой	.....	100,0	0,4	76,9	22,7	17,5	16,6
(11) Армейский	.....	100,0	0,4	56,8	42,8	36,4	20,1
(12) Фронтной	.....	100,0	8,6	25,7	65,7	6,1	0,3
(13) Орловско-Курская битва							
(10) Войсковой	.....	100,0	—	78,9	21,1	1,5	3,6
(11) Армейский	.....	100,0	0,1	58,2	41,7	22,4	9,5
(12) Фронтной	.....	100,0	2,2	46,7	51,1	7,0	11,1

Key: (1). Area, into which occurred the treatment of those wounded the skull. (2). Movement of those wounded skull. (3). It was located undergoing medical treatment. (4). It recovered. (5). It is evacuated. (6). It is left in therapeutic installations and other issues. (7). It is operated from number of those treating. (8). From them it died. (9). Stalingrad battle. (10). Military (11). Army. (12). Front line. (13). Orel-Kursk battle.

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The given materials, that illuminate conditions of therapeutic aid by that wounded the skull in two combat process/operations in question, sufficiently convincingly show that the basic factor, which affects difference indicated above in the issues during the treatment

of those wounded the skull, was different organization of therapeutic aid to this group of wounded. While into Stalingrad battle wounded the skull it is sufficiently wide operations in army therapeutic installations without the presence of sufficient for this conditions, during Orlovsk-Kursk battle the readings to process/operation in army area were completely correctly restricted. In army area during Stalingrad battle in 1942 it was not still neurosurgeons and sufficient number of X-ray apparatuses; therefore process/operations on skull sufficiently widely were conducted in those particularly intended, so-called specialized, hospitals and, less frequent, in some KhPPG of general-surgical profile/specialty. In the period of Orel-Kursk battle in the army area all of those wounded the skull they guided into the specialized hospitals where they provided the neuro-surgical specialized aid. Moreover, with the overload specialized hospital wounded the skull of the transportable wounded of this group immediately they evacuated by aircraft into the specialized hospitals of front.

Therapeutic aid by that wounded the skull in the period of defensive and offensive combat operations under winter conditions (battle for Stalingrad and blockade break-through of Leningrad).

Both combat process/operations occurred almost in one and the same period of war under winter conditions, both were characterized

by cruel combat under the difficult conditions of locality and climate. The studied defensive period of the Stalingrad battle envelops the time through 3 February, 1943, and the period of the offensive combat of army for the blockade break-through of Leningrad - from 12 January through 16 February of the same year.

The movement of wounded the skull along army, army and front line therapeutic installations during period dismantled combat process/operations is represented in Table 56.

Table 56. Movement of wounded the skull with damage bones (in percentages).

(1)	(2) Движение раненых в боях	(3) Находясь под медицинским лечением	(4) Выздоровело	(5) Эвакуировано	(6) Оставлено в лечебных учреждениях и прочие расходы	(7) Оперировано из числа лечившихся	(8) Из них умерло
(9) Сталинградская битва							
(10) Войсковой	100,0	9,4	76,1	22,7	17,5	16,6	
(11) Армейской	100,0	9,4	56,8	32,8	36,4	29,1	
(12) Фронтальной	100,0	8,6	23,7	63,7	6,1	0,3	
(13) Прорыв блокады Ленинграда							
(10) Войсковой	100,0	8,9	87,0	15,0	4,9	22,0	
(11) Армейской	100,0	8,9	76,8	23,1	15,5	18,1	
(12) Фронтальной	100,0	8,2	20,7	71,5	6,7	12,6	

Key: (1). Area, in which occurred the treatment of those wounded the skull. (2). Movement of those wounded skull. (3). It was located undergoing medical treatment. (4). It recovered. (5). It is evacuated. (6). It is left in therapeutic installations and other issues. (7). It is operated from number of those treated. (8). From them it died. (9). Stalingrad battle. (10). Troop. (11). Army. (12). Front line. (13). Blockade break-through of Leningrad.

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As is shown in Table 56, Stalingrad combat process/operation was characterized by high in comparison with Leningrad operating activity in army area with respect to those wounded the skull.

During the blockade break-through of Leningrad operability of wounded the skull with damage bones on DMF composed only 4.9c/o, whereas into Stalingrad battle on DMF it was operated by 17.5c/o of such wounded.

During Stalingrad battle, as already mentioned, in army area it was not still neurosurgeons in the so-called specialized hospitals, and those wounded the skull they operated frequently in KhPPG of the general-surgical profile/specialty both the first and second line.

In Leningrad process/operation in army area for those wounded the skull were already provided specialized KhPPG, which, true, accepted at the same time and heavy general-surgical wounded (to 40.8o/o), which considerably violated their work. In connection with this only unit of those wounded the skull underwent primary processing in these hospitals, and the others were evacuated into front line area without processing. The personal neuro-surgical groups of ORMU [separate medical reinforcement company] in army it was not, but to the period of combat process/operation to it was commissioned the neuro-surgical group of front line ORMU.

With the selection/analysis of the represented tables the fact calls attention to itself that operability of those wounded into skull into Stalingrad process/operation was in army area three times,

but in army area it is more than twice higher in comparison with of the occurred during the blockade break-through of Leningrad.

The characteristic feature of the dismantled process/operation of Leningrad Front was the fact that at close distance from the hospital basis of army (in 30 km) was located the located in Leningrad powerful/thick front line base with the equipped hospitals and the great cadres of experienced specialists. In connection with this the large part of those wounded the skull was rapidly evacuated on GBF. Were evacuated not only wounded with the damage of bones skulls (76.90/o), but also almost all, obtained wounds of the soft tissues of skull (97.50/o), since in Leningrad there were for the treatment of this group of wounded well organized hospitals.

During the analysis of post-operation lethality during the combat process/operations indicated it is evident that in the period of Leningrad process/operation it was in army area above (22.00/o), than during Stalingrad battle (16.60/o). Is explained this, it is doubtless, by the fact that in the period of the blockade break-through of Leningrad surgical processing in army area underwent only small group (4.90/o) of the especially heavily wounded, whereas during Stalingrad battle in army area was used extensively operational processing (17.50/o) and those were easily wounded the skull.

Especially high operational activity in front line area (46.70/o) into the period of the blockade break-through of Leningrad in comparison with Stalingrad battle, accompanied by considerable post-operation lethality (12.60/o), is explained by the incomparably greater evacuation of those wounded the skull without processing from army and army area into the nearby hospitals of Leningrad, whereas during Stalingrad battle front line base was still insufficiently organized and certain unit of the wounded was headed, without depositing in it, directly into service areas.

Considerable attention during the analysis of the given Data deserves comparison with the general/common/total lethality of wounded the skull by different areas in period of both combat process/operations.

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Study in this respect of report materials showed that the general/common/total lethality of those wounded the skull in all areas in the period of the Stalingrad battle was above than in the period of the blockade break-through Leningrad in army area lethality within these periods was related as 4:3, but in army it was almost

two times higher, and only in front line area difference was relative to insignificant. The higher numbers of the lethality of those wounded indicated the skull during Stalingrad process/operation in comparison with Leningrad cannot be completely explained either difference in the character/nature of combat process/operation or difference in conditions of locality, weather and climate, but they are explained only by the conditions of giving medical treatment by that wounded the skull during both combat process/operations.

Thus, the main factor, which caused the smaller lethality of those wounded the skull in Leningrad combat process/operation in comparison with Stalingrad battle, should be counted the best organization of therapeutic aid by that wounded the skull in the period of the blockade break-through of Leningrad. Cruel street fightings in destroyed Stalingrad, difficulty of the evacuation through Volga, action of hostile aviation in hospitals and ambulance transport, absence of doctor-neurosurgeons, distance of disposition to that created in progress of combat GBF, which was being arranged/located in rural locality in not fitted/not adapted/unadapted quarters/premises, and the series/row of other reasons explain comparatively worse results of treatment during Stalingrad battle.

Therapeutic aid by that wounded the skull in the period of defensive

battles and offensive under summer conditions (Orel-Kursk battle and liberation of Belorussia).

Both dismantled process/operations occurred by summer and were distinguished only by the character/nature of combat process/operations and by the conditions of locality.

Combat operations in the period of Orel-Kursk battle, which were consisting in cruel defensive actions with the subsequent counteroffensive before the restoration/reduction of initial position, occurred from 5 to 20 July, 1943, in broken ground with a great quantity of ravines and creeks with the swampy shores.

The offensive combat operations of army in the period of the liberation of Belorussia, which were consisting in the penetration of defense and the pursuit of the routed enemy for elongation/extent 500 km, occurred from 23 June through 18 July, 1944, under conditions of plain, covered with the places by forest, with a great quantity of creeks, swamps/marshes and two large/coarse water obstacles (river Berezina and Niemen).

The movement of wounded the skull during period dismantled process/operations on army, army and front line therapeutic installations is represented in Table 57.

As is shown in Table 57, the operability of wounded into skull in army area in the period of the liberation of Belorussia was above than in the period of Orel-Kursk battle, just as the lethal post-operation outcomes.

However, the general/common/total lethality of those wounded the skull in army and front line area during Belorussian combat process/operation was considerably lower than in the period of Orel-Kursk battle.

Taking into account the conditions of rendering to medical aid by that wounded the skull during both dismantled combat process/operations, one should recall that during Orel-Kursk battle those wounded the skull with the damage of bones were operated in army therapeutic installations into 4.50/o of cases with lethality into 3.60/o and that on GBA this group of wounded was operated in the specialized hospital where, besides two neuro-surgical groups of ORMU, was an also permanent neurosurgeon and X-ray apparatus.

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During the liberation of Belorussia those wounded the skull with

the damage of bones were operated on DMP only from vital readings, moreover the trepanations of skull were produced altogether only into 0.60/o, after giving post-operation lethality into 28.40/o. In army area the large part of the wounded into skull (85.90/o), especially with the damage of bones, they guided into specialized KhPPG, which were created via attachment to the field mobile hospitals of the neuro-surgical groups of ORMU. In spite of the extremely rapid advance of the troops/forces of army, the neuro-surgical groups of ORMU, being moved by "sand bar" in those being located ahead KhPPG, managed to ensure the appropriate aid by that wounded the skull. It should be noted that 66.30/o of those wounded into skull entered during this combat process/operation into the specialized hospitals during the first day; 54.70/o by that wounded the skull process/operation was produced in these hospitals in the first 24 hours after wound.

The small comparatively lethality of wounded the skull with damage bones on GBF makes it possible to make the conclusion that the quality of the neuro-surgical processing of wounds in the specialized army hospitals achieved within the period both of Orel-Kursk and Belorussian process/operation of considerable perfection.

Thus, the comparison of all given data makes it possible to come to the conclusion that during the liberation of Belorussia, in spite

of the very complicated conditions for combat and the rapid advance of army, the specialized aid by that wounded into skull organized was still better, since during it they were abbreviated/reduced to the minimum of process/operation on skull in army therapeutic installations and the wounded of this group rapidly they evacuated for the rendering by them of operational aid into specialized army KhPPG. All these measures had good effect on the results of therapeutic aid by that wounded the skull, in spite of extremely unfavorable for this military-tactical circumstances of Belorussian process/operation, causing permanent redislocation of therapeutic installations.

Table 57. Movement of wounded the skull with damage bones (in percentages).

(1) Район в котором происходило лечение раненных в череп	(2) Движение раненных в череп	(3) Находилось на излечении	(4) Выздоровело	(5) Эвакуировано	(6) Оставлено в лечебных учреждениях и прочие исходы	(7) Оперировано из числа лечившихся	(8) Из них умерло
(9) Орловско-Курсккая битва							
(10) Военской	.....	100,0	—	78,9	21,1	4,5	3,6
(11) Армейский	.....	100,0	0,1	58,2	41,7	22,4	9,5
(12) Фронтной	.....	100,0	2,2	46,7	51,1	7,0	11,1
(13) Освобождение Белоруссии							
(10) Военской	.....	100,0	—	80,1	19,9	0,6	28,4
(11) Армейский	.....	100,0	—	48,1	51,9	38,3	11,5
(12) Фронтной	.....	100,0	0,3	75,7	24,0	15,0	9,7

Key: (1). Area, in which occurred the treatment of those wounded the skull. (2). Movement of those wounded skull. (3). It was located undergoing medical treatment. (4). It recovered. (5). It is evacuated. (6). It is left in therapeutic installations and other issues. (7). It is operated from number of those treating. (8). From them it died. (9). Orel-Kursk battle. (10). military. (11). Army. (12). Front line. (13). Liberation of Belorussia.

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Therapeutic aid by that wounded the skull in the period of two offensive combat operations in different season (liberation of Belorussia and process/operation the vistula - Oder).

Both these combat process/operations are characterized by the penetration of the defense of enemy and by the extremely rapid rates/tempos of his troops/forces' pursuit with overcoming on the route/path of the large/coarse water boundaries, by blocking and rout of the ganglia/nodes of resistance. During the liberation of Belorussia the army within 25 days passed with combat approximately 500 km, forcing the rivers and the mute; during process/operation a vistula-Oder army in 26 days it passed with combat approximately 600 km, forcing river Oder.

One of the essential differences in these combat process/operations consisted in the fact that the Belorussian process/operation occurred by summer, from 23 June through 18 July, 1944, in plain, covered with places by forest and by swamps/marshes with many creeks, but process/operation a vistula-Oder was deployed

also in the flat terrain, covered with small forests/scaffolding, in the characterized by thaws period in the winter of of 1945, from 14 January through 10 February; however, all rivers were still contained by ice.

Particular difficulties in the work of therapeutic installations in the period of the liberation of Belorussia consisted of locomotion along the poor roads of forest-bog locality. During process/operation a vistula-Oder therapeutic installations experienced difficulty with redislocation as a result of a deficiency in the fuel, and in latter/last stage burst by enemy dams and flooding of the unit of the disposition of our troops/forces by water with ice considerably complicated rendering aid by wounded.

For characteristics of therapeutic aid by that wounded the skull in the period of the dismantled combat process/operations is given table 58.

Judging by a quantity of those surgical processed wounded the skull and on post-operation lethality, therapeutic aid during process/operation a vistula-Oder was set still better than during the liberation of Belorussia.

Table 58. Movement of wounded the skull with damage bones (in percentages).

(1) Район в котором происходило лечение раненных в череп	(2) Движение раненных в череп	(3) Находилось на излечении	(4) Выздоровело	(5) Эвакуировано	(6) Оставлено в лечебных учреждениях и прочие исходы	(7) Оперировано из числа лечившихся	(8) Из них умерло
(9) Освобождение Белоруссии							
Войсковой		100,0	—	80,1	19,9	0,6	28,4
(10) Армейский		100,0	—	48,1	51,9	38,3	11,5
(12) Фронтальной		100,0	0,3	75,7	24,0	15,0	9,7
(13) Операция Висла—Одер							
Войсковой		100,0	—	82,8	17,2	0,5	6,4
(10) Армейский		100,0	—	53,4	46,6	32,9	7,2
(12) Фронтальной		100,0	—	57,2	42,8	25,4	11,2

Key: (1). Area in which occurred the treatment of those wounded the skull. (2). Movement of those wounded skull. (3). It was located undergoing medical treatment. (4). It recovered. (5). It is evacuated. (6). It is left in therapeutic installations and other issues. (7). It is operated from number of those treating. (8). From them it died. (9). Liberation of Belorussia. (10). <sup>Military</sup> Army. (11). Army. (12). Front line. (13). Process/operation vistula-Oder.

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Dismantling in more detail the condition of rendering to therapeutic aid by that wounded the skull for the time of combat operation a vistula-Oder, it is possible to note that on DMP the surgical treatment of the wounds of skull with the damage of bones

was conducted within this period extremely rarely - only from vital readings. In army area neuro-surgical aid by that wounded the skull was completely provided with the neuro-surgical groups of ORMU [separate medical reinforcement company] and correctly provided by maneuvers of KhPPG; the front line specialized hospital in initial position was located near the line of combat and it accepted to itself those almost all wounded the skull. A deficiency in the fuel in some therapeutic installations somewhat destroyed the selected plan of rendering aid wounded into skull, after preventing the timely redislocation of specialized KhPPG. In connection with this the specialized aid by that wounded the skull in this combat process/operation was connected with a series/row of difficulties. In initial position the neuro-surgical group of ORMU was occupied exclusively with classification and evacuation of those wounded the skull into the front line specialized hospital. However, in it, taking into account the possibility of the entry of a large number of wounded, wounded the skull they operated only from vital readings and in essence produced only classification and evacuation all transportable of those wounded the skull into the following front line specialized hospitals. With the rapid pursuit of enemy forward advanced different KhPPG of army, which picked up wounded, including those wounded in skull. Within entire period of offensive neuro-surgical groups were moved by "sand bars" of one KhPPG in another and provided with the operational specialized aid the

significant part of those wounded the skull.

The special feature/peculiarity of the dismantled combat process/operation is the fact that during the rapid advance of the troops/forces of the evacuation of the wounded of as such from army strictly it was not, but front line hospitals, following the army, "were covered" KhPPG, accepting from them on the spot of wounded. By this is explained somewhat smaller in front line hospitals the lethality of those wounded the skull in the period of process/operation a vistula-Oder, than during Belorussian process/operation.

Thus, the results of the treatment of those wounded the skull in the period of combat process/operation a Visla-Oder in comparison with Belorussian must be acknowledged by very good, in spite of the series/row of the difficulties which it was necessary to overcome during the organization of the specialized aid by that wounded the skull.

Therapeutic aid by that wounded the skull during offensive combat operations in the initial and final period of the Great Patriotic War (rout of the Germans in the environs of Moscow and Berlin process/operation).

Both these offensive combat operations were carried out by our troops/forces on routes of approach to two capitals: to the capital of our native land Moscow and to the hostile capital - Berlin. One occurred in the initial period of war (from 6 December, 1941, through 28 January, 1942), and another - in its final period (from 16 April through 5 May, 1945). Furious fighting in the environs of Moscow conducted by the advancing/attacking army under conditions of the severe winter when frost reached to  $-36^{\circ}$ , in plain, covered with forest and that carried by snow, with by the destroyed and burned retreating enemy the housing fund when the supply and evacuation routes of wounded were broken by tanks, guns and aviation.

Combat process/operation in the environs of Berlin was conducted by the advancing/attacking army in the springtime with small sediments, in plain with the dense net/system of lakes and small forests, crossed dense net/system of the bituminous roads.

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The left by enemy housing fund could be completely used for the needs of therapeutic installations.

The movement of wounded the skull along army, army and front line therapeutic installations in period dismantled combat

process/operations finds its representation in Table 59.

In Table 59 attention is drawn to the impressive contrast between the data of two combat process/operations in a quantity of those operated (in percentages) with the wounds of the bones of skull in army area. While in the period of the rout of the Germans in the environs of Moscow the percentage of those operated was equal to 30.0, moreover was observed high post-operation lethality, during the Berlin process/operation of trepanation the skulls on DMP were conducted only from vital readings, and lethality after process/operation was small.

Further table 59 shows that the percentage of those operated in army area during Berlin process/operation was one and a half times more, but lethality among those operated - is two times less than in the period of the rout of the Germans in the environs of Moscow.

The study of the corresponding reports showed, besides the fact that the general/common/total lethality with the wounds of skull proved to be within the time of Berlin combat operation considerably below in comparison with the first large-scale offensive operation during the Great Patriotic War on enemy's rout on routes of approach to Moscow. By army and army area this lethality during combat in Berlin proved to be almost three times, while by front line area four

times it is lower.

One should also indicate that a quantity of process/operations, produced in army KhPPG with the wounds of the soft tissues of skull, was in the first combat process/operation very insignificant (7.10/o), and the lethality with them of comparatively high. However, the quantity of similar process/operations in the period of Berlin combat was considerably more (32.50/o), and they were not completely escorted/tracked by lethality.

It is necessary to note the very high percentage of the evacuation of easily wounded with the damage only of soft tissues of skull from army (82.50/o) and from front line area (81.80/o) in the period of the rout of the Germans in the environs of Moscow.

Table 59. Movement of wounded the skull with damage bones (in percentages).

(1) Район, в котором происходило лечение раненных в череп	(2) Движение раненных в череп	(3) Находилось на лечении	(4) Выздоровело	(5) Эвакуировано	(6) Оставлено в лечебных учреждениях и прочие исходы	(7) Оперировано из числа лечившихся	(8) Из них умерло
	(9) Газгром немцев под Москвой						
	Войсковой . . . . .	100,0	1,6	49,0	49,4	30,0	46,6
(11) Армейский . . . . .		100,0	0,7	19,2	80,1	49,5	14,3
(12) Фронтальной . . . . .		100,0	—	72,1	27,9	40,0	8,8
	(13) Берлинская операция						
(10) Войсковой . . . . .		100,0	—	85,8	14,2	0,3	3,6
(11) Армейский . . . . .		100,0	—	43,9	56,1	64,8	6,0
(12) Фронтальной . . . . .		100,0	—	79,5	20,5	20,4	8,0

Key: (1). Area, in which occurred the treatment of those wounded the skull. (2). Movement of those wounded skull. (3). It was located undergoing medical treatment. (4). It recovered. (5). It is evacuated. (6). It is left in therapeutic installations and other issues. (7). It is operated from number of those treating. (8). From them it died. (9). Rout of Germans in the environs of Moscow. (10). Army. (11). Army. (12). Front line. (13). Berlin process/operation.

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The evacuation of those wounded the soft tissues of skull during Berlin process/operation presents sharp contrast. From army area within this time were evacuated only 10.2% wounded the soft tissues of skull, while from front line it was not evacuated not one similar

wounded, therefore, this all easily wounded groups remained undergoing medical treatment in army or front line area.

If we for explaining the reasons for such great differences as results of the treatment of the wounds of skull during the dismantled combat process/operations turn to the conditions of rendering to medical aid by that wounded into skull into these periods, then will have to note the following moments.

In army area in the period of the rout of the Germans in the environs of Moscow, in spite of very unfavorable conditions for work of DMP, in connection with their frequent redislocation and fragmentation by several echelons, in them greatly widely was conducted the treatment of the wounds of skull and brain. In this case it is necessary to note that surgical interventions indicated were conducted by surgeons on DMP in the absence of the roentgenological and neuropathological examination/inspection of wounded. Under these conditions in the period of the rout of the Germans in the environs of Moscow was operated on DMP by 30.00/o of wounded with the penetrating wounds of skull, that caused considerable lethality among those operated. The basic reason for lethality, besides the severity of wound, was always not the radical and at the same time the sparing technique of similar surgical interventions on skull and the forced early evacuation of wounded

along the broken roads.

In army area in the period of the rout of the Germans in the environs of Moscow it was still either the specialized hospitals for wounded the skull or the neuro-surgical groups of ORMU. Those wounded the skull were evacuated and entered army KhPPG in general/common/total mass with all surgical wounded.

Thus, evacuation on designation/purpose and specialized aid that wounded the skull in army area in the period of the rout of the Germans in the environs of Moscow yet it was not. In front line area the majority of those wounded the skull was distributed in two powerful/thick SEG, where there were neuro-surgical separations/sections with the qualified cadres.

In contrast to this, in the period of Berlin battle the operability of those wounded the skull on DMF was brought to the minimum, surgical interventions were conducted only from vital readings. In army area the specialized aid by that wounded the skull was provided with appropriate KhPPG, to which were fastened the neuro-surgical groups of ORMU. When in progress of combat these KhPPG proved to be those loaded wounded into skull, specialized aid by that wounded the skull began to render the army evacuation hospital, to which was commissioned the neuro-surgical group of ORMU.

All wounded the skull from army area, besides not only with DMP, but even it is direct from units, they evacuated strictly according to designation/purpose, passing all intermediate stages, into the specialized army hospitals. With this 64.70/o of those wounded into skull entered the specialized hospital for the first 24 hours and already 95.30/o - during the first two days after wound. In the period of Berlin combat process/operation 99.00/o of those wounded the skull they were encompassed by the specialized aid. Operational aid in the army specialized hospitals with the wounds of skull with the damage of bones was shown/rendered into 64.80/o of cases, and with the penetrating wounds of skull - into 84.30/o.

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Thus, the dismantled two combat process/operations sharply differ from each other in terms of the fact that during the rout of Germans in the environs of Moscow in the studied army it was not the still specialized aid of those wounded the skull, during Berlin process/operation this specialized aid, with evacuation according to designation/purpose, stood at great height. This difference in therapeutic aid by that wounded the skull pronounced, it is doubtless, on those results which were obtained during the treatment

of those wounded into skull during the dismantled combat ones by process/operation.

After supplying result to the study of the value of combat circumstances, the season, conditions of climate and locality, one should come to the conclusion/derivation that all these factors to a certain degree affect the results of therapeutic aid by that wounded the skull.

The experiment/experience of war showed that the frequency and the character/nature of the wounds of skull are changed depending on the type of combat process/operations, and also on the conditions of the locality where are deployed combat operations. Especially unfavorable in this respect proved to be the street fightings, with which the wounds will be deposited usually from close distance, more frequently are encountered bullet wounds, and the fragments of stone buildings can play the role of the secondary shells, which increase a number of wounds of skull.

Indirectly frequency and character/nature of the wounds of skull affect climatic conditions. During hot summer days the soldiers sometimes drop the incandesced by the Sun helmets, leaving the head of that not protected. The probability of the wounds of skull in this case increases, and wounds themselves bear heavier character/nature.

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Depending on combat circumstances, locality and especially on season, are changed the conditions of rendering of first aid by that wounded the skull. The saturation of fire/light, open country and season manifest themselves, first of all, the carrying out of wounded from the field of combat. The majority of those wounded the skull, especially with the damage of bones sometimes for several hours is found in unconscious condition and cannot without extraneous aid be selected from the field of battle.

Under winter conditions the wounded undergo, furthermore, to the activity of cold. This is why in the combat process/operations, which are carried out under conditions of winter frost, particular attention was turned to the timely carrying out of those wounded the skull from the field of combat.

The conditions of combat circumstances, climate and especially the character/nature of locality have effect also on the transportation of those wounded the skull. It is known that those wounded the skull greatly heavily withstand evacuation generally, and evacuation along poor roads in particular. Evacuation is that supplementary injury which causes new hemorrhages in the sector of the damaged substance of brain. Therefore during the

decision/solution of a question about the evacuation of that wounded into skull always it was necessary to estimate not only the character/nature of wound and the health of wounded, but also the condition of roads and the extent of evacuation route.

Thus, the conditions of combat process/operation, climate and locality, affecting frequency and character/nature of wound, for the periods of the carrying out of those wounded the skull from the field of combat and their transportation to the first stages of evacuation, thereby have effect on promptness and volume of the specialized neuro-surgical aid.

It is necessary to note also that changes in medical-tactical circumstances during combat process/operation frequently led to the repeated redislocation of the medical installations of the army and army area that it could not but be reflected in the quality of the exerted by them therapeutic aid.

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However, in proportion to removal from the field of combat the role of such factors as the character/nature of combat operations, the condition of climate and locality, gradually decreases and increasing value acquires the organization of the specialized aid.

The analysis of the results of the treatment of those wounded the skull, depending on the character/nature of combat process/operations, season and varied conditions of locality, shows that all these moments, beginning with army area, they retreat to the second plan/layout, being inferior the place for basic factor - the correctly organized system of the specialized neuro-surgical treatment of those wounded into skull.

As showed the experiment/experience of war, the results of the treatment of those wounded the skull primarily depended on the organization of the medical support of a combat process/operation, constructed taking into account the special features/peculiarities of combat circumstances, climate, character/nature of locality and especially from the correct organization of the specialized neuro-surgical aid. Continuous improvement in the course of the war of the organization of medical aid the generally and specialized aid in particular led to the unprecedented ever previously improvement in the results of the treatment of those wounded into skull.

Effect of the organization of the system of the specialized neuro-surgical aid to the results of the treatment of those wounded the skull.

At the beginning of the Great Patriotic War in the

leadership/manual of the military medicine of the Red Army had the already clearly developed system of rendering aid by that wounded into skull, based on the accounting of the experiment/experience of all preceding/previous wars, special features/peculiarities of the course of the wounds of brain, and also possibilities of the provision of a requirement for the cadres of the doctors of the corresponding specialities. As the basis of this system was assumed the beginning of the treatment of the wounds of skull in the specialized KhPPG of army, organized via the attachment of the specialized groups of ORMU for neurosurgery, mandibular surgery, ophthalmology and otolaryngology, and also possibility of the qualified x-ray examination and prolonged post-operation hospitalization of wounded.

Thus, according to this system, the primary treatment of the wounds of skull was transferred from army area where could not be provided either aid of the qualified neurosurgeons and x-ray examination or necessary post-operation hospitalization, into army specialized KhPPG, in which all conditions indicated were presently. In army area surgical interventions on the skull it had to be conducted only from vital readings in the cases of the threatening hemorrhages and sharp growth of intracranial pressure. By these very in this system of the specialized aid by that wounded the skull the center of gravity was transferred not so much to the early processing

of the wounds of skull, as for their deferred processing, but produced under the corresponding conditions.

For the purpose possible of the more rapid delivery/procurement of those wounded the skull into specialized KhPPG the integral part of the indicated system of rendering aid by that wounded into skull was the evacuation of them strictly according to designation/purpose, it is direct into specialized KhPPG, passing all intermediate stages. However, was such the special feature/peculiarity of the system of the specialized treatment of those wounded in skull, accepted by the leadership/manual of the military medicine of the Red Army from the first days of the Great Patriotic War.

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This system, in spite of entire its scientific validity, definition of formulation and provision with the appropriate authorized-organizational structure, at first of the Great Patriotic War in practice it was realized insufficiently satisfactorily. Depended this on many reasons and, first of all, from the fact that the majority of the military medical commanders and leaders of the surgical service of fronts and armies, which are representatives different of surgical schools and by the followers of the dominated in scientific literature standard unscientific ideas, had to acquire

practical experience in order to understand the special features/peculiarities of the course of the wounds of brain and surgical treatment of the bullet wounds of skull and brain in the complicated circumstances of mobile warfare. If we to this add that into army after mobilization was poured doctors' immense quantity, it is virtually insufficient familiar ones with the principles of military field surgery, that initially in immense front the specialized hospitals were not still completely manned by neurosurgeons and neuropathologists, that there were great difficulties during the evacuation of wounded, then will be clear the difficulties of the practical realization of the system of the specialized aid by that wounded into skull, of the occurred in the first period wars.

During this period in surgeons' series/rcw had erroneous tendency toward the operational processing of the wounds of skull within the earliest possible periods in the absence of necessary for this conditions in army area, occurred the cases of the evacuation of those wounded into skull within the nearest periods after surgical interventions, moreover then they frequently evacuated in general/common/total flow. Individual surgeons, being little they are familiar with neurosurgery, attempted to carry out processing the wounds of skull by wide flap sections/cuts or with the extensive carving of the wounds of soft tissue. Processing the wounds of skull

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was in a number of cases of too surface, as a result of which in the depth of wound canal remained a great quantity of the bone fragments; in other cases this processing was conducted, on the contrary, it is too radical, with the excessive traumatization of cerebral substance. Some general/common/total surgeons always did not know how to manage the hemorrhage from the wound of brain and left for hemostasis the tampons; they insufficiently considered the possibility of intracranial pressure increase and always they did not know how it to regulate.

Finally, it is necessary to note that in individual places still was conducted sewing of the tightly processed bullet wounds of skull, which was being propagandized by individual surgeons without taking into account necessary for this conditions.

One should add that in the first period of war the series/row of shortages in the organization of the specialized aid by that wounded the skull was observed not only in the foremost stages of evacuation, but also in front line area and especially in the hospitals of the deep rear in which the shaping of neuro-surgical cots and the provision with specialists' their cadres passed with certain retardation and they were conjugated/combined with very great difficulties.

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For eliminating these all deficiencies and for clear putting into action of the directives of the leadership/manual of military medicine about the prohibition of processing the wounds of skull in army therapeutic installations, except presence to that of vital readings, and also about the evacuation of wounded according to designation/purpose into specialized KhPPG of army area and about the execution of an entire system of the specialized treatment was required known time and series/row of special measures.

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As a result of these measures the system of the specialized treatment of those wounded the skull began to be carried out ever more clearly. In the military medical service of the Red Army in the course of war rapidly forged himself the monolithic collective of medical workers, joined of uniform Soviet doctrine military medicine, which began to harmoniously and creatively improve this system of rendering aid by wounded. Military-medical commanders and surgeons of fronts and armies began to strictly follow the fact so that that wounded the skull they would not operate at DMP, but in proper time evacuated according to designation/purpose into the specialized KhPPG of army. The work of specialized KhPPG and evacuation hospitals began to acquire ever larger and great definition. The timely neurologic examination/inspection of those wounded the skull made it possible to

carry out their more correct classification. Neurosurgeons learned to correctly consider the condition of wounded and mastered delicate technique and at the same time sufficient radical processing of the wounds of brain. The post-operation hospitalization of wounded for the period not less than 3 weeks they began to carry out with pedantic definition.

Thus, the system of the specialized neuro-surgical treatment of those wounded the skull, that clearly outlined by the leadership/manual of the military medicine of the Red Army even in the beginning of the Great Patriotic War, virtually it was possible to fix and to put into practice, only beginning with the second year of war.

This, naturally, it put its impression on the results of the treatment of those wounded in skull and head brain. Therefore the selection/analysis of these results on the years of war deserves particular attention.

Prophylaxis of the wounds of skull and their complications in war and the organization of the delivery/procurement of wounded at DMP.

For the purpose the protection of skull from possible wound, and with its wounds for preventing the contamination of wound and

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subsequent development of infectious complications as far back as of the first world war were outlined and partially were carried out some very rational measures.

By the first and basic of these measures is carrying the soldiers of protective steel helmets. Judging by observations in the first world war, such helmets protected well skull from multiple small/fine fragments, and from that time they began widely to be applied in all belligerent armies.

However, a question about the protective role of helmets with difficulty yields to scientific analysis, and the value of their carrying in war is usually proven by general/common/total considerations and individual ones, true, by sufficiently numerous, by the examples when, in spite of the damage of helmets by fragments or bullets, completely were not observed the wounds of skull or there were only surface wounds. For the more detailed illumination of this question based on materials of the Great Patriotic War it was connected into program of the study of the histories of disease/sickness/illness/malady and obtained in this case data they are presented in the form of table (tables 60).

The given numbers, obtained during the study of a great quantity of wounds of skull, indicate very definitely that because of helmet

the percentage of the penetrating wounds of skull considerably was lowered. Difference in this group of wounds achieves almost one third. On the contrary, in the group of nonpenetrating wounds, especially during the damage of only some soft tissue, in which bore helmet a quantity of lighter wounds relatively increases. Indicated in this case data make it necessary to come to the conclusion/derivation that the carrying of helmet in combat definitely changes character/nature and severity of wounds, considerably decreasing a quantity of riskiest, penetrating wounds of skull.

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One should especially emphasize that the led into tables 60 selection/analysis of the character/nature of wounds is related only to the wounds of skull and does not throw light on completely a question about the protective role of helmet as a whole, since during war, it is doubtless, there was a large number of cases when the possessing relatively small manpower fragments jumped aside from helmet or damaged only helmet, whereas the wounds of skull in this case completely did not occur. All these cases, naturally, cannot be taken into consideration. However, the doubtless presence of the great group of the similar cases even more emphasizes the protective role of helmet.

Completely correspond to the given data the results of the comparison of issues in those wounded the skull depending on that, there was or was not put on helmet during combat (table 61).

Data of Table 61 confirm an improvement in the issues of wounds when helmet in combat was put on. The percentage of lethality in this group is wounded below, while the percentage of recovery is higher than in the wounded whose head was not shielded by helmet.

Thus, on the basis of the materials of the Great Patriotic War it is necessary to recognize the positive role of helmet in a descent in the severity of the wounds of skull.

It is at the same time necessary to emphasize that, unfortunately, the soldiers it is far not always wore helmets, although the troops/forces were completely provided with helmets. It is explained this by the fact that the helmet troubles the head (especially if soldier is not trained to it by prolonged training session), it contributes to the overheating of head in hot summer weather and during hot combat, especially offensive.

Table 60. Effect of helmet on the character/nature of the wounds of skull (in percentages).

(1) Ношение каски ранеными в череп	(2) Характер ранений черепя	(3) Ранения мягких тканей	(4) Непро- никаю- щие	(5) Проин- кающие	(6) Всего
(7)	Каска в бою была надета	49.9	23.6	21.5	100.0
(8)	Каска в бою не была надета	42.7	26.2	31.1	100.0

Key: (1). Carrying of helmet wounded the skull. (2). Character/nature of wounds of skull. (3). Wounds of soft tissues. (4). Nonpenetrating. (5). Penetrating. (6). In all. (7). Helmet in combat was put on. (8). Helmet in combat was not put on.

Table 61. Effect of helmet on issue in those wounded the skull (in percentages).

(1) Ношение каски ранеными в череп	(2) Исход	(3) Выздо- рование	(4) Утрата трудо- способ- ности	(5) Леталь- ность	(6) Всего
(7)	Каска в бою была надета	74.4	21.1	4.5	100.0
(8)	Каска в бою не была надета	67.5	25.7	6.8	100.0

Key: (1). Carrying of helmet wounded the skull. (2). Issue. (3). Recovery. (4). Loss of ability to work. (5). Lethality. (6). In all. (7). Helmet in combat was put on. (8). Helmet in combat was not put on.

The second important measure, doubtless which facilitates prophylaxis both of the contamination of the wounds of skull and development of the subsequent infectious process, this is the short hair-cutting of hair on the head before combat. At the value of this measure have long ago been turned the attention. However, in spite of entire simplicity of this measure, its conducting into life ran into great obstacles causing an entire mode of life of the military circumstances, by exclusively heavy in the period of the bitter battles.

However, in spite of all obstacles, these measures they can and they must be realized by conducting the corresponding organizational measures by military command element, since the value of them is sufficiently great.

The following measure, which is important for prophylaxis of the subsequent complications of the wound of skull, consists in the observance of periods and as the occlusion of the wounds of skull by the appropriate bandage. Measure this, realized on the field of battle, completely depends on the character/nature of combat circumstances and it with difficulty yields to control/regulation.

However, as show materials the studies of combat process/operations, in the course of war and in this area were considerable achievements. Increased a quantity of primary bandages, superimposed by aidmen, medical instructors and feldshers, as about this testifies table 62.

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The periods of rendering of first aid by wounded on the field of battle also changed in the course of war (tables 63).

As can be seen from these data, the periods of rendering of first aid by wounded on the field of battle in the course of war progressively were reduced.

Table 62. Rendering of first aid on the field of battle in different combat process/operations (in percentages).

(1) (2) Боевые операции	(3) Санитарами, санитарными инструкторами, фельдшерами и врачами	(4) Само- и взаимопомощь
(5) Прорыв блокады Ленинграда (январь 1943 г.) . . . . .	44,8	55,2
(6) Орловско-Курская битва (июль 1943 г.) . . . . .	64,4	35,6
(7) Висла — Одер (январь 1945 г.) . . . . .	74,3	25,7
(8) Берлинская операция (апрель 1945 г.) . . . . .	76,9	23,1

Key: (1). Rendering of first aid. (2). Combat process/operations.

(3). By aidmen, medical instructors, feldshers and by doctors. (4).

Self- and mutual assistance. (5). Blockade break-through of Leningrad (January of 1943). (6). Orel-Kursk battle (July 1943). (7).

Vistula-Oder (January of 1945). (8). Berlin process/operation (April of 1945).

Table 63. Periods of rendering to first aid on the field of battle in different combat process/operations (in percentages).

(1) (2) Боевые операции	(3) Сроки оказания первой помощи	(3) До 1 часа	(4) От 1 до 3 часов	(5) От 3 до 6 часов	(6) Свыше 6 часов	(7) Всего
(8) Прорыв блокады Ленинграда (январь 1943 г.) . . . . .		69,7	18,9	9,6	1,8	100,0
(9) Висла — Одер (январь 1945 г.) . . . . .		88,2	8,4	3,0	0,4	100,0
(10) Берлинская операция (апрель 1945 г.) . . . . .		91,0	7,7	1,2	0,1	100,0

Key: (1). Combat process/operations. (2). Periods of rendering of

first aid. (3). To 1 hour. (4). From 1 to 3 hours. (5). From 3 to 6

hours. (6). It is more than 6 hours. (7). In all. (8). Blockade

break-through of Leningrad (January of 1943). (9). Visla-Oder (January of 1945). (10). Berlin process/operation (April of 1945).

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By important moments in the organization of first aid wounded the skull were the periods of the carrying out of wounded from the field of combat and their delivery/procurement on BMP and PMP. All these moments were to a considerable degree caused by the circumstances of combat process/operations, by season and by the character/nature of locality greatly they varied in different combat process/operations. However, in the course of war they also progressively were reduced.

So, during battle in the environs of Stalingrad the majority of wounded entered at BMP during the periods up to 3 hours after wound. For the first 2 hours in the period of combat process/operation Visla-Oder on BMP it was delivered to 80.00% of wounded, and during Berlin process/operation - 89.00%.

Were shortened the periods of the delivery/procurement of wounded on PMP (Table 64).

On PMP, the wounded in the skull, like all other wounded, were

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treated and were replaced the gotten wet bandages and were introduced antitetanus serum, cardiovascular, pain relievers, etc. Furthermore, with purpose of prophylaxis of so terrible a with wounds skull and brain of the infectious process to those wounded the skull, beginning with PMP, gave inside sulfanilamide preparations. However, this important preventive measure not in all stages of war and not in all combat process/operations was carried out sufficiently pedantically.

Great value in work of PMP acquired the correct classification of wounded with the heavy damages of skull, since wounded with the signs/criteria of the growing compression of brain were subject to primary evacuation. The unconscious condition of such victims was not contraindication to evacuation; however, one ought not to have secreted the wounded, who were being found in agonic condition, who undoubtedly were not subject to further transportation.

During individual combat process/operations as a result of complicated combat circumstances, poor condition of roads, absence of living quarters and deficiency in transport means on some PMP were created the very stressed working conditions as a result of the accumulation of a considerable quantity of wounded. In the similar cases skillful maneuver by transport means and cadres of DMP made it possible to dress up the stressed circumstances on PMP.

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Thus, for instance, during the liberation of Belorussia after assault crossing of the Niemen to recently occupied with our troops/forces shore with DMP for aid of PMP were isolated particular groups in the composition of surgeon, nurses and aidmen who, after being situated in 2 km from line of fire, ensured first aid and rapid evacuation of wounded to DMP.

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Table 64. Periods of the delivery/procurement of the litter wounded on PMP in different combat process/operations (in percentages).

(1) Боевые операции	(2) Сроки доставки на ПМП	(3) До 2 часов	(4) От 2 до 4 часов	(5) От 4 до 6 часов	(6) От 6 до 8 часов	(7) Свыше 8 часов
(8) Орловско-Курская битва (июль 1943 г.)	Орловско-Курская битва (июль 1943 г.)	43,3	26,9	15,3	9,4	5,1
(9) Освобождение Белоруссии (июль 1944 г.)	Освобождение Белоруссии (июль 1944 г.)	48,3	27,6	14,0	5,4	4,7
(10) Висла — Одер (январь 1945 г.)	Висла — Одер (январь 1945 г.)	62,4	18,3	11,0	5,0	3,3
(11) Берлинская операция (апрель 1945 г.)	Берлинская операция (апрель 1945 г.)	66,6	19,8	8,4	4,2	1,0

Key: (1). Combat process/operations. (2). Periods of delivery/procurement on PMP. (3). To 2 hours. (4). From 2 to 4 hours. (5). From 4 to 6 hours. (6). From 6 to 8 hours. (7). It is more than 8 hours. (8). Orel-Kursk battle (July 1943). (9). Liberation of Belorussia (July 1944). (10). Visla-Oder (January of 1945). (11). Berlin process/operation (April of 1945).

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During the penetration of the defense of enemy in combat process/operation a Visla-Oder individual groups with of DMP also were utilized for reinforcing the composition of PMP. Finally, with the pursuit of enemy PMP, forced to follow the regiment during the rapid advance of military units forward, left sometimes nontransportable wounded in the populated place under the observation of medical workers to the approach of transport DMP.

The important moment of work of PMP, the formulation of the medical documents of forward area, have especially great value with the wounds of skull. In these cases indication of nausea, vomiting, temporary/time loss of consciousness, and also other signs/criteria of jolt or contusion of brain forced to more serious estimate the condition of wounded even during, it would seem, surface wound or light damage of skull. Unfortunately, as showed the study of the corresponding documents, filling of the maps/charts/cards of forward area during the Great Patriotic War in a number of cases always was not located on proper height.

Finally, latter/last essential team in rendering to preliminary aid by that wounded the skull composed the periods of their delivery/procurement on DMP, where by the wounded can be shown/rendered the already qualified surgical aid.

Table 65 gives the established/installed on the basis of the available documents periods of the entry of wounded on DMP in the period of different combat process/operations.

The given data, although they envelop the restricted quantity of combat process/operations, nevertheless sufficiently demonstrative

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show, as in the course of war progressively were reduced the periods of the delivery/procurement of wounded on DMP.

Therapeutic aid by that wounded the skull in different stages of evacuation.

Medical aid by that wounded the skull in army therapeutic installations.

As has already been indicated above, DMP and KhPPG of the first line were during the Great Patriotic War the first therapeutic installations, to which according to the plan was charged the provision with the surgical aid of wounded. In connection with this they had available the appropriate surgical cadres and entire necessary equipment for production in all possible special process/operations.

Table 65. Periods of the delivery/procurement of wounded on DMP in different combat process/operations (in percentages).

(1) Боевые операции	(2) Сроки доставки на ДМП	(3) До 6 часов	(4) От 6 до 12 часов	(5) От 12 до 18 часов	(6) От 18 до 24 часов	(7) Свыше 24 часов
(8)						
Сталинградская битва (сентябрь—декабрь 1942 г.)		14,8	22,7	22,4	19,5	20,6
Орловско-Курская битва (июль 1943 г.)		52,6	36,9	6,2	1,8	2,9
Висла — Одер (январь 1945 г.)		50,8	32,6	10,5	3,4	2,7
Берлинская операция (апрель 1945 г.)		66,2	20,8	9,0	3,2	0,8

Key: (1). Combat process/operations. (2). Periods of delivery/procurement on DMP. (3). To 6 hours. (4). From 6 to 12 hours. (5). From 12 to 18 hours. (6). From 18 to 24 hours. (7). It is more than 24 hours. (8). Stalingrad battle (September-December of 1942). (9). Orel-Kursk battle (July 1943). (10). Visla-Oder (January 1945). (11). Berlin process/operation (April of 1945).

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Nevertheless the leadership/manual of military medicine from the very beginning of the Great Patriotic War did not consider it advisable to produce surgical interventions on skull in army therapeutic installations, since DMP and KhPPG the first line did not have available X-ray apparatuses, by the cadres of the neurosurgeons and neuropathologists, and most important, according to the conditions of army area, they could not ensure with wounded so/such necessary after process/operations on skull prolonged hospitalization.

In spite of these installations, was required certain period, until them solidly assimilate all military medical commanders and surgeons of fronts and armies, and into the first period of war operational aid by that wounded the skull frequently proved to be on DMP and in KhPPG of the first line. Thus, for instance, during Stalingrad battle in some KhPPG of the first line the operability of wounded the skull with damage bones achieved 54.0c/o.

Soon this tactic with respect to those wounded the skull was

changed, at DMP they began to render operational aid only from vital readings, whereas majority wounded the skull evacuated according to designation/purpose into the specialized KhPPG of army.

The changes indicated in surgical tactics of DMP with respect to those wounded the skull illustrates the material of the studied combat process/operations (Table 66).

Table 66 shows great operational activity on DMP with respect to the wounds of skull with the damage of bones during the first year of war and its contraction/abbreviaticn to minimum limits in the period of latter/last combat process/operations.

On that, to what extent was correct this tactics of the sharp limitation of process/operations with the wounds of skull with the damage of bones in army area, testify, first of all, the data of detail among the same operated on DMP in period combat process/operations (Table 67).

Table 66. Operability of wounded with the damage of the bones of skull at DMP in different combat process/operations (in percentages).

(1) <sup>(2)</sup> Боевые операции Оперированность на ДМП	(3) <sup>(3)</sup> Рот немцев в окрестностях Москвы	(4) <sup>(4)</sup> Сталинградская битва	(5) <sup>(5)</sup> Прорыв блокады Ленинграда	(6) <sup>(6)</sup> Орловско-Курский битва	(7) <sup>(7)</sup> Освобождение Белоруссии	(8) <sup>(8)</sup> Висла-Одер	(9) <sup>(9)</sup> Берлинская операция
(10) Оперированность раненных в череп	30,0	17,5	4,9	4,5	0,6	0,5	0,3

Key: (1). Combat process/operations. (2). Operability at DMP. (3). Rout of Germans in the environs of Moscow. (4). Stalingrad battle. (5). Blockade break-through of Leningrad. (6). Orel-Kursk battle. (7). Liberation of Belorussia. (8). Vistula-Oder. (9). Berlin process/operation. (10). Operability of those wounded skull.

Table 67. Lethality among operated at DMP wounded with the damage of the bones of skull in different combat process/operations (in percentages).

(1) <sup>(9)</sup> Боевые операции Летальность на ДМП среди оперированных	(2) <sup>(2)</sup> Рот немцев в окрестностях Москвы	(3) <sup>(3)</sup> Сталинградская битва	(4) <sup>(4)</sup> Прорыв блокады Ленинграда	(5) <sup>(5)</sup> Орловско-Курская битва	(6) <sup>(6)</sup> Освобождение Белоруссии	(7) <sup>(7)</sup> Висла-Одер	(8) <sup>(8)</sup> Берлинская операция
(10) Летальность среди оперированных раненных в череп	46,6	16,6	22,0	3,6	28,4	6,4	3,6

Key: (1). Combat process/operations. (2). Rout of Germans in the environs of Moscow. (3). Stalingrad battle. (4). Blockade break-through of Leningrad. (5). Orel-Kursk battle. (6). Liberation of Belorussia. (7). Vistula-Oder. (8). Berlin process/operation. (9). Lethality on DMP among those operated. (10). Lethality among operated

those wounded skull.

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As can be seen from Table 67, lethality among those operated at DMP with the contraction/abbreviation in them of operational activity with respect to the wounds of skull with the damage of bones sharply descended. During the study of the corresponding documents it is possible to see that during the rout of the Germans in the environs of Moscow of process/operation on the skull were done at DMP not always correct. During processing in a number of cases were allowed/assumed the errors: the wide carving of skin wound in the form of "five-kopek coins", abandonment in the wound of bone fragments, supplementary damages of cerebral substance in the searches/scannings of foreign bodies, autopsy of dura mater without sufficient bases, etc. In the period of Stalirgrad battle and blockade break-through of Leningrad in surgical technology during perfecting of the wounds of the bones of skull on some DMP were noted the same errors, but to a lesser degree. During Orel-Kursk battle on different DMP was observed always uniform tactics with respect to those wounded the skull with the damage of bones.

Logically does arise the question: is not explained contraction/abbreviation indicated above of operational activity in

army area with the wounds of skull by failure in surgical aid to those wounded by whom the timely process/operation could save life? For a response/answer to this question should be compared operational activity at DMP with general/common/total lethality with the wounds of skull in army area in the period of the same combat process/operations.

Diagram (Fig. 63) shows that, in spite of sharp reduction of operational activity in army area in recent years of war, general/common/total lethality with the wounds of skull with the damage of bones in comparison with the first years of war became considerable less.

Thus, comparing all given data, it is possible to conclude that the sharp contraction/abbreviation of the operational perfecting of the wounds of skull with the damage of bones in army area not only was escorted/tracked by a considerable descent in the lethality among those operated, but also favorably it was repelled in the overall decrease of lethality with this group of wounds.

It goes without saying that a question about the correctness of the accepted by leadership/manual military medicine of installation about contraction/abbreviation to the minimum of operational activity in army area with the wounds of skull with the damage of bones cannot

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be solved finally on the basis of some given data alone on DMP. For this decision/solution it is necessary to trace further fate of this group of wounded in army, front line and service area.

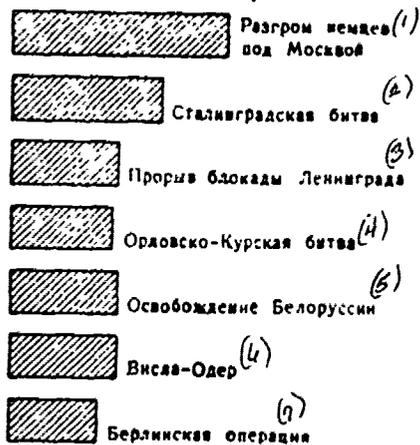


Fig. 63. General/common/total lethality with the wounds of skull with the damage of bones on DMP in different combat process/operations.

Key: (1). Rout of the Germans in the environs of Moscow. (2). Stalingrad battle. (3). Blockade break-through of Leningrad. (4). Orel-Kursk battle. (5). Liberation of Belorussia. (6). Vistula- Oder. (7). Berlin process/operation.

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Furthermore, dismantling surgical activity at DMP with respect to those wounded the skull, it is necessary to be stopped at a question about that, how radically were operated the army area this wounded groups, which were requiring in process/operation "from the vital readings", to number of which must be referred the cases of external and intracranial hemorrhages with the growing compression of

brain. Straight/direct data for a response/answer to this question in the studied report materials there is not. However, the indirect data of pathoanatomical autopsies, indicating the frequency deaths from intracranial hematomas in foremost therapeutic installations, make it necessary to assume, that these process/operations "from vital readings" were conducted in army area nevertheless insufficiently. This, it is doubtless, it will be worthwhile in connection with the difficulty of correct recognition of the syndrome of the growing intracranial hemorrhage under conditions for the stressed work of army area in the absence of the consultation of neuropathologist and difficulty to establish/install timely readings to surgical intervention.

In contrast the descent in the operational activity indicated at DMP with respect to the wounds of skull with the damage of bones, the frequency of the surgical perfecting of the wounds of the soft tissues of skull in army area during the Great Patriotic War considerably increased (Table 68).

This tactics with the wounds of the soft tissues of skull made it possible to leave the lightest group of these wounded in the limits of army area to full/total/complete recovery, in consequence of which the evacuation of those wounded the soft tissues of skull from army area began during war gradually to fall (Table 69).

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The data of Table 69 indicate the decrease of evacuation with DMP of those most easily wounded the soft tissues of skull during war.

Table 68. Operability of those wounded the soft tissues of skull at DMP in different combat process/operations (in percents).

(a)	(1) Боевые операции	(2) Роты немцев в Москве	(3) Сталинградская битва	(4) Прорыв блокады Ленинграда	(5) Операция «Курская дуга»	(6) Освобождение Белоруссии	(7) Висла-Одер	(8) Берлинская операция	(9) Оперативность в ДМП
(a) Оперативность в ДМП									
(b) Оперативность раненых в мягкие ткани черепа		6,3	7,6	6,8	13,0	13,8	8,0	14,5	

Key: (1). Combat process/operations. (2). Germans' rout in the Moscow environs. (3). Stalingrad Battle. (4). Blockade break-through of Leningrad. (5). Orel-Kursk battle. (6). Liberation of Belorussia. (7). Visla-Oder. (8). Berlin process/operation. (9). Operability at DMP. (10). Operability of those wounded the soft tissues of skull.

Table 69. Evacuation of those wounded the soft tissues of skull from army area in different combat process/operations (in percentages).

(a)	(1) Боевые операции	(2) Роты немцев в Москве	(3) Сталинградская битва	(4) Прорыв блокады Ленинграда	(5) Операция «Курская дуга»	(6) Освобождение Белоруссии	(7) Висла-Одер	(8) Берлинская операция	(9) Эвакуация в ДМП
(a) Эвакуация в ДМП									
(b) Эвакуация раненых в мягкие ткани черепа		77,0	87,0	97,9	72,3	85,0	78,6	78,1	

Key: (1). Combat process/operations. (2). Rout of Germans in the environs of Moscow. (3). Stalingrad battle. (4). Blockade break-through of Leningrad. (5). Orel-Kursk battle. (6). Liberation of Belorussia. (7). Vistula-Oder. (8). Berlin process/operation. (9). Evacuation of wounded from DMP. (10). Evacuation of those wounded

soft tissues of skull.

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Important team in the system of the specialized neuro-surgical aid by that wounded in the skull, besides contraction/abbreviation to the minimum of their operability at DMP, composes also their evacuation according to designation/purpose from army area to the specialized KhPPG of army.

As testifies the experiment/experience of the Great Patriotic War, in its first years the evacuation of those wounded the skull according to designation/purpose was realized hardly ever and the frequently wounded of this group they evacuated by reverse empty car in general/common/total flow with other wounded to the nearest therapeutic installation, arranged/located on the route of transport. Evacuation from DMP during the first years of war according to the conditions of combat circumstances sometimes underwent wounded into skull, located in nontransportable condition on severity wounds or soon after the transferred process/operation. Such examples of the evacuation nontransportable of those wounded in the skull were observed, for example, during the rout of Germans in the environs of Moscow in 1941, moreover in the period of this battle those wounded the skull were distributed among all wounded in different hospitals

of army area in a quantity from 1.0 to 6.20/o. During Stalingrad battle in 1942 of those wounded the skull they guided initially in KhPPG of the first line and only subsequently evacuated into another KhPPG of army, including in so called specialized KhPPG. In the period of this combat process/operation, in spite of the tendency to concentrate the wounded of this group in the specially isolated hospitals of army, nevertheless was observed the dispersion of those wounded the skull, moreover to 4.0-5.0o/c it entered remaining KhPPG of army area. Those wounded the soft tissues skulls guided during this period predominantly into the hospitals of the second echelon GBA; however, together with those easily wounded the soft tissues of skull it struck into these hospitals and certain quantity those more heavily wounded the skull, with the damage of bones.

During the blockade break-through of Leningrad during January 1943 in army was an already specialized hospital for those wounded into skull; however, the unit of these wounded was evacuated nevertheless first from army area for the evacuation points, arranged/located on the flanks of army, and only from there already was headed for specialized KhPPG, arranged/located in the center of army, i.e., for those wounded the skull was created, thus, the excess stage of evacuation. Furthermore, into the specialized hospital during this combat process/operation, besides those wounded the head, entered almost the same quantity of heavily wounded of

general-surgical profile.

In contrast the combat process/operations indicated, during Orel-Kursk battle (July 1943) was observed already the clear direction of those wounded the skull strictly according to designation/purpose into specialized KhPPG of army. The same clear evacuation of wounded strictly according to designation/purpose from army area into specialized KhPPG occurred also into period of the combat process/operations of liberation of Belorussia (1944), Vistula-Oder (1945) and Berlin process/operation (1945).

A precise evacuation of those wounded the skull according to designation/purpose considerably accelerated the periods of their delivery/procurement into specialized KhPPG of army area. Thus, for instance, in the first period the liberation of Belorussia 66.30/o of those wounded the skull entered into the specialized hospital for the first 24 hours from the moment of the wound; whereas during Berlin combat process/operation during that period it entered to 64.70/o, and for 48 hours after wound - 95.30/o of wounded.

In the first period of the great Patriotic war during the evacuation of wounded with the damage of skull from army area sufficiently widely were applied the various kinds of bandage for the immobilization of head.

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However, the accumulated within the time of war experiment/experience made it necessary subsequently completely to refuse from the immobilization of head with the aid of splints, since in severely wounded, who were being found in the stunned or unconscious condition, this sometimes led to the aspiration of emetic masses into respiratory tracts. The rest, necessary for head with such wounds, was best anything achieved with the aid of the tightly well-packed sacs/bags/follicles with sand or cushions, and mainly, by attentive medical observation during transportation.

It should also be noted that during the evacuation of wounded the skull with damage bones in first half war occurred the cases of the violation of very important requirements, namely their transportation in horizontal/lying position/situation to avoid serious complications. Sometimes similar by sight of easily wounded transported, as this was, for example, during Orel-Kursk battle, in sedentary position/situation. Most frequently this was encountered during the evacuation of those wounded the skull by reverse empty car in a total number with the wounded of general-surgical profile. In proportion to the development of the system of the specialized

treatment of those wounded the skull to these deficiencies in the evacuation was turned considerable attention and for the transportation of those wounded the skull "according to designation/purpose" they began to use special transport, strictly observing all particular requirements presented to the evacuation of this type of wounded.

Medical aid by that wounded the skull in army therapeutic installations.

Basic link in the system of the specialized treatment of those wounded the skull had to compose according to the plan of the leadership/manual of military medicine by the specialized KhPPG of army. They were formed via command to general-surgical KhPPG of neuro-surgical and other groups of ORMU. Created thus specialized KhPPG it had available the neuro-surgical group, which consisted of neurosurgeons, neuropathologist and state/staff of bandaging regiment, and also ophthalmological, otolaryngological, stomatological and roentgenological group, equipped with X-ray apparatus. When, in ORMU, the same second specialized groups are present, the leadership/manual medical services of army had the opportunity to create in army two specialized KhPPG for those wounded the head. The provision of each specialized KhPPG with specialists' group in the composition of neurosurgeon, neuropathologist,

ophthalmologist, otorhinclaryngologist and stomatologist created the possibility of correct treatment of such the frequent ones with the wounds of the skull of the combined damages of orbit, sinuses of nose and ear. Presence in state/staff of this specialized hospital of an ophthalmologist, otiatrist and rcentgenclcgist made it possible to produce the comprehensive examination/inspection of those wounded the skull and the head brain.

Organization of the specialized KhPPG in the basis general-surgical field hospitals via the attachment to them of the specialized groups of ORMU had by the task of ensuring necessary maneuverability of the specialized aid of army. The command element of the medical service of army received as a result of this possibility, with respect to medical-tactical circumstances, it is easy to transfer the specialized groups of ORMU from one KhPPG to another, providing the specialized aid in any sector of army.

The most advisable location of specialized KhPPG in army was the limiting point of evacuation routes/paths from divisions, which made it possible to ensure the most rapid delivery/procurement of those wounded the skull of all divisions.

In the presence in army of two evacuation directions the medical aid by that wounded the skull was provided by another specialized KhPPG. At the rapid offensive of the troops/forces of army the specialized aid by wounded was achieved by the transportation of the specialized groups of ORMU "moving" to that arranged/located ahead KhPPG.

This scheme of the organization of the provision of those wounded into skull by the specialized aid underwent during the Great Patriotic War further development. In particular, in all front sectors medical commanders soon in practice were convinced of the advisability of the recommendations of GVSU of the Red Army about the evacuation of wounded regarding designation/purpose to the bunched disposition of the specialized hospitals so that in the neighborhood from KhPPG for those wounded the skull would be arranged/located hospitals for the wounds of thigh and large/coarse joints, and also for those wounded the breast and the abdominal area. This collector/receptacle of the specialized hospitals it proved to be most advisable to arrange/locate beside basic evacuation route/path in order to avoid unloading to it from the "reverse empty car" of the wounded of general-surgical profile.

The experiment/experience of war showed that, where these conditions were not observed and specialized KhPPG was deployed isolated/insulated, especially if it in this case was

arranged/located even on basic evacuation route and the principle of evacuation along designation/purpose was not sufficiently observed, then this hospital, as a rule, was rapidly loaded by the grown heavy in route/path wounded of other profiles, which violated operation in rendering to the specialized aid. In contrast to this, during the correct organization of evacuation according to designation/purpose and the bunched disposition of hospitals not only were created the best conditions for rendering to specialized aid in each individual hospital, but also was provided by wounded the mutual consultation of the necessary specialists and their aid with the combined and multiple wounds of different areas.

Further it should be pointed out that, in spite of all advantages in the sense of maneuverability which were created by the system of the attachment of the specialized groups of ORMU to any KhPPG of army and its conversion into the specialized hospital, this system in the beginning of war nevertheless had a series/row of shortages, caused by neurosurgeons' insufficient quantity in the country in 1941 for the satisfaction of the requirement of army for these specialists. The basic shortage, connected with neurosurgeons' deficiency in army, was the fact that the basic state/staff of KhPPG, which was being occupied usually by general-surgical work, was little familiar with the specific character of care of those wounded the skull and their treatment, and therefore with commanding of the

neuro-surgical group of ORMU those wounded the skull, in fact, were deprived of the specialized aid.

However, this forced GVSU of the Red Army from the first days of war to deploy the net/system of the courses of specialization for the urgent training of personnel of the neurosurgeons. Furthermore, in armies began to be created the specialized hospitals in the basis of specific KhPPG whose staff was trained to the specific character of work with those wounded the skull. In some armies organized were, besides the groups of ORMU, also permanent specialized KhPPG, provided and permanent neurosurgeon, and with X-ray apparatus. Such specialized KhPPG during their bunched disposition jointly with hospitals for those wounded the thigh and the large/coarse joints, and also for those wounded the thoracic and abdominal area provided the highly skilled medical aid by wounded under varied conditions of the combat operations of the troops/forces. As already mentioned, the great value here had the evacuation of wounded from the DMP and KhPPG of the first line is strict according to designation/purpose.

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Finally, it should be noted that for the provision of rapid by the aid of those wounded into skull even in the period of the

especially rapid advance of the troops/forces forward of GVSU of the Red Army it specializedly developed the very advisable system of maneuver by the substances of the specialized aid. In this case on the departure line before the offensive all KhPPG and army groups of ORMU, intended for the specialized aid, they were found in the convoluted condition, but in front/leading line was deployed for rendering to the specialized aid the army or even front line evacuation hospital, provided with staff of its specialists or by specialized by groups front line ORMU. This front line hospital picked up in first phase of combat all of those wounded the skull. During the advance of the troops/forces ahead was deployed already army specialized KhPPG, first one, and thereupon another.

The given system of maneuver by the specialized hospitals played exceptional role in rendering to the timely and highly skilled medical aid by that wounded the skull during the Great Patriotic War. System this in all details was developed by GVSU of the Red Army and it was persistently carried out by it.

However, it should be noted that it immediately was not understood by all military medical commanders at the immense front of the Great Patriotic War, and was required the series/row of special directives and instructions, in order to realize it into the practice of military field service.

In connection with this the given schema of the formation of the specialized aid by that wounded the skull in army, front line and even service area underwent, naturally, great oscillations/vibrations depending on the period of war and varied conditions of the combat operations of the troops/forces. The experiment/experience of war confirmed that also the front line hospitals, but in the exceptional cases even rear, must be they were ready to work under conditions of army and sometimes army area. Therefore in the basis of the work of the entire specialized aid must lie/rest the stages of evacuation with an indispensable accounting of special features/peculiarities of the pathogenesis of the wounds of skull and brain and periods of the entry of wounded into treatment installations.

During the combat process/operation of the rout of the Germans in the environs of Moscow (1941-1942) the specialized groups of ORMU for aid that wounded the skull in army area in the studied army yet it was not. This wounded groups were evacuated from army area into all KhPPG in the general/common/total flow with those obtained of wound into other areas of body. Army KhPPG did not have during this period not only of neurosurgeons, but also sufficient quantity of qualified surgeons. To this should be added another deficiency in living provisions for positioning/arranging the hospitals, strong

winter frost, poor evacuation routes and overloading of hospitals.

These unfavorable conditions during the rout of the Germans in the environs of Moscow caused comparatively great general/common/total lethality among heavily wounded the skull with damage bones. Surgical interventions with these wounds of skull were produced in army KhPPG within this period into 49.50/o of cases with the comparatively small post-operation lethality - 14.30/o, which indicates that surgical interventions were conducted in the group more easily wounded. Surgical interventions with the wound of the soft tissues of skull were produced in the period of this combat process/operation of altogether only into 1.10/o of cases.

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In the period of Stalingrad battle (1942-1943) in the dismantled army although were hospitals, specially intended for the treatment of those wounded the skull however in them even on it was the neuro-surgical groups of ORMU and was felt deficiency in the qualified surgeons of general/common/total profile. Those wounded the skull they evacuated into all KhPPG of army, frequently in general/common/total flow with the wounded of other profiles, although has already been observed certain tendency to concentrate them in the specific hospitals. The general/common/total lethality of

wounded the skull with damage bones in this combat process/operation although proved to be below than during the rout of the Germans in the environs of Moscow however it was still comparatively high. Surgical interventions with the wounds of skull with the damage of bones were produced in army KhPPG into 36.4c/o of cases with lethality among those operated into 20.1c/o. Operability with the wound of the soft tissues of skull achieved during this period 15.9c/o, moreover lethality among those operated was equal to 0.9c/o.

During the blockade break-through of Leningrad (January of 1943) in the dismantled army was isolated already specialized KhPPG and for rendering to neuro-surgical aid was commissioned the special group of front line ORMU. However, this neuro-surgical group was utilized not only for the surgical perfecting of those wounded the skull. During the combat process/operation indicated the activity of the specialized hospitals came in essence to sorting-surgical dressing work and evacuation, and partially - to rendering aid to a great quantity of entered hospital general-surgical wounded. Specialized KhPPG for those wounded the skull was first expanded on initial position in the center of the army; then, in proportion to the advance of army forward, via the redislocation of neuro-surgical group was organized by the second specialized KhPPG in the operating flank of army. Partially wounded into skull entered during this combat process/operation directly from army area into the specialized

hospital. However, unit more easily wounded entered GOPEP and after this was headed for the hospital basis of front, with exception of the grown heavy wounded whom they guided from GOPEP into army specialized KhPPG. In view of the special features/peculiarities of the conditions of Leningrad Front, which were consisting in disposition near from the army of large/coarse front line base, almost half those wounded the skull was directed during this process/operation from army directly to front line area.

The general/common/total lethality of wounded the skull with damage bones in army area was during this combat process/operation considerably lower than in both preceding/previous. Operability of those wounded the skull from damages of bones in army area, in view of the nearness of this area of Leningrad, was comparatively low (15.50/o), and post-operation lethality among those operated was equal to 16.10/o. Comparatively high lethality of those operated is explained by the fact that in the specialized hospitals of army they operated mainly heavy, nontransportable wounded. During the dismantled combat process/operation in army area operated those only 3.20/o wounded the soft tissues the skulls, since in their basic mass they were evacuated on GBF.

Thus, in the period of the blockade break-through of Leningrad during January 1943 based on the example of the studied army it is

evident that the specialized aid by that wounded the skull was realized in army KhPPG by imparting to it the neurosurgical group of ORMU. This specialized KhPPG was located on initial position in the center of army area. During the advance of army forward in this combat process/operation neuro-surgical group was transferred to that arranged/located ahead KhPPG, which was converted the secondly specialized hospitals.

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The most heavily wounded the skull were processed in these KhPPG; however, the large part of those wounded the skull, without holding up in army area, they evacuated immediately to the arranged/located hereatout powerful/thick hospital basis of front.

In the period of Grel-Kursk battle (July 1943) in dismantled army were two specialized KhPPG. However, in view of the need for the subsequent movement of hospitals forward, one specialized KhPPG in the beginning of battle was convoluted. Therefore all wounded the skull accepted to itself only one specialized KhPPG, arranged/located in the center of army. In progress of combat, in view of the advance of our troops/forces and loading of this KhPPG, ahead it was expanded by the second specialized KhPPG, which accepted to itself those all wounded the skull. Within this period first specialized KhPPG it had

time to be unloaded, evacuating the unit of the wounded into front line area and after leaving on the spot the group of medical workers for the recuperation of the nontransportable wounded, and to be relocated by "sand bar" following by the attacking troops/forces. After being situated ahead second specialized KhPPG, it again began to pick up those wounded the skull.

For the provision for neurosurgical aid in army were two neuro-surgical groups of ORMU, by which they reinforced state/staff the one, the another specialized KhPPG. Furthermore, in this army in state/staff of both specialized KhPPG it was on one neurosurgeon, and also there was X-ray apparatus. This created great possibilities for rendering to neuro-surgical aid.

During Orel-Kursk battle of those wounded the skull they guided already completely according to designation/purpose into the specialized hospitals. As a rule, wounded into skull entered the specialized hospital from army region on the 2-3rd day after wound. Besides those wounded into skull and head, specialized KhPPG they accepted even and those wounded the chest. In all in the period of this combat process/operation specialized KhPPG received 90.0% of all wounded the skull with damage bones and 46.8% with the wounds of the soft tissues of skull. More heavily wounded the skull with damage bones was operated in specialized hospitals 22.4%; lethality

among them composed 9.5c/o. Wounded into the soft tissues of skull it was operated by 14.0o/c.

Lethality with the wound of skull with the damage of bones in army area was in the period of Orel-Kursk battle still lower than during the blockade break-through of Leningrad.

It should be noted that during Orel-Kursk battle, in view of the large entry of those wounded the skull into the specialized hospitals, the latter, in spite of reinforcing of state/staff IS by the neuro-surgical groups of ORMU, it had to evacuate a considerable quantity of those wounded the skull to GEF. Transportable wounded they immediately evacuated by aircraft into the specialized hospitals of front line area. Because of a sufficient quantity of medical aircraft in this way it was possible to transport all been subject to evacuation those wounded the skull; which allowed specialized KhPPG to perform its work under calmer conditions.

After supplying results, it is possible to say that within the time of Orel-Kursk battle in the middle of 1943 the specialized treatment of those wounded the skull in army area was realized already entirely. As a result of this it was possible to attain a considerable descent in the lethality with the wounds of skull with the damage of bones in army area.

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During the liberation of Belorussia (July 1944) in the dismantled army for rendering to neuro-surgical aid by that wounded into skull were two completely manned neuro-surgical groups of ORMU. Specialized aid in this combat process/operation rendered under conditions overcoming of the sustained defense of enemy and preceding with combat of his units, moreover our troops/forces within 25 days moved up to distance of approximately 500 km.

For rendering to neuro-surgical aid on initial position in 10-18 km from army area was expanded army evacuation hospital with the attached to it both neuro-surgical groups of ORMU. After the penetration of the defense of the enemy, with his troops/forces' pursuit, one of the neuro-surgical groups was moved forward into deployed here KhPPG, which began to pick up those wounded the skull. By further rapid advance of the troops/forces always were conducted the transportation of the groups of ORMU by "sand bar" to that arranged/located ahead KhPPG of the first line, which after this became specialized and began to pick up those wounded into the skull, which proved to be from behind specialized KhPPG continued the recuperation of the operated wounded. Its serviced neuro-surgical

group of ORMU soon was transported into new KhPPG.

For this combat process/operation those wounded the skull with the damage of bones were encompassed by aid in the specialized hospitals into 85.90/o of cases, wounded the soft tissues - into 63.40/o, moreover 66.30/o all of those wounded the skull were delivered into specialized KhPPG during the first day from the moment of wound. The easily wounded the soft tissues skulls during this combat process/operation partially entered directly to GLR which were maximally approximated to army area.

To surgical intervention in army area it underwent by 38.30/o of wounded with the damage of bones, moreover more than in half of these wounded of process/operation they were produced during the first day after the wound; lethality in the specialized hospitals among those operated with the wounds of skull with the damage of bones was equal to 11.50/o.

Deserves attention the fact that in those, comparatively rare cases when wounded with the damage of the bones of skull entered general-surgical KhPPG, lethality after surgical intervention achieved 22.00/o and, therefore, it was doubly higher than lethality among wounded, processed by the neurosurgical groups of ORMU.

Thus, the Belorussian process/operation is an example of further creative development of the system of the specialized treatment wounded in the skull which was carried out in this process/operation, in spite of all difficulties of medical-tactical circumstances, connected with the extremely rapid advance of the attacking troops/forces. As a result of applying the specialized treatment of those wounded the skull during the liberation of Belorussia in army area the general/common/total lethality of those wounded the skull with the damage of bones and the lethality among those operated they were comparatively small.

During combat process/operation a Vistula-Oder (January 1945) the dismantled army arranged/located for rendering to the specialized aid by two neuro-surgical groups of ORMU. In the initial position before the penetration of the deeply distributed in depth defense of the enemy on small bridgehead/beachhead on the western shore of the vistula it was possible to situate only several hospitals.

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One of them - to evacuation point - was attached the neuro-surgical group of ORMU and in it they guided those wounded into skull, that entered directly from units. In this hospital produced only the classification and rebandaging of wounded in the skull and were taken

antishock measures. All transportable wounded the skull evacuated to another shore the vistulas into the deployed there front line specialized evacuation hospital. Nontransportable wounded they transmitted into arranged/located next to evacuation hospital KhPPG, which was being serviced by the unit of the neurosurgical group of ORMU.

The front line specialized evacuation hospital, having available neuro-surgical separation/section and X-ray apparatus, performed in essence sorting-evacuation work, leaving in itself those heavily wounded the skull. This tactics was caused by the possibility of the great entry of wounded during long time.

With the rapid pursuit of enemy the specialized aid by that wounded the skull is exerted advanced forward KhPPG, which was attached the neuro-surgical group of ORMU. In the course of further offensive of the troops/forces of those wounded the skull consecutively/serially accepted another KhPPG. Finally, when our troops/forces moved out to Oder, was expanded one additional specialized KhPPG to which was attached the neuro-surgical group of ORMU.

Thus, in the period of this combat process/operation the specialized aid was shown/rendered to the majority of those wounded

into skull.

In spite of temporary/time deficiency in fuel and difficulties with the evacuation of wounded to GBF, correct maneuvering by the neuro-surgical groups of ORMU allowed also in this combat process/operation to render specialized assistance by 81.00/o of wounded the skull with damage bones. That wounded the soft tissues of skull it was shown/rendered into 53.10/o, and this remaining easily wounded groups entered GLR.

The operability of those wounded the skull with the damage of the bones obtained in combat process/operation in army area was equal to 32.90/o, moreover 84.00/o of process/operations were produced by the neuro-surgical groups of ORMU. Lethality among the operated wounded the skull with damage bones was equal to 7.20/o.

In army area in the specialized hospitals the general/common/total lethality of wounded the skull with damage bones was almost twice lower than in the hospitals of general-surgical profile/specialty.

Operability with the wounds of the soft tissues of skull in army area was equal to 33.00/c, moreover barely it was observed lethal outcomes.

Thus, in spite of all difficulties in the organization of the specialized aid, during the considered combat process/operation it was nevertheless shown/rendered to the majority of those wounded into skull. The results of this aid must be recognized as completely satisfactory ones.

In the period of Berlin combat process/operation (April of 1945) for giving specialized assistance to wounded into the skull the dismantled army had available, besides two neurosurgical groups of ORMU, by the even more army specialized evacuation hospital in state/staff of which was a neurosurgeon. furthermore, during the combat process/operation of this army was temporarily attached the neuro-surgical group of ORMU from adjacent army. Thus, army was provided with five, and into some periods and family by neurosurgeons.

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In initial position and in the period of the penetration of the defense of the enemy from army area there was near expanded/scanned two specialized KhPPG with neuro-surgical groups. Wounded the skull accepted first arranged/located ahead specialized KhPPG whose

state/staff was considerably intensified due to the hospitals of reserve. After loading of this hospital in it they remained only nontransportable wounded, and all remaining wounded into skull they guided in located near another KhPPG. During loading of second KhPPG transportable of those wounded the skull they evacuated from foremost specialized KhPPG directly into the army specialized evacuation hospital whose state/staff was intensified by neuro-surgical group of the adjacent army. From second specialized KhPPG transportable of those wounded the skull they evacuated directly into the specialized front line evacuation hospital.

In proportion to the advance of the troops/forces ahead it was expanded of one additional specialized KhPPG of the reserve of the medical army command, to which was attached the neuro-surgical group. In the following stage of the advance of the troops/forces for the reception/procedure of those wounded in the skull was forward advanced one additional specialized KhPPG.

One should point out that in the beginning of combat process/operation specialized KhPPG, located in area of KhPPG of the first line, it accepted to itself those wounded the skull, which into 98.70/o went according to designation/purpose directly from units and with DMP; 64.70/o of these wounded entered into the specialized hospital during the first day after wound.

In the period of entire Berlin combat process/operation 99.00/o of wounded the skull with damage bones they traversed the specialized hospitals. Operational aid with the wounds of skull with the damage of bones was shown/rendered into 64.80/o of cases, after giving lethality into 6.00/o. The operational perfecting of wounds with the wound of the soft tissues of skull was produced in army area into 31.00/o of cases, moreover lethal outcomes it was not observed.

Thus, during Berlin combat process/operation the correct conducting of the system of the specialized aid by that wounded the skull was achieved by means of pulling in the initial position of the specialized hospitals to army area, and during further development of offensive - by means of the corresponding maneuver by the specialized hospitals and the neuro-surgical groups of ORMU. Conducting this system made it possible to ensure with the specialized aid of all heavily wounded in the skull, after granting to them thereby the best possibilities to recovery.

So that it is better to become acquainted with the effect specialized aid by that wounded into skull in army area on the results of the treatment of this group of wounded, it is expedient to compare the data of different combat process/operations (Table 70).

Table 70. Envelopment in the army area with specialized aid to those wounded the skull in different combat process/operations (in percentages).

(9) Схат специ- ализированной помощи	(1) Военные операции	(2) Разгром немцев под Мухоморов	(3) Война под Сталинградом	(4) Проход блокады Ленинграда	(5) Орел-Курскская битва	(6) Освобождение Белоруссии	(7) Висла-Одер	(8) Берлинская операция
(10) Всего раненных в череп . . . . .	0	0	51.7	67.5	71.7	69.3	87.9	
(11) В том числе								
раненных с повреждением костей . . . . .	0	0	52.3	90.0	85.9	81.0	99.0	
раненных в мягкие ткани . . . . .	0	0	44.6	48.0	63.4	53.1	79.9	

Key: (1). Combat process/operations. (2). Rout of Germans in the environs of Moscow. (3). Battle in the environs of Stalingrad. (4). Blockade break-through of Leningrad. (5). Orel-Kursk battle. (6). Liberation of Belorussia. (7). Visla- Oder. (8). Berlin process/operation. (9). Envelopment by specialized aid. (10). In all wounded skull. (11). Among other things of wounded with injury of bones; wounded into soft tissues.

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As is shown to Table 70, the specialized aid that wounded the skull during Moscow and Stalingrad battle in army area yet it was not. During this period in armies there was either the neuro-surgical groups ORMU or specialized KhPPG.

The specialized aid by that wounded the skull begins for the first time is used army area during the blockade break-through of Leningrad, and then envelopment by it progressively increases, achieving during Berlin process/operator 99.00/o.

If we compare operability in the army area of those wounded the skull with the damage of bones and post-operation mortality during different combat process/operations, then it will prove to be that in the period when the specialized aid in army area was organized, operability of those wounded in skull achieved 49.5-36.40/o, but lethality among those operated - 14.3-20.10/o (Table 71).

From Table 71 it is evident that in proportion to the

organization of the specialized aid operability of those wounded the skull in army area, that was lowered at first as a result of neurosurgeons' deficiency, then began to increase and achieved into Berlin battle 64.80/o. At the same time lethality among those operated, if we do not consider the blockade break-through of Leningrad, began to descend and achieved 11.5-6.00/o. Comparatively high in the period of Leningrad combat process/operation lethality among those operated (16.10/o) is explained by the fact that during it all transportable wounded they evacuated to nearby GBF, and surgical interventions underwent only the heaviest group of those wounded in the skull.

However, operability of those wounded the skull and the lethality among those operated by themselves cannot still characterize the successes of the treatment of this group of wounded, since in this case can arise the completely natural assumption that perhaps surgical intervention underwent the lightest groups of wounded. In connection with this Table 71 it is necessary to compare with the indicators of the general/common/total lethality of the same wounded the skull in period combat process/operations (Fig. 64).

Thus, the data indicated make it possible to conclude that a descent in the lethality among wounded in skull with damage bones and, consequently, also increase in the recoveries in this group of wounded in army area they are found in the definite dependence on the volume of the specialized neuro-surgical aid.

Table 71. Operability of wounded the skull with damage guests and post-operation lethality in army area in different combat process/operations (in percentages)<sup>1</sup>.

FOOTNOTE 1. Crosses in the table designated the degree of the organization of the specialized aid. ENDFOOTNOTE.

Ранение черепа с повреждением костей	(1) Боевые операции	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Результат помощи пострадавшим	Истребление немцев под Сталинградом	Прорыв блокады Ленинграда	Орловско-Курский битва	Освобождение Белоруссии	Висла - Одер	Берлинская операция	Организация помощи	Оперированность	Летальность среди оперированных		
Организация помощи	0	0	+	++	++	++	+++					
Оперированность	49,5	36,4	15,5	22,4	38,3	32,9	64,8					
Летальность среди оперированных	14,3	20,1	16,1	9,5	11,5	7,2	6,0					

Key: (1). Combat process/operations. (2). Wound of skull with damage of bones. (3). Rout of Germans in the environs of Moscow. (4). Battle in the environs of Stalingrad. (5). Blockade break-through of Leningrad. (6). Orel-Kursk battle. (7). Liberation of Belorussia. (8). Vistula-Oder. (9). Berlin process/operation. (10). Organization of specialized aid. (11). Operability. (12). Lethality among those operated.

Table 72 gives representation about rendering to therapeutic aid

to those wounded the soft tissues of skull in army area.

It shows that in proportion to the organization of the specialized aid in army area progressively increased a quantity of process/operations with the wounds of the soft tissues of skull, which were not being escorted/tracked in this case by such high lethality which was observed in the period of the first two combat process/operations.

A considerable improvement in the results of the treatment of wounded in skull, in dependence from the organization of the specialized neuro-surgical aid, becomes even more clear, if we compare the same indicators of therapeutic aid in different combat process/operations by army and army area simultaneously (Table 73).

The data given in Table 73, show that in that period when the specialized aid by that wounded the skull in the dismantled/selected armies yet was not organized, this wounded groups widely were operated not only in army area, but also on DNP, moreover these surgical interventions were escorted/tracked by comparatively high lethality.

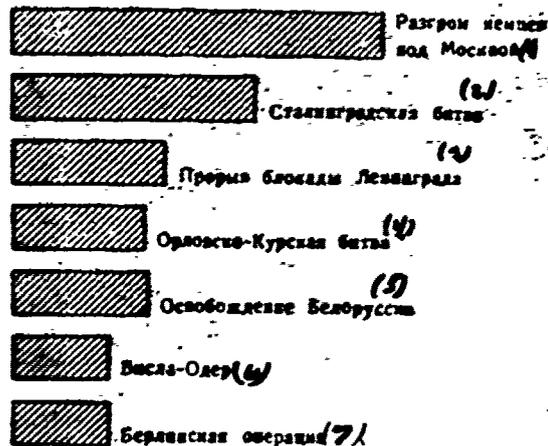


Fig. 64. General/common/total lethality with the wounds of skull with the damage of bones in army area in different combat process/operations.

Key: (1). Rout of the Germans in the environs of Moscow. (2). Stalingrad battle. (3). Blockade break-through of Leningrad. (4). Orel-Kursk battle. (5). Liberation of Belorussia. (6). Vistula-Oder. (7). Berlin process/operation.

Table 72. Operability of those wounded the soft tissues of skull and post-operation lethality in army area in different combat process/operations (in percentages)<sup>1</sup>.

FOOTNOTE 1. Crosses in the table designated the degree of the organization of the specialized aid. ENDFOOTNOTE.

Ранения мягких тканей черепа (а)	(1) Боевые операции		(3) Разгром немцев под Москвой	(7) Витка под Сталинградом	(4) Прорыв блокады Ленинграда	(6) Орловско-Курский битва	(7) Освобождение Белоруссии	(8) Висла - Одер	(9) Берлинские операции
	(11)	(12)							
Организация специализированной помощи			0	0	+	++	++	++	+++
Оперированность	(11)	(12)	1,1	15,9	3,2	14,0	26,2	33,0	31,0
Летальность среди оперированных			1,6	0,9	0	0	0	0,3	0

Key: (1). Combat process/operations. (2). Wounds of soft tissues of skull. (3). Rout of Germans in the environs of Moscow. (4). Battle in the environs of Stalingrad. (5). Blockade break-through of Leningrad. (6). Orel-Kursk battle. (7). Liberation of Belorussia. (8). Vistula-Oder. (9). Berlin process/operation. (10). Organization of specialized aid. (11). Operability. (12). Lethality among those operated.

However, from time of the introduction to the specialized aid operability of those wounded to skull in army area sharply descends,

comprising in the period of Berlin battle only 0.30/o. Simultaneously with this operability of those wounded the skull in army area considerably rises, achieving in the period of the same Berlin battle 64.80/o.

Lethality among those operated in the period of rendering to the specialized aid sharply was lowered both in the army and in army area.

The given data about the value of the specialized neuro-surgical aid with the wounds of skull become even more convincing, if we compare them with the indicators of general/common/total lethality in army and army area (Fig. 65).

Table 73. Operability of those wounded the skull with the damage of bones and the lethality among those operated by army and army area in different combat process/operations (in percentages).

Боевые операции	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Резерв под Ленинградом Москвой	Битва под Сталинградом	Прорыв бло- кады Ленин- града	Орловско- Курский битва	Освобожде- ние Бело- русии	Висла - Одер	Берлинская операция	
Организация специализированной помощи	0	0	+	++	++	++	+++	
Оперированность								
(11) Войсковой район	30,0	17,5	4,9	4,5	0,6	0,5	0,3	
(12) Армейский район	49,5	36,4	15,5	22,4	38,3	32,9	64,8	
Летальность (13) среди оперированных								
(11) Войсковой район	46,6	16,6	22,0	3,6	28,4	6,4	3,6	
(12) Армейский район	14,3	20,1	16,1	9,5	11,5	7,2	6,0	

Key: (1). Combat process/operations. (2). Rout of Germans in the environs of Moscow. (3). Battle of Stalingrad. (4). Blockade break-through of Leningrad. (5). Orel-Kursk battle. (6). Liberation of Belorussia. (7). Vistula-Oder. (8). Berlin process/operation. (9). Organization of specialized aid. (10). Operability. (11). Army area. (12). Army area. (13). Lethality among those operated.

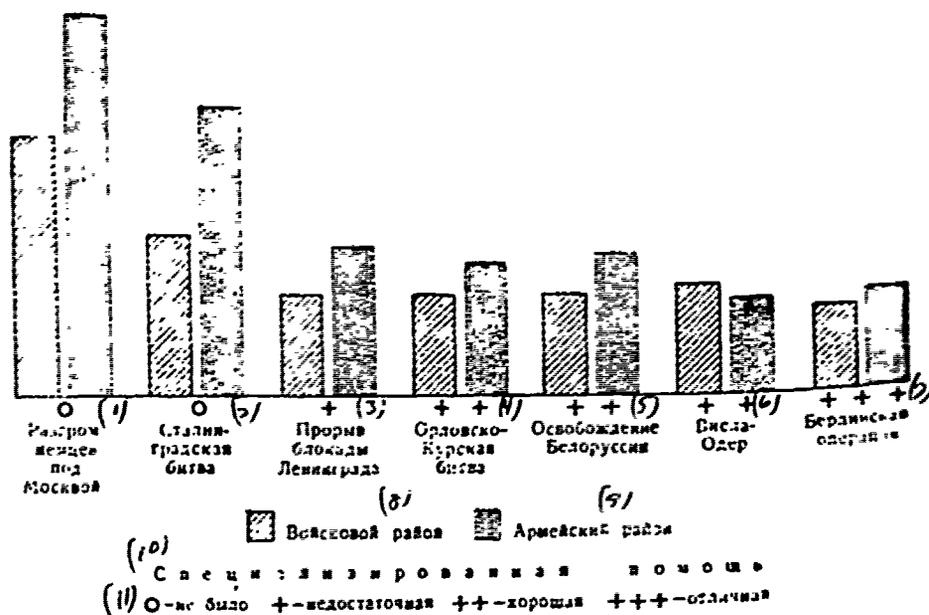


Fig. 65. General/common/total lethality with the wounds of skull with the damage of bones in army and army area in different combat process/operations.

Key: (1). Rout of the Germans in the environs of Moscow. (2). Stalingrad battle. (3). Blockade break-through of Leningrad. (4). Orel- Kursk battle. (5). Liberation of Belorussia. (6). Vistula-Oder. (7). Berlin process/operation. (8). Army area. (9). Army area. (10). Specialized aid. (11). o - it was not. + - insufficient ++ - good +++ - excellent.

The comparison of all given data makes it possible to come to the defined conclusion that the introduction of the system of the specialized neuro-surgical aid by that wounded into skull considerably improved the results of the treatment of this group of wounded both in the army and in army area.

**MEDICAL AID BY THAT WOUNDED THE SKULL IN FRONT LINE THERAPEUTIC INSTALLATIONS.**

The organization of the specialized aid by that wounded the skull in front line area is located in direct dependence on the character/nature of combat operations, special features/peculiarities of a medical-tactical circumstances, and also on the presence of the cadres of the neurosurgeons and medical equipment.

The medical service of the Red Army even prior to beginning the Great Patriotic War provided the creation of the specialized separations/sections in the evacuation hospitals of front which had to be provided with the cadres of the neurosurgeons, and also with the corresponding equipment, switching on X-ray apparatuses. For these specialized separations/sections of front line evacuation hospitals had to be headed those wounded the skull predominantly with

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the damage of bones.

However, the deployed from the first days wars unprecedented to their scales combat did not make it possible to completely carry out the outlined system of rendering to this specialized aid group of wounded.

During the first year of the war of those wounded the skull frequently they distributed on all hospitals. Evacuation according to designation/purpose within the hospital basis of front always was not maintained/withstood, and certain unit of those wounded the skull passed by the specialized evacuation hospitals.

Based on the example of the dismantled/selected large-scale combat process/operations of the Great Patriotic War is sufficiently clearly revealed/detected the process of the creation of the system of the specialized aid by that wounded in skull, its development, and also skillful maneuvering by front line neuro-surgical hospitals during the offensive operations of the latter/last years of war.

In particular, if during the rout of the Germans in the environs of Moscow during December 1941 entire/all medical aid by wounded in army and army area proved to be under very complicated and unfavorable conditions, then it is possible to assume, what

difficulties in rendering to the specialized aid by that wounded the skull were created at this time on the hospital basis of front.

Entire/all severity of work GBF lay in essence to two SEG to which it was necessary to organize the evacuation of wounded from army to itself, and to also adjust the shipment of a great quantity of wounded into the rear.

In progress of combat were expanded/scanned still several SEG and considerable number of the so-called "operational cots" on the basis of the civil/civilian hospitals which accepted to themselves certain quantity of those wounded the skull.

SEG of the hospital basis of front evacuated into rear 72.10/o of those wounded the skull with the damage of bones, after leaving for further treatment 27.90/o.

Several highly skilled neurosurgeons' presence, especially in one of SEG, made it possible to deploy the sufficiently stressed surgical work on perfecting entered of those wounded into skull. As a result it was operated by 40.00/o of those wounded the skull with damage to bone, the lethality among patients operated on composing 8.80/o. Process/operations most frequently performed within late periods, and they frequently bore the character/nature of reworking.

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Otherwise was matter concerning the "operational cots" of hospitals GBF, where the percentage of operability among wounded the skull with damage bones did not exceed 9.0-10.0, but lethality after surgical interventions achieved 39.4-42.30/o. From these therapeutic installations was evacuated into the rear a negligible number of wounded in skull with damage bones, whereas their basic mass remained for further treatment.

Thus, the therapeutic installations of the hospital basis of front in 1941 as far as possible processed those wounded the skull with the damage of bones in order to stave off infectious complications or to eliminate those already arisen. In this case a considerable number of wounded the skull with damage bones SEG evacuated into the rear, while in hospitals with "operational cots" those wounded into skull remained for further treatment and then they little evacuated into the rear, which caused loading bed-patient fund and restricted the possibility of further reception/procedure of wounded.

Surgical interventions, which were being conducted by that

wounded into the soft tissues of skull, were from 0.4 to 1.7-2.2o/c, and the percentage of evacuation in the rear achieved in SEG 81.8.

Hence follows the conclusion that the group more heavily wounded with the smaller likelihood of the fastest recovery was hospitalized in front line area, and group easily wounded they guided into the rear where it was held up by prolonged period as a result of development in some of them complications from the side of the excessively cut all over or completely unfinished wounds of the soft tissues of skull.

Some shortages in the organization of the specialized aid by that wounded the skull occurred, also, during Stalingrad battle into 1942. As a result of the disposition of the hospital basis of Stalingrad Front far from city, its comparatively small sizes/dimensions in the initial period of deployment, entry of a sufficiently considerable number wounded on reverse empty car, frequent raids of hostile aviation, and also disposition GBF in great territory, with a deficiency in the experiment/experience in work, the unit of army light medical truck without being unloaded, was passed by transit through GBF and was headed further for the rear.

Neurosurgeons' insufficient quantity in the specialized front line hospital caused comparatively even lower ~~the fact that among~~

entered wounded into skull with damage bones (12.30/o), and the tendency to evacuate wounded as much as possible into the rear was expressed in the fact that from it evacuated 97.40/o wounded the soft tissues of skull and 82.90/o of wounded the skull with damage bones.

At the same time, the hospitals of the general-surgical profile/specialty GBF of Stalingrad Front, picking up an also considerable quantity of those wounded the skull, adhered to another, more correct tactics. From these hospitals were evacuated into the rear of altogether only 20.50/o of wounded, moreover in essence of heavily wounded the skull with damage bones.

One should be specified that the front line hospitals were loaded mainly in view of the considerable entry of easily wounded, together with need reject the reception/procedure to some army light medical trucks, which delivered to GBF of heavily wounded and those forced to follow by transit further into the rear.

As the confirmation of that fact that those locating undergoing medical treatment in front line hospitals wounded into skull were in bulk easily wounded, it serves, in particular, the fact that their operability composed altogether only 3.50/o, and in the group of wounded the skull with damage bones - 6.10/o, with very small lethality among those operated, that was expressed for the group of

those wounded in skull with an injury of the guests in 0.30/o.

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If we consider this fact, then from the report data GBF is evident the tendency of hospitals to leave in itself for further treatment of these wounded. The high percentage of recoveries (33.9 for those wounded the soft tissues of skull and 8.6 for wounded with the damage of bones) attests to the fact that in army was still insufficiently fixed the work on the recuperation of those easily wounded the soft tissues of skull and GBF, attempting to compensate this shortage, she was overloaded by moderate/mild wounded. As a result of this the unit of those heavily wounded the skull and the brain could not be accepted by front line hospitals and was evacuated without processing further into the rear.

The considerable progress in the system of the organization of the specialized aid by that wounded the skull is visible based on the example of the combat process/operation of the blockade break-through of Leningrad (January 1943).

The Leningrad hospital basis of front at the beginning of the second year of war had available powerful/thick bed net/system, numerous specialized hospitals, and also sufficiently ordered system

of the evacuation of wounded along designation/purpose.

The presence of neuro-surgical separations/sections in SEG, and also largest hospital for those wounded the head, together with several hospitals, which had neuro-surgical separations/sections, made it possible to sufficiently fully ensure those wounded into skull by the specialized aid.

The internal profiling of the largest neuro-surgical hospital of Leningrad to the series/row of the separations/sections: for the wounds of the arch/summary of skull, basis of skull, infectious complications from the side of brain and its shells, etc., in the presence of numerous laboratories and supply status by specialists it contributed to the thorough clinical study of the entered wounded.

Taking into account these facts, the army neuro-surgical group of ORMU produced surgical interventions and it hospitalized on the spot only of the nontransportable wounded. Thus, the large part of those wounded the skull accepted to itself GBF of Leningrad Front.

Wounded the skull with damage bones they operated in front line hospitals into 46.70% of cases, and in neuro-surgical front line hospital this percentage achieved even 60.6.

The majority of those wounded the skull was left for further treatment on GBF. Only 10.70/o of wounded were evacuated into the rear, moreover evacuation underwent the mainly wounded with the damage of brain (20.30/c), who, as it predicted, had to subsequently become disabled. Easily wounded the soft tissues of skull it was evacuated into the rear only 5.00/o.

This tactics pronounced also on the results of treatment. In spite of a comparatively heavy composition of those wounded the skull, in 1 1/2 months of this combat process/operation recovered 26.30/o wounded the soft tissues of skull and 8.20/o of wounded the skull with damage bones. From those left in hospitals in the course of the next 4 months recovered 28.20/o among heaviest group wounded the head brain, to say nothing of those wounded in soft tissues and obtained the nonpenetrating wounds of skull.

During an Orel-Kursk battle (July 1943) a considerable number of those wounded the skull from the army, which was being located on the direction of main attack, was sent for three specialized hospitals of evacuation point, one of which was approximated to army area.

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First of all it was widely used air evacuation. The presence of

the specialized neuro-surgical hospitals at this evacuation point, which had available a sufficient bed fund, the cadres of neurosurgeons, and also equipped by X-ray apparatuses, made it possible to sufficiently full-valued service entered those wounded into skull.

However, judging by the reports of another evacuation point, which composed remaining unit GBF, during this combat process/operation not on entire GBF were eliminated the shortages of the first year of war. In particular, into the specialized neuro-surgical hospitals of this evacuation point entered altogether only 69.00% of those wounded the skull, and remaining were directed toward general-surgical cots. Operability of wounded the skull with damage bones composed only 10.40%. From this number only of 1/3 trepanations it was produced in the specialized hospitals, and the others 2/3 - in general-surgical separations/sections. In the specialized hospitals it at first fell short specialist-neurosurgeons and X-ray apparatuses, which was eliminated only in the course of combat process/operation.

Considerably more serious task was the provision of those wounded into skull of the specialized by aid during the rapid offensive operations Red Army in second half the Great Patriotic War. Were by this time achieved the great successes on the organization of

the ordered system of the specialized aid by that wounded into skull, were trained neurosurgeons' cadres, were created the numerous specialized hospitals not only in front line area, but also in ~~existing~~ armies, but the main thing - was acquired already considerable experiment/experience in work. <sup>9</sup> Based on the example of combat process/operation on the liberation of Belorussia (summer 1944) it is evident that GBF constructed its work according to the principle of several groups from which one was the foremost receiving-sorting basis of front, the second was basic base, and the third composed the rear basis of front.

In proportion to the advance of the troops/forces forward rear group GBF was moved sharply forward, after accepting to itself the functions of foremost receiving-sorting GBF.

Basic GBF, after moving also forward, "covered" the overloaded initial receiving-sorting basis of front, after giving to it the possibility to be advanced forward and to organize the new foremost receiving-sorting basis of front for the armies of right wing.

Thus, GBF almost uninterruptedly it followed the army hospitals, and maneuver by basic base GBF and with its groups it made it possible "to cover" the army hospitals, giving to them the possibility to advance forward, creating also conditions for

locomotion forward and all groups GBF.

Those wounded the skull provided with the specialized aid during this combat process/operation even on initial position the neuro-surgical hospitals of group GBF, where wounded entered through several hours after wound, and also being in the system of evacuation point two neuro-surgical groups of ORMU and maneuvering by them.

In foremost receiving-sorting group GBF, which was located on 35-40 km from front, also was a specialized neuro-surgical hospital.

In proportion to the advance of the troops/forces forward advanced the specialized hospitals, which on the spot accepted from army specialized KhPPG those wounded into skull. As a result, in spite of very complicated working conditions, connected with the rapid advance of army forward, GBF performed the necessary processing of the wounds of skull, it evacuated into the rear 2/3 those wounded the skull and attained the recovery 12.3c/o of those wounded the soft tissues of skull.

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About 1/4 wounded were left for further treatment in view of possibility rapid recovery or their nontransportability as a result

of the severity of condition.

The rapid offensive of our troops between rivers the Visla and by Oder (beginning 1945) with the liberation of Poland and output/yield into Germany is characterized by further increase in the organization of the specialized aid by wounded. The hospital basis of front contained the also three groups of hospitals, moreover in contrast to the preceding/previous combat process/operation in the initial position before the penetration of the defense of enemy from bridgehead/beachhead on the western shore of the vistula the army hospitals were convoluted, and leading group of hospitals GBF was sharply advanced forward and it accepted to itself all wounded from army area.

Thus, in first phase of combat GBF actually were fulfilled the functions of army KhPPG. By this is explained entry into these advanced forward specialized hospitals of the front of the considerable number of those very heavily wounded the skull, which usually hospitalized in army therapeutic installations.

In proportion to the advance of army was forward advanced the group of the hospitals subordinate to Front line authority, among which there was the specialized neuro-surgical hospital. The latter "covered" the army specialized neuro-surgical hospital and accepted

from it those wounded the skull. Advanced then forward another group of hospitals GBF created two new powerful/thick bushes of hospitals.

This maneuver by hospitals GBF made it possible to accept within the early periods and to ensure with the specialized aid of those wounded the skull, from which significant part was in heavy condition, since GBF frequently accepted wounded directly from army area.

Front hospitals evacuated all those wounded the skull further into the rear, leaving in themselves only nontransportable as a result of heavy condition or easily wounded with the brief periods of treatment. A comparatively high percentage of the lethality of wounded the skull with damage bones is explained by the fact that in this combat process/operation GBF it fulfilled in essence of the function of army KhPPG.

The final Berlin process/operation of the Great Patriotic War (in the spring of 1945) is characterized by further improvement of the organization of the specialized aid by that wounded the skull. The presence of several specialized neuro-surgical hospitals in army area, the rapid and accomplished evacuation of wounded strictly according to designation/purpose made it possible to maximally encompass those wounded into skull by the high-quality specialized

aid.

GBF had the advanced base of the hospitals of front, approximated to army area and provided with all means of the specialized aid. Somewhat further was arranged/located the main sorting-evacuation basis of the hospitals of front, which picked up all light medical trucks from army areas. Deeper into the rear stood purely the therapeutic basis of front, and still further - the rear basis of the hospitals of front. All these bases were provided with all means of the specialized aid, with sufficient quantity of specialist-neurosurgeons and with medical equipment. This distributed in depth disposition of the bases of the hospitals of front predetermined the entry in them of those wounded in skull, which were being distinguished by the time of wound, to its character/nature and severity.

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The significant part of those wounded into skull entered on GBF full-valued surgical processed, with exception of those which entered directly with DMP on aircraft or by way of unloading forward therapeutic installations into the first 5 days of combat. This caused comparatively low operability among those wounded the skull on GBF (10.2o/o), since the majority of the entered wounded was already

processed and surgical interventions were undertaken mainly with purpose of reworking or apropos of injection complications from state of brain.

As a result the advanced bases of the hospitals of front were occupied in essence by evacuation work, operating and leaving in themselves undergoing medical treatment only of the nontransportable wounded, but the therapeutic and rear basis of the hospitals of front they evacuated into the rear only of the disabled subsequently wounded, leaving in themselves undergoing medical treatment of all easily wounded into the soft tissues of skull.

Similar tactics even to end of this comparatively short combat process/operation caused the recovery 38.20/o of those wounded the soft tissues of skull and 6.10/o of wounded with the damage of the bones of the skull of nonpenetrating character/nature.

Thus, the analysis of the system of organization and rendering to neuro-surgical aid by that wounded the skull in front line area in the development period of different combat process/operations of the Great Patriotic War, in spite of entire difference between these process/operations and medical-tactical conditions with them, it shows that in the course of war steadily progresses the provision of those wounded the skull by the highly skilled aid and are improved

the results of treatment.

In the periods of offensive combat completely justified itself persistently carried out GVSU of the Red Army the system of the sharp approximation/approach of the front line specialized neuro-surgical hospitals to army area, which made possible to the army hospitals in beginning of combat to be found in the convoluted condition. In proportion to the advance of the armies of rational proved to be fulfilled, according to this system, practice of the distribution of different groups of the hospitals of front, advancement forward of the bushes of hospitals, "covering" by them army specialized neuro-surgical KhPPG, and also system of "sand bars".

#### MEDICAL AID TO THOSE WOUNDED IN THE SKULL IN REAR HOSPITALS.

In the beginning of war those wounded the skull, arriving into rear hospitals from front line area, frequently were distributed on the individual hospitals where they were found under the observation of the general/common/total surgeons. Only in some large/coarse centers of the country where there were neuro-surgical hospitals, it was possible to speak about the specialized aid by that wounded the skull already in the first months of war.

The shaping of hospitals and separations/sections in them went

comparatively slowly: there was not still sufficient quantities of cadres, since neurosurgeons' majority was located in army in the field, was felt deficiency in neuro-surgical instrumentation.

The extremely stressed combat situation at fronts in the first months of war always did not give the possibility to carry out the specialized aid by that wounded into skull in army and front line region. Therefore at first of war certain number unfinished of those wounded the skull reached the hospitals of the nearest rear, and sometimes it was possible to meet, also, in the deep rear those unfinished wounded the soft tissues of skull with that already developing by complications in the form of purulent fistulas and osteomyelitis.

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Life imperatively required the creation of the specialized separations/sections in the evacuation hospitals of the rear. In the course of war were trained the cadres of the specialists of the neurosurgeons with the aid of whom became possible the organization of the specialized separations/sections in the hospitals both of the nearest and deep rear.

During the first two years of war in the hospitals of the rear

was created the net/system of the numerous specialized neuro-surgical separations/sections, and in the series/row of the cities of the deep rear - special hospitals for the treatment of the neuro-surgical wounded. Subsequently were created even wonderfully equipped hospitals for the treatment of those wounded the skull.

During war was changed the system of the evacuation of those wounded the skull. Ever increasing dissemination received the principle of evacuation according to designation/purpose. If during the first years of war into the hospitals of the deep rear they evacuated those wounded the skull, not requiring prolonged treatment, then subsequently they here guided only those wounded the periods of treatment of whom exceeded 2-3 months. Thus, for instance, if during the first year of war into the hospitals of Ural military district entered 49.00/o wounded the soft tissues of skull, then in last year of war easily wounded among all these wounded the skull composed only 10.00/o. Decreased a quantity of wounded with the nonpenetrating wounds of the skull: if during the first year of the war of nonpenetrating wounds the wounded with the damage of the bones of skull had 60.00/o, then in last year of war the percentage of such wounds decreased to 26.0.

All less and less than wounded entered rear hospitals from front line area without primary neuro-surgical processing. So, according to

the data of neuro-surgical hospital in Gor'kiy, the percentage of those wounded into skull, that entered without primary neuro-surgical processing, was lowered toward the end of the war more than 13 times, which is evident from Table 74.

Timely neuro-surgical aid by that wounded the skull in army and front line area, improvement in the quality of the primary processing of the wounds of skull and correct post-operation conduct of such wounded decreased a quantity of infectious complications with the wounds of skull, which were being observed in rear hospitals. If in the beginning of war the percentage of infectious complications with the penetrating wounds of skull composed 44.4, then at the end of the war it was lowered to 6.8, i.e., decreased almost 7 times. As illustration it is possible to indicate the decrease of the frequency of the abscesses of brain in the hospitals of the rear (Table 75).

As can be seen from Table 75, the frequency of the abscesses of brain with the penetrating wounds of skull in the last half-year of war in comparison with the first decreased eight times.

Table 74. The specific gravity/weight of those wounded into skull, that entered into rear hospital without processing into different half-years of war (according to the data of the specialized hospital in Gor'kiy in percentages).

Ранение в череп	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Полугоды войны	Первое	Второе	Третье	Четвертое	Пятое	Шестое	Седьмое	Восьмое	Девятое
Поступившие без обработки	(11)	52,0	14,7	7,3	9,6	6,7	8,1	4,2	2,8	

Key: (1). Half-year of war. (2). Wounded skull. (3). The first. (4). The second. (5). The third. (6). The fourth. (7). The fifth. (8). The sixth. (9). The seventh. (10). The eighth. (11). Entered without processing.

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In connection with the considerable successes in the organization of neuro-surgical aid was changed the character/nature of therapeutic work in the hospitals of the rear. Increasingly less became need in surgical interventions. Thus, for instance, frequency of surgical interventions in one of the rear hospitals in last year of war in comparison with the first decreased doubly - from 5.10 to 26.00/o.

Changed the character/nature of surgical interventions. If during the first years of war most frequent process/operations were the distance/separation of bone fragments from the substance of brain, reworking of the wounds of skull and intervention apropos of the abscesses of brain, then toward the end of the war considerably decreased the percentage of the process/operations of late primary processing and greater specific gravity/weight acquired process/operations apropos osteomyelitis, epilepsy and other complications.

Greater attention they began to give to questions of the reducing therapy, which obtained wide acceptance. Increasingly wider and wider began to use the therapeutic exercise, physiotherapy and ergotherapy during the treatment of the wounds of skull, which were being escorted/tracked by functional violations.

On an improvement in the results of treatment in the hospitals of the rear eloquently testify the data about lethality with the penetrating wounds of skull.

As can be seen from Table 76 despite the fact that the specific gravity/weight of the penetrating wounds of skull in the hospitals of the deep rear to end of the war grew considerably, lethality among the wounded of this group decreased doubly.

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It is necessary in conclusion to note that an improvement in the results of the treatment of those wounded the skull in rear hospitals it is not possible to consider the consequence of good organization of the specialized aid only in these latter/last stages of evacuation. A continuous improvement in the results of treatment in rear hospitals was repulsing an improvement in the organization of an entire system of the specialized aid by that wounded the skull both in the army ones and front line ones and in rear therapeutic installations.

Table 75. Frequency of the abscesses of brain with the penetrating wounds of skull on the half-years of war (according to the data of specialized hospital in Gor'kiy in percentages).

Проникающие ранения (2)	Полуголе войны (1)									
	(3) Первое	(4) Второе	(5) Третье	(6) Четвертое	(7) Пятое	(8) Шестое	(9) Седьмое	(10) Восьмое		
Абсцессы мозга (11)	24,2	15,5	11,2	11,9	8,6	6,9	5,3	3,1		

Key: (1). Half-year of war. (2). Penetrating wounds. (3). The first. (4). The second. (5). The third. (6). The fourth. (7). The fifth. (8). The sixth. (9). The seventh. (10). The eighth. (11). Abscesses of brain.

Table 76. Lethality with the penetrating wounds of skull in the hospitals of the rear on the years of war, according to the data of Ural military district (in percentages).

Проникающие ранения (2)	(1) Год войны	(3) Первый	(4) Второй	(5) Третий	(6) Четвертый
	Летальность (7)		4,1	3,0	3,1

Key: (1). Year of war. (2). Penetrating wounds. (3). The first. (4). By the second. (5). The third. (6). fourth. (7). Lethality.

After supplying the results of the results of the treatment of those wounded the skull depending on effect, which showed/rendered the system of specialized neuro-surgical aid, beginning from army area and ending with the hospitals of the deep rear, one should come to the conclusion that, judging by the extensive experiment/experience of the Great Patriotic War, this system radically changed to the best side rendering to therapeutic aid by that wounded the skull.

The experiment/experience of the Great Patriotic War, thus, completely confirms the correctness of resolution by Soviet medicine of one of the most complicated problems of military field surgery - problems of the treatment of the bullet wounds of skull and brain.

Further prospects for therapeutic aid with the wounds of skull.

The study of any experiment/experience will prove to be useless, if it will not be used for an improvement in formulating of affair in the studied area.

In connection with this during the analysis of vast experiment/experience on the treatment of the bullet wounds of skull and brain, accumulated by Soviet medicine for the time of the Great Patriotic War, completely logically arises question, in what

direction it is possible to expect improvement in the results of the treatment of the bullet wounds of skull.

It goes without saying that here it is not possible to be limited to the frames/scopes one medicine alone, and it is necessary to affect those all numerous factors which can affect the treatment of the wounds of skull under military conditions, since still our great founder of military field surgery N. I. Pirogov indicated that "not medicine, and administration plays main role in a matter of aid by wounded and patient in the theater of war .... If doctor in these cases does not assume to himself by the main target of, first of all, performing administratively, and then is already medical, then it entirely will be lost and neither head its nor hands will show/render aid".

With respect to the principles indicated it is necessary, taking into account entire extensive experiment/experience on the treatment of the bullet wounds of skull, which was acquired in the Great Patriotic War, be stopped at the basic points of the medical support of those wounded the skull and the head brain.

#### PROPHYLAXIS OF THE WOUNDS OF SKULL AND BRAIN.

As has already been indicated, on the experiment/experience of

the Great Patriotic War completely was confirmed the importance of wearing protective metallic helmets for the purpose of prophylaxis of wounds and descent in the severity of wounds during the bullet damages/defects of skull. However, helmet, in spite of troops/forces' sufficient supply, hardly ever they were utilized in our armies during combat, especially in offensive battles, in the summer hot weather when soldiers sometimes took them off.

So that this important protective measure would be carried out with sufficient completeness, it is necessary perhaps to develop the models of most convenient metallic helmets. Furthermore, it is necessary to conduct the appropriate public health education work among soldiers, to in advance systematically train them in the carrying of protective helmets, and military command element must take corresponding organizational measures.

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PROPHYLAXIS OF THE DEVELOPMENT OF THE INFECTIOUS PROCESS WITH THE WOUNDS OF SKULL.

One should indicate the importance of the realization of this simple measure as the short hair-cutting of hair on head in military units. In spite of the difficulty of taking this measure under heavy

war time, to it should be to pay serious attention and via the public health education work and organizational measures strove its implementation under any conditions.

Important value in prophylaxis of the infectious complications of the wounds of such measures as the timely imposition of the corresponding bandage, the fastest carrying out of wounded from the field of battle and their delivery/procurement on BMP and PMP, is subject to no doubt. Taking these all measures is tightly closely related with the character/nature of combat circumstances; however, also it is here possible and must develop the methods of their more advanced and rapid execution.

Great value for prophylaxis of the infecticus process in wounds had the newest antiseptics and antibiotics. During the Great Patriotic War, beginning PMP, widely were applied with this purpose the preparations of sulfanilamides. The value of penicillin was just as lustrously confirmed in postwar surgery that at present should be recognized as necessary the wide and necessary use/application for the purpose of prophylaxis of the development of the infecticus complications of the bullet wounds of skull, besides sulfanilamides, also preparations of penicillin. Antisepsis and antibiotics should be applied under military conditions, beginning with PMP, and under favorable conditions - and with BMP.

## PRODUCTIONS ON DMP OF OPERATIONS WITH THE WOUNDS OF SKULL.

During the development of the system of the specialized aid by that wounded the skull operational activity on DMP was abbreviated/reduced to the minimum in order to ensure to this group of wounded the qualified neuro-surgical processing of wounds in the specialized hospitals of army area. This contraction/abbreviation of process/operations in the relation to wounded the skull in army area and their increase in the specialized hospitals of army area it was very profitably repelled in the results of the treatment of this group of wounded.

However, it is necessary to note that the system of the specialized aid by no means removes/takes a question about the operational processing of the wounds of skull on DMP. From DMP never it was removed/taken responsibility for the need for exerting during wounds and damages of skull urgent operational aid "from vital readings". These "vital readings" include in essence intracranial hemorrhages with the phenomena of the growing compression of brain. There are many foundations for considering that during the Great Patriotic War this group of wounded did not receive sometimes in the army area of the necessary operational aid and that, on the contrary,

in a number of cases on DMP produced surgical interventions with wounds the skulls supposedly "from vital readings", when in actuality no intracranial hemorrhage there was.

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These errors, it is doubtless, are connected with the difficulties of the correct identification of the syndrome of the threatening intracranial hemorrhage under conditions for the stressed work DMP. The differential diagnosis between the contusion of brain and the violations, caused by tunicary hemorrhages to the period of the greatest development of symptoms, as showed the experiment/experience of the Great Patriotic War, it presents difficulty even und ~ clinical peacetime conditions. In such cases retains entire its value the established/installed already by N. I. Pirogov rule/handspike, that observation of patient, after the dynamics of clinical picture, accounting to entire totality of symptoms of disease/sickness/illness/malady give to doctor more than the establishment of individual signs/criteria upon the one-time examination/inspection of victim. It goes without saying that under conditions the works DMP both careful lasting observation of wounded and its detailed neurologic examination/inspection are usually impracticable, whence appear the almost unavoidable errors during the establishment of readings to special process/operations "from vital

readings" in those wounded into skull.

Under similar conditions it is possible to avoid such errors only in such a case, when the surgeon of MSB possesses great experiment/experience and high clinical culture and, furthermore, it is sufficiently well familiar with the foundations of neurologic diagnosis.

As certain output/yield of difficult position/situation created it is possible to outline two route/path: 1) good documentation of all changes of consciousness during wound and damage of skull in map/chart/card forward area and 2) greater knowledge of at least one authorized doctor DMP with foundations of neurologic examination/inspection wounded. <sup>9</sup> The second source of difficulties with the wounds of skull on DMP can be the combined and multiple wounds of the skull and other organs/organs. The study of the maps/charts/cards of the deepened characteristics showed that in the heaviest group of the penetrating wounds of skull such associated wounds of other organs/organs were encountered into 31.60/o of cases, and, in particular, 2.40/o of them were related to the wounds of chest, 0.50/o - to the wounds of stomach and 6.10/o - to the wounds of lower extremities. The greatest obstacles for the evacuation of those wounded the skull according to designation/purpose into the specialized hospital present the

penetrating wounds of stomach, wound of chest with open pneumothorax and bullet damages of thigh, which require immediate operational processing on DMP. After this processing are not unconditionally subject to that following the wounds of chest. Consequently, simultaneously existing in this group of wounded the penetrating wounds of skull must be subjected to operational processing under conditions DMP.

It goes without saying that the principles of perfecting the penetrating wounds of skull and subsequent conduct of this group of wounded must not diverge from the basic principles of the system of the specialized neuro-surgical aid by that wounded the skull. For this it is necessary that one of the surgeons of DMP would receive the appropriate instructions and consultative aid from the neuro-surgical group of specialized army KhPPG.

Thus, the selection/analysis of those cases in which the operational processing of the wounds of skull must be conducted in army area, makes it possible to come to conclusion about the need for more intimate interrelations of one of the surgeons of DMP with the neuro-surgical group of GRMU.

The necessary briefing can widely be carried out in between-battle periods.

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**MEDICAL DOCUMENTATION.**

The study of the experiment/experience of the Great Patriotic War, which concerns the wounds of skull, on the basis of primary documents showed that the accepted during war forms of account and the series/row of documents does not completely correspond to contemporary scientific representations and must be refined. In the forms of account the wounds of skull are subdivided only into two headings: "with the damage of soft tissues" and "with the damage of the bones of skull", moreover in latter/last group is not isolated exceptionally important and fundamentally excellent group of the "penetrating" wounds of skull. In connection with this during the development of a vast quantity of histories of disease/sickness/illness/malady it was necessary to expend much time and work in order to subdivide those wounded the skull into three basic groups, as this requires the contemporary scientific classification: 1) the wound of soft tissues, 2) the nonpenetrating wounds of skull and 3) the penetrating wounds of skull and brain.

It is necessary to think that to introduce the appropriate changes in the forms of account in the wounds of skull is completely expedient and in proper time.

During the study of maps/charts/cards of forward area attention is drawn to is sometimes insufficiently complete filling of the basic information about wound. However, the histories of the disease/sickness/illness/malady were the extensive volumes, in which in all details was written the most varied information about wounded, and nevertheless was absent such important information as, for example, there was wound blind or tangent, was discovered during processing of wound the damage of solid cerebral shell, etc.

In connection with this completely logically arises the question about the advisability of developing the simplest schemes of the histories of disease/sickness/illness/malady for the wounds of the basic departments of the bodies which would ensure obtaining all most important for this group wounds of information. Filling of such basic concepts will require from the doctor of the minimum of forces and time, moreover will be given all most important information about wounded in convenient for further use form/species.

This is extremely necessary, since the high quality of medical documentation composes the foundation of the correct treatment of wounded under evacuation-line-of-communication conditions. Leadership/manual of military medicine during Great Patriotic War repeatedly emphasized that: "there are such elements/cells in field work, which remain firm under any conditions of combat cessation. This is - cessation of hemorrhage, immobilization of the damaged extremities, introduction of preventive sera and good quality of medical documentation. These elements/cells must be always and everywhere provided". "Documentation to us is necessary as air, as water, as light/world, and it is necessary to take all measures to that so that it would be good".

#### NEUROSURGEONS' CADRES.

The experiaent/experiences of the Great Patriotic War it showed that the system of the specialized neuro-surgical treatment of those wounded into skull and head brain gave the best results. It was provided in the Red Army with the appropriate authorized-organizational structure. For its conducting into life were necessary neurosurgeons' sufficient cadres, whereas in the first stages of war in them was felt acute/sharp deficiency that it is completely logical for any great war. Not in one country it will never be sufficient the qualified cadres, necessary with such

grandiose "traumatic epidemics", what present modern wars.

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At the same time the experiment/experience of war with respect to the provision with the neuro-surgical aid of wounded places before public health of peacetime to its full extent the task of the even better training of the doctors in the sense of the development in them of high clinical culture, necessary wide view and greater acquaintance with the foundations of neurologic diagnosis. Conducted at present by Soviet public health the reform of therapeutic aid to population, including the provision of population with the specialized neuro-surgical aid, acquires extremely great value, also, from the point of view of the practical training of the corresponding neuro-surgical cadres.

In the attitude of the neuro-surgical cadres of wartime it is necessary to bear in mind, which in the first stages of war is extremely important so that the basic links of the system of the specialized aid would be provided by neurosurgeons and neuropathologists. It is necessary to widely assign neuropathologists on this work, but not to appoint them, as this was in a number of cases in the first period of the Great Patriotic War, to administrative posts. The combination of the work of neuropathologist

and young surgeon can serve as foundation for organizing the neuro-surgical group, especially if this group briefs experienced neurosurgeon.

The experiment/experience of the Great Patriotic War teaches that by timely briefing, training in operating table, practical-scientific conferences and short term courses within comparatively short periods it is possible to prepare military neurosurgeons' completely satisfactory cadres from a number of neuropathologists and recently finished young doctors.

#### SUTURING OF THE TREATED WOUND OF SKULL TIGHTLY.

As has already been indicated, during the Great Patriotic War was carried out the principle of the so-called open treatment of wounds. This principle in essence widely adhered to neurosurgeons during processing of the wounds of skull and brain, allowing/assuming into second half war in certain cases small retreats from it.

However, at present a question of suturing under the military conditions of the wounds of skull tightly finds new prerequisites/premises, and those all advantages of the closed conduct of the wounds of the skulls, to which indicated during the first world war Russian surgeon A. V. Britnev, again they must be

taken in attention, acquiring under new conditions special importance.

Two new, very essential of factor, which appeared for this time, create prerequisites/premises for a possibility under military conditions of suturing of the wounds of skull tightly.

The first of these factors - created for the time of the Great Patriotic War ordered system of the specialized neuro-surgical aid by that wounded into skull. If that wounded the skull comparatively early undergoes operational processing in specialized KhPPG of army by the sufficiently qualified neurosurgeon, and processing wound is conducted sufficiently radically, moreover in the post-operation period this wounded not less than 3 weeks remains in the same hospital under the observation of his operated neurosurgeon, then all objections against suturing of the processed wound of skull tightly completely disappear, and entirely come forward the large/coarse advantages of this method. It goes without saying that under the changing conditions or with change in a medical-tactical circumstances again must be advanced the requirement of the open conduct of wounds.

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Suturing will be tightly contraindicated during processing of the wound of skull from special readings on DMP; it will be inadmissible, if processing wound performs surgeon, insufficiently experimental in the area of neurosurgery, and also if according to the conditions of a medical-tactical circumstances wounded soon after process/operation must be evacuated.

The second important factor, which creates prerequisite/premise for suturing of the wounds of skull tightly, is introduction to the medical practice of contemporary powerful/thick antibiotic - penicillin. In postwar surgery of peacetime was accumulated already a sufficient number of completely conclusive observations about the great value of this preparation in prophylaxis of the development of the infectious process and in struggle with it.

During the combination of two most important factors indicated - processing the wound of skull by the sufficiently qualified neurosurgeon under conditions of the specialized hospital and energetic penicillin-therapy appears further prospects in the relation to not only suturing of wounds tightly, but also the more radical processing of the wounds of brain. All this must create new possibilities for an improvement in the results of the treatment of the penetrating wounds of skull in the sense of warning/prevention of such most posterior complications as festering cerebral scar or onset

on the soil of the rough cicatrization of the cerebral tissue of hydroencephalia and epilepsy.

NEURO-SURGICAL AID WITH THE WOUNDS OF SOFT TISSUES AND WITH THE NONPENETRATING WOUNDS OF SKULL.

The manufactured in the year of the Great Patriotic War system of the specialized aid by that wounded into skull encompassed, as already repeatedly it was indicated, the predominantly heaviest group of the penetrating wounds of skull. This is understandable, since in this group of wounded in all stages of evacuation most sharply stood a question about struggle for their life. And this struggle for the life of wounded with the penetrating wounds of skull gave during Great Patriotic War very perceptible results, having considerably lowered the lethality of this group of wounded.

At the same time, neuro-surgical aid proved to be that those wounded the skull, in which the character/nature of wound did not suggest such heavy fears. Those wounded the soft tissues skulls evacuated in essence into general-surgical KhPPG or GLR. In these hospitals for the first time in the history of wars the wounded the soft tissues skulls sufficiently widely underwent the primary processing of wounds, moreover in the course of war operability of this category of easily wounded grew/rose, about which testifies **Table 77.**

Table 77. The surgical processing of the wounds of the soft tissues of skull in different are year wars, acccrding to the data of the deepened development of the histories of disease/sickness/illness/malady.

(1) Год войны	(2) в 1941	(3) в 1942	(4) в 1943	(5) в 1944
(6) Процент обработанных ран мягких тканей	21,0	25,6	25,2	30,2

Key: (1). Year of war. (2). The first. (3). The second. (4). The third. (5). The fourth. (6). Percentage of processed wounds of soft tissues.

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It should also be noted that operability with the wounds of the soft tissues of skull in army area, according to the data of different combat process/operations, oscillated in limits of 7.0-14.0o/o, and in army area it achieved sometimes 31.0-33.0o/o, about which testifies Table 78.

Thus, operability of the group of those wounded the soft tissues of skull continuously grew/rose in the course of war, although on the whole it was still insufficient. However, if we consider the special features/peculiarities of pathology during these, it would seem,

light wounds of the soft tissues of skull, then gets up an important question about the need of the envelopment of this group of wounded by the specialized neuro-surgical aid.

It suffices to say that suturing of the processed wound of the soft tissues of skull was produced altogether only into 14.0c/o of cases, early anechoic suture was superimposed into 4.2c/o, partial sutures - into 3.9c/o, the primary deferred sutures - into 0.4c/o and secondary sutures - into 6.1c/o of cases. In this case in 11.3c/o those wounded the soft tissues of skull was observed the prolonged festering of wound with the education of fistulas and osteomyelitis. The unit of these wounded had to long be treated in the hospitals of the deep rear.

These data show that the quality of the operational aid with the wound of the soft tissues of skull, given in general-surgical KhPPG and GLR, was in a number of cases insufficient. Therefore one of the basic tasks of military field surgery was the tendency to possibly more fully/totally/completely encompass with the specialized neuro-surgical aid the great group of those wounded into the soft tissues of skull, that also began to be realized with second half war.

Table 79 indicates an improvement in the results of the treatment of the group of those wounded the soft tissues of skull on

Table 78. operability of those wounded the soft tissues of skull in army and army area in different combat process/operations (in percentages).

(1) Оперативность	Войсковой район (2)	(3) Ростов-Волгоград Москвитин	(4) Сталинградская битва	(5) Прорыв блокады Ленинграда	(6) Орел-Курскская битва	(7) Освобождение Белоруссии	(8) Висла-Одер	(9) Берлинская операция
В войсковом районе (10)		6,5	7,6	6,8	12,0	13,8	8,0	11,5
В армейском районе (11)		4,1	15,9	3,2	14,0	26,2	33,0	31,0

Key: (1). operability. (2). Combat process/operations. (3). Rout of Germans in the environs of Moscow. (4). Stalingrad battle. (5). Blockade break-through of Leningrad. (6). Orel-Kursk battle. (7). Liberation of Belorussia. (8). Vistula-Oder. (9). Berlin process/operation. (10). In army area. (11). In army area.

Table 79. Issues with the wounds of the soft tissues of skull on the years of war (in percentages).

(1) Исходы	Год войны (2)	(3) Первая	(4) Вторая	(5) Третья	(6) Четвертая
Выздоровление (7)		94,1	94,1	96,2	96,0
Временная нетрудоспособность (8)		3,0	3,1	2,9	2,5
Прочие и неизвестные исходы (9)		2,7	2,9	0,9	1,0

Key: (1). Issues. (2). Year of war. (3). The first. (4). The second. (5). The third. (6). The fourth. (7). Recovery. (8). Temporary/time disablement. (9) Other and unknown issues.

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At the same time these data indicate that entire/all problem of the treatment of those easily wounded the skull to the very end of the Great Patriotic War yet was not completely solved and in this direction must be developed further measures.

As far as group is concerned of the nonpenetrating wounds of skull, then the reports of combat process/operations, comprised on old form, do not give the possibility to delimit the nonpenetrating wounds of the bones of skull from those penetrating and to conduct the more detailed analysis of the data, concerning this group wounded.

On the basis of the available materials one should recognize that the significant part of these wounded passed through the specialized hospitals together with those obtained the penetrating wounds of skull. Certain unit of these wounded underwent in the specialized hospitals processing wounds, whereas another group, transportable wounded, immediately was evacuated on GBA or into the front line specialized hospitals. The sufficiently significant part of the wounded with the nonpenetrating wounds of skull, just as some

obtained penetrating wounds, passing specialized KhPPG, it was evacuated together with those wounded the soft tissues of skull into the army and front line general-surgical hospitals where it underwent operational processing by the surgeons of general/common/total profile. The fact that among those wounded the soft tissues of skull was encountered certain quantity of those obtained and the heavier penetrating wounds of skull, is confirmed, for example, by reports about the Stalingrad battle, during which in one of GLR among those wounded the soft integuments of skull recorded there were 8.40% of lethality, which indicates the defects of the evacuation of those heavily wounded the skull according to designation/purpose.

According to the data of the maps/charts/cards of the deepened characteristics, the issues with the nonpenetrating wounds of skull can be represented on the years of war in the following form (Table 80).

Comparing all given data, it is possible to come to the conclusion/derivation that treatment of the wounds of soft tissues and nonpenetrating wounds of skull as comparatively the lungs, gave during the Great Patriotic War good results, after ending in the overwhelming majority of the cases by the recovery of wounded, moreover a quantity of those recovered with each year of war progressively increased. At the same time it is necessary to note

that even with these comparatively light wounds occurred the temporary/time disablement, which achieved with the wound of the soft tissues of skull 3.00/o, and with the nonpenetrating wounds of already comparatively high number (26.50/o) during the first year of war. Furthermore, lethal outcomes with the nonpenetrating wounds of skull were encountered into 3.30/o of cases and even in the cases of the lightest wounds of the soft tissues of skull they nevertheless were observed in limits from 0.3 to 0.80/o.

Table 80. Issues with the nonpenetrating wounds of skull on the years of war (in percentages).

(1)	(2)	(3)	(4)	(5)	(6)
	Годы	Первый	Второй	Третий	Четвертый
Всего (7)		66,7	71,9	75,9	73,4
Временная потеря трудоспособности (8)		26,5	24,0	23,7	23,9
Прочие и неизвестные случаи (9)		6,8	4,1	2,8	2,7

Key: (1). Issues. (2). Year of war. (3). The first. (4). The second. (5). The third. (6). The fourth. (7). Recovery. (8). Temporary/time loss of working capacity. (9). Other and unknown issues.

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Further it should be noted that the classification of those wounded the skull on the obtained wounds soft tissues, the nonpenetrating and penetrating wounds of the bones of skull and brain presents in the majority of the cases considerable difficulties. Evaluation of the general condition of wounded and form/species of wound are in a number of cases completely insufficient for the demarcation of these wounds. It is small then, sometimes a most important question about the presence of the damage of solid cerebral shell and substance of brain cannot be solved even by the neurologic

examination/inspection of wounded and by the X-ray analysis of skull. Only during the operational processing of wound it is possible in such cases to come to light/detect/expose the depth of the damage of tissues and to give final conclusion about the character/nature of wound.

Thus, although the wounds indicated by nature and on the essence of the pathological process actually/really are related to the lighter wounds of skull however it is necessary to bear in mind, that they can be escorted/tracked by deep changes in membranes and brain tissue in the form of hemorrhages and contusion foci and that with them can develop deep foci of infection in membranes and substance of brain. By itself of course the timely identification of these all associated damages/defects and complications has exceptionally important value for correct treatment and subsequent issues.

All special features/peculiarities of the dismantled lighter wounds of skull indicate that for the correct identification of the essence of the pathological process and correct treatment is necessary the sufficiently qualified therapeutic aid. Only by the insufficiency of this aid it is possible to explain those comparatively prolonged periods of treatment, disablement and even lethal outcomes which were recorded during the Great Patriotic War among this group of wounded.

It is necessary to add that during the Great Patriotic War was outlined the great and on the whole correct tendency toward the treatment of easily wounded in GLB of army area either even in army area to their full/total/complete recovery within the limits of its army or even its inherent division. As is shown the experiment/experience of war, in this group of easily wounded sufficiently widely were included the obtained wounds of the soft tissues of skull, that in view of the specific special features/peculiarities of these wounds should be recognized the completely incorrect.

Taking into account all special features/peculiarities of the wound of soft tissues and nonpenetrating wounds of skull, it is necessary to emphasize that precisely relative to the practicing previously organization of the treatment of this group of wounded as cannot more appropriate is Ye. I. Smirnov's admonition about the inaccurate understanding of term "easily wounded" with the tendency to guide this wounded for treatment toward doctors not to surgeons. "In actuality easily wounded require the timely aid and the compulsorily qualified surgeon", since "to increase the percentage of the return to formation/cider there is primary task of the medical service of the Red Army".

Thus, and from the point of view indicated the group of those obtained the light wounds of skull "compulsorily requires qualified surgeon's timely aid", i.e., this group of wounded must be completely encompassed by the created during the Great Patriotic War system of the specialized neuro-surgical aid. How the decision/solution of this question is important for the group of the bullet wounds of skull, evidently from the fact that among them great specific gravity/weight have the wounds of soft tissues and the nonpenetrating wounds of skull.

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The materials of the development of the maps/charts/cards of the deepened characteristics showed that the wounds of soft tissues compose 54.60/o, and nonpenetrating - 17.30/o of all wounds of skull, i.e., both these groups together comprise more than 2/3 all bullet wounds of skull.

The envelopment all of those wounded the skull, including the obtained wounds soft tissues, by the system of the specialized aid greatly it will simplify all difficulties of classification and organizing the therapeutic aid by that wounded the skull. In this

system in army area are held up only the obtained surface wounds of skin of skull, which are about 30.00/o of those wounded into soft tissues.

All remaining wounded the skull, with exception of nontransportable ones, must be evacuated according to designation/purpose into the specialized KhPPG armies. In the latter can be outlined the following job schedule: all wounded, general condition and form/species of wound whom they force to assume that the depth of wound does not exceed the thickness of the soft integuments of skull, they undergo operational processing by the surgeons of KhPPG, on basis of which they will deploy specialized hospital. If with the carving of wound bone proves to be whole, then wound they will sew tightly, and wounded through several days can be transferred into army GLB.

In the cases of the violation of the integrity of bone the latter they trepan and they inspect solid cerebral shell. With the integrity of the latter wound after cleaning/purification they will sew and wounded is left on 10-14 days under observation in specialized KhPPG. If from the side of wound and no general/common/total neurologic these complications it attacks/advances, wounded can be directed for recuperation to army or front line general-surgical hospital.

If solid cerebral shell during processing of wound proves to be damaged, is produced x-ray examination, if in this there is a need, and wounded they transfer into another operating room for further processing of the wound of brain by the forces of neuro-surgical group.

Thus, in the outlined tentative scheme of work it is possible to pass all those wounded the skull through the supervision of the specialized hospital, without expanding is at the same time excessively the work of neuro-surgical groups. Into the responsibility of the latter on this scheme will as before enter perfecting the heaviest group of the penetrating wounds of skull, to which will be added another consultation and organization of all matter of therapeutic aid by that wounded the skull.

The given considerations and the possible directions of the ways of further development of the specialized neuro-surgical aid wounded the skull completely escape/ensue from the study of the experiment/experience of the Great Patriotic War on rendering to therapeutic aid by that wounded the skull. Their task is reduced to introduce further improvements into the treatment of those wounded the skull. They must even more decrease a quantity of lethal outcomes and a percentage of disablement and even more increase a quantity of recoveries.

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Supplement.

From the editorial staff of section the "bullet wounds of skull and brain".

Preceding/previcus 4th that, dedicated to "bullet wounds and damages of skull and brain", published in 1949.

In the past 4 years occurred the events of vast historical importance.

The Soviet people and entire progressive humanity it was enriched by comrade I. V. Stalin's brilliant works "Marxism and questions of the linguistics" and "economic problems of socialism in the USSR", by the being models of creative Marxism, which had immense effect on the development of all branches of science.

At the past XIX Congress of the Communist Party of the Soviet Union, and also in historical speech at the congress/descent of comrade I. V. Stalin is outlined grandiose program of struggle for further building of communism in our country.

In Soviet medical science occurred deep and fundamental changes.

At the session of the All-Union Academy of agricultural Sciences in V. I. Lenin were finally routed the idealistic theories of Weismann and Morgan about the inalterability of hereditary signs/criteria and triumphed the created by I. V. Michurin life-asserting exercise of Soviet creative Darwinism about the effect of the varied conditions of environment on heredity.

The joined session of the Academy of Sciences of the USSR and Academy of medical Sciences of the USSR revealed the idealistic essence of Verhoeffism and was indicated not the need for further comprehensive development of I. P. Pavlov's materialistic physiological exercise about nervosism and about the interrelation of organism with the environment.

Editorial staff counts therefore they are necessary to indicate the allowed in the 4th volume by the authors of individual chapters errors and to amend their, how this will prove to be possible under conditions of this on the need for short supplement.

It is first of all necessary to pay attention to subchapter

"change from the side of mental sphere" (page 125-132), written by A. S. Shmar'yan, who stood on incorrect and faulty idealistic positions.

Of propagandized by A. S. Shmar'yan in his works psycholocalism it found its reflection, also, in this subchapter. The widespread introduction of I. P. Pavlov's physiological exercise into clinic made it possible to expose the idealistic essence of the "cerebral pathology" of A. S. Shmar'yan and to guide Soviet psychiatry on correct route/path.

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In the 4th volume there is a series/row of the ill-defined formulations which were allowed as a result of insufficient use by the authors of Pavlovian physiology. In particular, I. S. Babchin, carrying out the full/total/complete analogy between the closed injury of skull in peaceful and wartime, did not consider the severe conditions under which are situated the soldiers in combat circumstances (page 40). Meanwhile there is no doubt that the injury of skull in field conditions is the reason for more serious functional violations, than under conditions of peacetime.

In the chapters, which concern neurologic characteristics and clinic of the wounds of skull (I. Ya. Razdol'skiy, I. S. Babchin),

questions of localization of functions in cerebral cortex are treated sometimes from incorrect localistic positions.

Editorial staff considered also they were necessary to place in the 5th volume in the form of supplement the chapter the "physiological bases of the pathological processes during bullet wounds and damages of skull and brain", which must give contemporary concept about the basic processes, occurring in brain as a result of its bullet wounds and damages, and indicate the erroneous localistic treatments, allowed in the individual chapters of the preceding/previous volume.

Editorial staff attempted in supplementary chapter to throw light on questions of the pathogenesis of the bullet wounds of brain on the basis of the research of the great physiologist-materialist of I. P. Pavlov and his students with respect to the principles of foremost Soviet medicine.

Some fundamental admonitions apropos of the 4th volume the "bullet wounds of skull and brain".

Successive development by the Soviet scientists of the scientific views of I. M. Sechenov, S. P. Botkin and especially I. P. Pavlov, who created really scientific materialistic physiology,

forces to critically reexamine the "theory" of A. S. Shmar'yan's cerebral pathology, the series/row of positions/situations of whom is presented in subchapter, printed in the 4th volume, which left into light/world in 1949.

Indicating the great value of Pavlov's exercise for rebuilding of medicine on new scientific bases, the resolution of the joined session of the Academy of Sciences of the USSR and Academy of medical Sciences of the USSR at the same time emphasizes the following: "the discoveries/openings of I. P. Pavlov in the area of higher nervous activity as the greatest achievement of the contemporary science about brain, they are the powerful natural-science foundation of materialistic ideology, by the terrible weaponry of our ideological struggle with all manifestations of idealism and obscurantism".

On that taking place on 11 October, 1951, the joined conference of the presidium of the Academy of medical Sciences of the USSR and plenum of the board of the All-Union society of the neuropathologists and psychiatrists were revealed the erroneous installations of the propagated by A. S. Shmar'yan "theory" cerebral pathology.

In the 4th volume of work "experience of Soviet medicine in the Great Patriotic War 1941-1945" (pages 125-132) A. S. Shmar'yan gives

characteristics of the series/row of the psychopathological syndromes which allegedly are observed with the specific localization of the wounds of brain.

Localizing mental functions in one or the other departments of the cerebral cortex of brain, A. S. Shmar'yan enters in irreconcilable contradictions with I. P. Pavlov's exercise and actually are repeated the reactionary assertions of the foreign neurologists and psychologists.

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For example, A. S. Shmar'yan asserts: "in the first place in brightness, fundamentality and depth of psychotic manifestations should be to place the damages/defeats of frontal cortex, its polar-basal departments with front-nazo-orbital wounds" ... "the contemporary data of the pathology of brain they make it possible to secrete psychopathological syndromes the basis of frontal fraction/portion and delimited they from general cerebral disorders, from the syndromes of the damage/defeat of the convex surface of frontal cortex" ...; "... the majority of fronto-orbital wounds is escorted/tracked by the selective damage/defeat of the basis of frontal cortex, during which to the foreground come forward effective and motor brake releasing, euphoria, hypomanic condition with

excitation of inclinations (increased hunger, eroticism)". "During the damage/defeat of the convex surface of frontal fraction/portion comes forward the loss of initiative, activity, apathies, motor inhibition, impoverishment of speech and thinking" ... "during temporal, sincipital and sincipital-postcranial damages/defeats are violated the recognition, the understanding of speech, activities, alignment in space, in time and in its own body, together with the more complicated disorders of perception and hallucinatory phenomena".

Thus, indicating that during the damage of one or the other departments of the cerebral cortex are detected different and supposedly the strictly outlined psychopathological syndromes, specific for the damage/defeat of this area of the cerebral cortex, A. S. Shmar'yan tried to demonstrate the existence of the centers of the highest mental functions.

The inaccuracy of this assertion is proved by the numerous research of I. P. Pavlov and his students.

According to I. P. Pavlov's exercise, the essence of the conditioned reflex cannot be localized in the specific point/post of the cerebral cortex, since the substratum of the conditioned reflex is closing/shorting between each elements/cells of the crust ends of

interoceptive (including motor) and any other analyzer.

" ...temporary nerve communications is most universal physiological phenomenon in animal peace/world and in us themselves, wrote I. P. Pavlov. - And at the same time it and mental - that the psychologists call association, will be this formation of the connections from all possible activities, impressions or from letters, words and thoughts" (Vol. III, 2, 325, 1951)<sup>1</sup>.

FOOTNOTE <sup>1</sup>. Here below references are done to the appropriate volumes of I. P. Pavlov's works izd. Academy of Sciences of the USSR 1951 Moscow. ENDFOOTNOTE.

In front/leading fractions/portions there are no such mechanisms, which would be supreme with respect to all hemispheres. There are no especially important instruments which would establish/install the high perfection of nerve activity, there.

This is the position/situation of I. P. Pavlov by the confirmed numerous observations of the neuropathologists, psychiatrists and neurosurgeons during the Great Patriotic War with the wounds of skull and brain.

According to the experiment/experience of the wars, diverse in

severity and volume the penetrating wounds of the skulls, with which were damaged the convex and basal surfaces of the frontal fractions/portions of brain, and also sincipital, temporal and postcranial fractions/portions, they were escorted/tracked altogether only into 1.10/o by mental violations.

It is characteristic that these mental violations were very diverse and they were not placed in those strictly outlined frames/scopes of the syndromes which A. S. Shmar'yan secreted for the specific localization of the damages of brain.

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A. S. Shmar'yan's error is also tendency to give explanation to the basic basic pathophysiological manifestations of the violation of the activity of the cerebral cortex separately from those data, which were obtained by I. P. Pavlov during the study of the experimental neuroses in laboratory and the mental diseases of man in clinic.

For example, the origin of hallucinations A. S. Shmar'yan connected exclusively with such localization of wound with which could occur the stimulation of one or the other sensitive area. Thereby A. S. Shmar'yan denied the representation of I. P. Pavlov about the inertness of excitation and phase conditions as to the pathophysiological foundation of the origin of the hallucinations, which can appear as the manifestation of the general/common/total symptoms of the damage of the cerebral cortex.

Erroneous in A. S. Shmar'yan's work was the interpretation of the mechanism of pains during the damage/defeat of sincipital area, during which was emphasized the value of cortico-talamiceskix

violations.

In direct connection with the inaccurate representations of A. S. Shmar'yan about the pathogenesis of cerebral injury is located his treatment of the physiological mechanisms of reduction processes, which was being reduced by it to the creation of "new alternate routes and intra-neuronal communications". Ignoring by A. S. Shmar'yan, I. P. Pavlov's exercise led him to the straight/direct sermon of the vitalism: "at any intensity of traumatic damage/defeat always it becomes apparent the maximum tendency of organism to resist all destructions and to be held down/retained in life" (page 130).

By especially intolerant are interpretations A. S. Shmar'yan the mechanisms of disturbance of consciousness as one of the central symptoms of cerebral injury. A. S. Shmar'yan asserted the existence of two equal mechanisms of the violation of consciousness: a primary-cortical and truncal.

Positions/situations, close to A. S. Shmar'yan's views, were given also in the chapter of I. S. Babchin, who described the disorders of consciousness and psychics/psyche "as hanger-on and vegetative symptoms". The same error committed I. Ya. Razdol'skiy. All this contradicts the materials, represented in the same 4th volume, which with a certainty testified about the absence of any

dependence of the frequency of the cases of the violation of consciousness on localization of wound and thereby they indicated the possibility to consider the violations of consciousness as the consequence of the general/common/total disturbances of the functional condition of crust cells. The pathophysiological substratum of such violations was onset and irradiation of beyond the limits inhibition and first of all their actions on the neurodynamic mechanisms of the second signal system.

The observations of the clinicians of the violations of consciousness with the injury of the hanger-on unit of brain indicate unavoidable with this localization wounds the sharp violations of the vitally necessary functions of blood circulation, respiration, metabolism/exchange, which by heaviest mode manifests itself the functional condition of crust cells.

Incorrectly was explained this symptom of cerebral injury as the disorders of sleep. In chapter of N. S. Molchanovo the violations of sleep are examined among other disorders of vegetative sphere. By that author himself acknowledged the concept of Hess, who combined the center of sleep with the field of the vegetative centers of hypthalamic field, that was undergoing criticism I. P. Pavlov's on the part.

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I. P. Pavlov defined the condition of sleep as the spilled inhibition in the cells of cerebral cortex, which can be extended also to subcortex. The conditions, which ensure the irradiation of inhibition, are sufficient intensity of inhibition and presence of the lowered exciter tone or crust cells.

Primary sleep appears in the cerebral cortex; the functional condition of subcortex changes only for a second time by the force of the violation of the usually existing negative-induction effect of cortex on subcortex.

In the chapter of A. S. Smar'yan, furthermore, the origin of emotive violations is connected with the damages/defeats of frontal fraction/portion and diencephalic violations. "It is most difficult to demarcate clinic of the damage/defeat of basal cortex from the primary damage/defeat of interstitial brain", writes he.

The inaccuracy of these views was with entire obviousness proved by I. P. Pavlov in his numerous research about the interrelation of cortex and subcortex.

Thus, A. S. Smar'yan as the author of the "theory" of cerebral

pathology, mechanically timing individual mental functions to the strictly localized sectors of brain, attempted to convert the idealistic essence of his theory into materialistic.

However, mechanization in natural science, as is known, it is only the reverse side of idealism.

Struggle for I. P. Pavlov's physiological exercise in psychiatry combined Soviet psychiatrists.

I. V. Stalin's instruction to the struggle of opinions and the freedom of criticism as to the most important conditions for the development of science made possible to reveal entire inaccuracy of the theory of the cerebral pathology of Shmar'yan and to derive Soviet psychiatry on the wide road of I. P. Pavlov's physiological exercise.

Physiological bases of the pathological processes during bullet wounds and damages of skull and brain.

Soviet medical science during the Great Patriotic War assembled the richest factual material, characterizing course conditions, treatment and issues of the wounds of skull and brain. As in all other fields of the military medical science, neurosurgery can note

the essential successes in a matter of an increase in the number of such wounded as could return to service in army.

In the period of the Great Patriotic War and in particular after the world-wide historical victory of the Soviet Army above Fascist Germany and Japan they set about the analysis of the obtained material and to the generalization of the accumulated experience. However, it is necessary to note that during the scientific generalization of the extensive materials of military questions of the pathogenesis of the combat injury of brain were dismantled frequently without taking into account I. P. Pavlov's physiological exercise.

As prerequisite/premise for the physiological correct analysis of the pathogenesis of the combat injury of brain served Pavlovian representations about dynamic localization of functions and results of the experimental research of I. P. Pavlov and his students, dedicated to the study of a question about the consequences of the extirpation of one or the other departments of the cerebral cortex.

Studying by the objective method of the consequence of the extirpation of different departments of the cerebral cortex, I. P. Pavlov revealed/detected that in this case occurs the violation of the processes of analysis and synthesis, moreover especially suffered

their most delicate forms. By L. G. Voronin were damaged in animals different sectors of the cerebral cortex.

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In one step were destroyed the sectors of cortex of both hemispheres or this process/operation was realized in two stages. In some animals of damage were deposited in 3 places the cortices. As a result of such damages attacked/advanced the violations of the analytic-synthetic functions of cortex. These violations of functions were held from several weeks to year. Violations were revealed/detected most distinctly during the use of complicated irritants. Any damage of cortex does not pass without leaving a trace for the general/common/total function of analysis and synthesis. However, it was possible to observe the greatest violations when irritants were headed toward the analyzer whose territory proved to be damaged. At the foundation of this lies/rests the violation of the process of internal inhibition as more brittle. Besides this, as showed further research, suffers the exciter process in view of the incidence/drop in the efficiency of crust cell.

Pavlov considers the wounds of brain as the factor, which stimulates the brain: "...action of wound stimulation lasts the indefinite time, and it is unknown, to what distance it is spread.

You cannot say, when it ends.... Finally, it comes the desired moment, wound stimulation is passed, wound heals. But then to scene is new stimulation - scar" (Vol. III, 1, 223, 1951). The initially extended to distant distance activity of wound stimulation is expressed in the development of the braking process. At the termination of the activity of wound irritant and limitation of the phenomena of inhibition comes the period during which "all observed changes depend ... only on the absence of the removed units of the great hemispheres".

The first signs/criteria of the beginning of the activity of scar are expressed in the phenomena of suppression. Following by this can advance the "burst of spasms" as the manifestation of excitation. After completion "follows the new period of the subsequent suppression". I. P. Pavlov emphasizes as the important side of scar the activity of its not only as irritant, but also factor, which destroys cerebral substance. Observing a great quantity of operated animals, Pavlov indicated that "the work of scar ... is involved/tightened to months and year" (Vol. III, 1, <sup>223</sup>~~123~~, 1951).

These experimental research, and also great experience, acquired by I. P. Pavlov's school in clinic of nerve ones and mental diseases, made possible to A. G. Ivanov-Skolenskiy to study from the positions of Pavlovian physiological exercise the pathogenesis of the combat

injury of skull and brain. During the analysis of the obtained materials they isolated three stages of the course of disease/sickness/illness/malady and reducing period in patients with the injuries of brain.

First (acute/sharp) period of the course of the morbid processes with the injuries of brain.

The description of the symptomatology of the first period, directly following after injury skull and of brain, datum by A. G. Ivanov-Smolenskiy, virtually coincide with the description of this condition in other authors. In patients into the first hours after the open and closed injury was noted the loss of consciousness, the offensive comatose condition with the subsequent vomiting and by more or less extensive retrograde amnesia.

Delivering injury should be considered as ultrapowerful, although to the short-term operating irritant. Subsequently the tissues, which surround the place of injury, prove to be the source of the long operating stimulations and occasion for the reflector appearing violaticns of trophic system.

Recently to the condition of trophics of cerebral tissue is given the value of the most important condition of the normal functioning of crust cells (K. M. Bykov, 1952). To the violations of the trophic system of brain during its damages must be attached the most serious value in the study of the problem about the pathogenesis of the injury of brain. These violations, after arising primary as a result of the presence of stricken area, are complicated subsequently by the violations roof and liquor circulation. As the most significant violation of trophic system can be considered edema and especially the bloating of cerebral tissue.

The irritants, which appear with the injury of brain, force crust cells to work beyond the limit of their efficiency, causing the onset of beyond the limits inhibition (condition, which corresponds to N. Ye. Vvedenskiy's parabiosis). The braking process, which appears in area of injury, at sufficient intensity can irradiate on the cerebral cortex.

Thus, are detected the violations of the functional condition of the cerebral cortex at considerable distance from the place of injury. They are designated as the "repercussion" of injury.

To the process of the irradiation of inhibition can contribute, in the first place, the intensity of this process and, in the second

place, the low exciter tone of crust cells. Some special features/peculiarities of the conditions of obtaining the combat injuries in the individual categories of wounded can contribute to the great value of precisely this latter fact.

Combat injury can be obtained after the execution of considerable physical stress/voltage, action of sharp sonic irritants and finally against the background of considerable emotional stress/voltage. In each of these cases consists the prerequisite/premise for the possible overvoltage of the exciter process and the subsequent descent in the efficiency of crust cell even to the moment of wound. "Strong excitation from emotions excitant of cortex, and this rapidly conducts its stimulation to limit and beyond the limit of its efficiency", wrote I. P. Pavlov (Vol. III, 2, 207, 1951). It is necessary, however, to remember that of this type the effect of emotions is hardly ever necessary; it is detected, as a rule, only under the primary weakness of cortex or the excessive force of the stimulations, which are brought down to subcortex.

Another reason for the special feature/peculiarity of the course of the combat injury of brain can be its combination with considerable blood loss and supplementary injury - wound of soft tissues, supporting-motor apparatus, internal organs, the presence of

the specific period (to rendering aid) of entry into the central nervous system of "painful impulses/momenta/pulses" from the side of the receptors of the damaged tissues and organs/controls. The entry of the flow of these impulses/momenta/pulses can increase the condition of beyond the limits inhibition, the manifestation of phase conditions.

The presence of the extended on cortex braking process leads to limitation and exclusion of conditioned-reflex activity in wounded. Wounded ceases to react to that surrounding.

The impossibility of the education of new conditioned reflexes leads subsequently to the phenomena of amnesia.

Against the background of general/common/total beyond the limits inhibition can remain those not hindered or less slowed especially solid, which placed by those automated, conditional communications. From the side of the second signal system this can become apparent in the form of repetition by the wounded of the individual words and even phrases.

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Is possible inhibition of old ones, that was slowed, vocal

conditional reactions. However, these phenomena always cannot be considered as the manifestations of consciousness. They testify about incomplete envelopment by the braking process of all neurodynamic systems of cortex, stagnant excitation in some of them, the appearing as a result induction reinforcing exciter tone.

During the first period can be observed such violations of vegetative functions as vomiting, disorder of respiration, cardiovascular activity, etc. Observed against the background of the unconscious condition (at foundation of which lies/rests the wide irradiation of beyond the limits inhibition), these vegetative violations can be the result of the disconnection of the crust regulation of the function of internal organs/controls, dissemination of inhibition for the centers of subcortex, i.e. the progressive and gross violation of nerve regulation.

The dissemination of inhibition for subcortical and hanger-on education can lead to the violation of vital functions.

#### SECOND PERIOD OF THE COURSE OF THE MORBID PROCESSES WITH THE INJURY OF BRAIN.

The second period of the course of the morbid processes is characterized by the gradual weakening of beyond the limits

inhibition, which "lets itself be known, also, during entire the second period of disease" (A. G. Ivanov-Smolenskiy).

In this second period they are noted: 1) the symptoms, which depend on the concentration of inhibition in area of the injury; 2) the symptoms, which depend on that continuing to be held the process of the inhibition; 3) the symptoms, which depend on the violation of the normal interrelation of the processes of excitation and inhibition in the central nervous system, which is freed/released from the condition of the beyond the limits inhibition; 4) the phenomena, which depend on the violations of the normal interrelations of cortex and subcortex.

Symptoms, which depend on the concentration of inhibition in area of injury.

As a result of the concentration of inhibition in area of injury the braking process frees/releases the more or less extensive territories of the cerebral cortex, in connection with which is noted an improvement in the condition of the patient: it begins to react to external stimulations, is detected the gradual restoration/reduction of the function of the second signal system.

In direct connection with the concentration of the braking

process in area of injury will cost the manifestation of the local symptoms of injury, connected with the disturbance of the function of the crust end of one or the other analyzer. The intensity of the manifestation of these local symptoms depends, on one hand, from that, in what measure occurred fading the "repercussion" of injury, and with another, from the course of reduction processes and development of compensator mechanisms. Important role plays the character/nature of injury, the volume of damage and presence or absence of complications.

As is well known, in the crust end of each analyzer I. P. Pavlov distinguished nucleus and peripheral unit. Due to nucleus is realized delicate analysis by complicated the synthesis; the peripheral units of the analyzer, widely scattered in cortex, which are interdedded with the peripheral units of other analyzers, provide the simpler forms of analytical and synthetic activity. Therefore during the damage to center section (nucleus) of analyzer are detected the more considerable and more noticeable violations of especially complex functions.

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Symptoms, which depend on that continuing to be held the process of inhibition.

These phenomena find their expression "in general/common/total motor retardation (poverty/scarcity and deceleration of movements)". A. G. Ivanov-Smolenskiy describes as characteristic for this stage violation "vestibular-kinesthetic apparatus, i.e. the function of the balancing of body in space (appearance of vertigo, especially with a change in the position/situation, sometimes - an unsteadiness in gait, staggering with the closed eyes, etc.)".

Especially characteristic is the delay of inhibition on those neurodynamic systems, which are the substratum of the report/event of speech.

To the violations in the form of deafness, dumbness, deaf-mutism of patients and the like in clinic of the combat injuries of brain is given considerable attention. These conditions prove to be especially heavily transferred for a patient and can lead to the development of jet depression.

A. G. Ivanov-Smolenskiy showed the role of the irritants of the combat circumstances under conditions of which will be deposited military injury for the preferred manifestation of vocal violations.

"Is longer anything ... inhibition inclined to be held up on the system of the auditory centers, the highest echelon of command which is the auditory area (auditory analyzer) of cerebral cortex. However, it is necessary to take into consideration, that these departments undergo not only those harmful actions, that also all remaining departments of brain (air contusion, brain concussion), but, furthermore, at moment injuries receive seemingly extra load in the form of that super-maximum stimulation, such as is deafening sonic action from the occurred in immediate proximity burst. Meanwhile in man the auditory analyzer, which contains in itself the "sensory" center of speech, as is known, is most intimately in associative sense connected with a motor-kinesthetic vocal area ("motor center")".

I. P. Pavlov wrote: "the second signaling system and its organ/control, as quite latter/last acquisition in the evolutionary process, must be especially brittle, yielding first of all to the spilled inhibition, once it appears in great hemispheres" (Vol. III, 2, 325, 1951). Logically that during the reverse development of the widely irradiated guardian inhibition it is longer anything held up precisely in this area and, thus, does suffer clinically distinctly the speech of patient or not, in all cases of combat injury auditory analyzer proves to be under most unfavorable conditions.

I. V. Stalin in work "Marxism and questions of linguistics" showed the direct coupling of human thinking and speech.

"Whatever thoughts arose in the head of man and if they not arose, they can arise and exist only on the basis of lingual material, on the basis of lingual terms and phrases. The nude thoughts, free from lingual "natural matter" - there does not exist. "tongue is direct reality of thought" (Marx)" <sup>1</sup>.

FOOTNOTE <sup>1</sup>. I. Stalits, Marxism and questions of linguistics, page 81. ENDFOOTNOTE.

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The disease of auditory and speech- motor analyzer, leading to the violation of vocal function, can be revealed clinically in a whole series of the so-called mental symptoms, designated as the "disorder of thinking", "inconsistent thinking", "vocal retardation", etc.

It is possible that the mechanism of the violations of thinking indicated is not only, however, it is unconditional, it one cannot fail to consider with the selection/analysis of the pathophysiological symptomatology of injury.

Neurosurgical clinic constantly emphasizes the frequency of the appearance of the so-called mental symptoms during the damage/defeat of frontal fractions/pertions. This position/situation is far not absolutely, since "mental symptoms are observed also during the damage/defeat of other sectors of brain".

I. P. Pavlov on the basis of the richest experimental material created the exercise about dynamic localization of the functions: "the ...infinite mass of the phenomena of nature constantly gives rise to by means of the apparatus of great hemispheres the education first of positive ones, then of negative conditioned reflexes and by the fact in detail determines entire activity of animal, its daily conduct" (Vol. IV, 2, 231, 1951).

The conditioned reflex cannot be localized in any sector of cerebral substance, since its substratum is closing/shorting between the crust ends of analyzers.

Cerebral cortex, according to Pavlov, is the "most complex dynamic system".

The comparison of experimental material with different cases of

clinical pathology led I. P. Pavlov to the conclusion that "temporary/time nerve communications is most universal phenomenon in animal peace/world and in us themselves. But at the same time it and mental - that the psychologists call association, will be this formation of combinations from all possible activities, impressions or letters, words and thoughts".

I. P. Pavlov categorically objected to representation about localization in any sector of the cerebral substance of the highest mental functions, including in any fractions/portions: "In front/leading fractions/portions there are no such mechanisms, which would be supreme with respect to all hemispheres". "About any general/common/total mechanisms, which are located in front/leading fractions/portions, there cannot be speeches. There are no singular instruments, which would establish/install the high perfection of nerve activity, there, obviously,".

However, the accumulated clinical facts require the interpretation. As is known, the exciter tone of the cerebral cortex is supported by impulses/momenta/pulses from the external and internal medium of man. "Most important of the internal analyzers is motor analyzer".

The motor analyzer whose nucleus is located in the area of

front/leading central bend, receives impulses/moments/pulses from the receptors of muscles, tendons and ligaments.

These "proprioceptors" are stimulated in the process of muscular contraction/abbreviation, movements, realized by man, signalling thereby of change in the condition of organism.

Motor analyzer, as all others, is sensitive education. The axons of the sensitive cells, which form in their totality the crust end of the analyzer, are connected with dendrites of the great pyramidal cells of Betz-Merzhevskiy. Thereby impulses/moments/pulses from other analyzers, which are stimulated under the effect of conditional irritants and entering through the beaten routes/paths the territory of motor analyzer, can further be headed on pyramidal cells toward the segmental apparatus of oblong and spinal cord.

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The muscular apparatus of the body of man is approximately half his weight. Each muscular filament or group of filaments has their receptor instruments. The movements, carried out by man, which constitute the necessary condition of his existence, are the source of pulse arrival on the territory of the crust end of the motor analyzer. The stresses/voltages, developed with the skeletal

musculature, are also occasion for the onset of proprioceptive impulses/momenta/pulses. Since the considerable masses of one or the other muscular groups always are found in the condition of known stress/voltage (containment of all body as a whole, upper half body, head in vertical position), then constantly there are conditions of the onset of proprioceptive impulses/momenta/pulses and their entry into the crust unit of the motor analyzer. Even in the condition of the sleep when musculature to a considerable degree is weakened, occasion and to the onset of proprioceptive impulses/momenta/pulses is created by pressure on body from the side of the surface of support. All this together undertaken makes it possible to consider motor analyzer most active and strong, as emphasized I. P. Pavlov. It is possible to assume that the precisely motor analyzer is one of the basic sources of the exciter tone of the cerebral cortex. This is why during violations in the area of motor analyzer it is necessary to consider not only the appropriate motor violations, but also changes in the functional condition of the cerebral cortex as a whole, deprived under these conditions of the most essential "source" of exciter tone.

The violations of the functional condition of motor analyzer can occur not only if injury is localized in the area of the territory of its crust end. Its function can be disrupted by the mechanism of "repercussion" with any localization of injury and in particular in

frontal fractions/portions.

Above it was indicated what value in the symptomatology of cerebral injury, in particular, in the origin of the so-called mental violations, have the conditions of crust cells, transient between wakefulness and sleep, or hypnotic phases. These conditions, general laws governing manifestation of which for an entire nervous system were shown by already N. Yë. Vvedenskiy, appear with the oversteering of the stimulation process, occasion for what is injury. They are they attack/advance the more easily the lower the exciter tone of crust cells and, on the contrary, they can be scattered with its increase.

One of the occasions for a decrease in the exciter tone exactly is the disconnection of motor analyzer, which, as it was emphasized, can be the consequence of its direct damage and repercussion of the injury of any other sector of cortex. With localization of injury in frontal fraction/portion the place of wound will be the source both of the irradiation of beyond the limits inhibition and summing with it induction inhibition. This can pronounce on motor analyzer and that it is always necessary to consider in man, on a speech-motor analyzer. Hence is created occasion for the onset of phase conditions and thereby to the redcubling of the violaticns of higher nervous activity.

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Symptoms, which depend on the violation of the normal interrelation of the processes of excitation and inhibition.

These violations are the basis of some characteristic changes in the higher nervous activity of patients, in which are noted the phenomena of the increased excitability.

According to A. G. Ivanov-Smolenskiy, such conditions should be explained not by an increase in the exciter tone of crust cells, but by the relative predominance of the force of the exciter process above the braking. This is explained by the fact that the process of active, internal inhibition is restored already after was begun the restoration/reduction of the exciter process. In connection with this deficiency in the active inhibition it proves to be the increased irritability of such patients, offenses against the rules/handspikes of the internal order of therapeutic installations, etc.

Working conditions of crust cell with the weakness of active inhibition prove to be unfavorable - is detected its rapid exhaustion. Clinically it is possible to observe light enervation of

patients, failure of any lasting conversation, etc.

In the second stage (according to A. G. Ivanov-Smolenskiy), or in the period, which corresponds to the second stage, by a number of the authors was noted the appearance of the so-called "psychopathological symptoms or syndromes".

Estimating the condition of such patients, it is necessary to always remember that because of the low limit of efficiency of crust cells the latter easily can under the effect of, it would seem, insignificant occasions reveal/detect return for the condition of beyond the limits inhibition. Easily again appear the phase conditions, which can be the basis of hallucinatory-delirious phenomena.

Random intoxications, intercurrent diseases are represented by the factors, which decrease the limit of efficiency of crust cells and which complicate these phenomena.

The weakness of the cells of the cerebral cortex, characteristic for the second period of the course of cerebral injury, especially under the effect on this cortex of "difficult for it stimulations" perhaps according to I. P. Pavlov, by the reason for sharp "affective hursts and convulsive fits". The weakness of the cerebral cortex is

also the reason for emotiveness, characteristic to traumatized patients. In turn, on emotion, i.e. "stimulation from subcortex", is caused irradiation from it of excitation into the cerebral cortex. As a result of this can occur the excessive stimulation of "known point/post or area" of cortex .... "This it is sufficient with the weakness of cortex, wrote I. P. Pavlov, so that he would cause the strong extended negative induction, eliminating supervision, effect of the remaining units of the hemisphere", i.e. all or almost all neurophysiological systems, which are the substratum of the higher nervous activity of man. As a result appears the "concentrated stimulation of the specific point/post or area of great hemispheres in the form of the specific stimulation, perception or its trail" ...., the "stimulation, which obtained the predominant, illegal and invincible value". This stimulation can be the reason for the realization of one or the other attack/seizure/paroxysm of the forcible movements which are observed in traumatized patients.

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Phenomena, which depend on the violations of the normal interrelations of cortex and subcortex.

During the second period are detected numerous vegetative violations. They compose the object/subject of the complaints of

patients which declare about the presence of the pains in the area of heart, which have sometimes the character/nature of stenocardia, shortness of breath, asthmatic conditions, spasmodic phenomena in the area of gastrointestinal tract, etc.

During research are detected the changes in the composition of the peripheral blood, described in the period of the first world war of V. K. Khoroshko. Observe in the majority of the cases moderate leukocytosis, left-shift of leukocyte formula, decrease of a quantity of monocytes and eosinophils (A. L. Abashev-Kcnsta).

Researchers' majority notes the presence of distinct trophic disorders, in particular, violations of metabolism. One of the essential violations is the connected with injury vitamin insufficiency (G. Ye. Sukhareva).

As a rule, with the injury of brain can be sharply pronounced the violations of the functional condition of cardiovascular system. In patients are observed lability heart contractions, the tachycardia, an increase in the blood pressure, the inverted symptom Ashner. Sometimes proves to be distorted reaction to a change in the position/situation of the body: upon transfer from horizontal position to vertical is observed the blood pressure increase instead of the decrease. Is detected a change in the form, lumen, quantity

and character/nature of capillaries (I. K. Zyuzin).

A. G. Ivanov-Smolenskiy emphasizes as characteristic manifestation of vegetative violations with the injury of brain the sharply pronounced changes in the frequency of pulse with orthoclinostatic poll, the achieving 30-60 strikes/shocks per minute. The very frequent manifestation of vegetative violations in such patients is the increased perspiration.

Frequently attention is drawn to the vegetative asymmetries, which are expressed in different character/nature of dermographism for the skin surface of left and right half body, differences in the intensity of perspiration, degree of angiospasm, in connection with which prove to be sometimes sharply different the values of the blood pressure, measured on left and right shoulder artery and, etc.

The systematic research of the condition of internal organs/controls with the injury of brain was carried out by N. S. Molchanov, I. K. Zyuzin et. al.

The reason for all described above vegetative violations is change in such sick normal interrelations of the mechanisms of the regulation of vegetative functions.

As is well known, I. P. Pavlov counted: "although the life of animals and us he is headed by the basic tendencies of organism: to food, floor/sex, aggressive, research and so forth (function of the nearest subcortex), nevertheless for the accomplished coordination and the realization of these all tendencies and unavoidably in connection with general living conditions is a special unit of the central nervous system, which any individual tendency moderates, everything them will match and provides their advantageous realization in connection with environmental conditions of environment. These are, of course, great hemispheres" (Vol. III, 2, 206, 1951).

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As a result of the injury of brain and development of the phenomena of beyond the limits inhibition in the cerebral cortex prove to be possible the most varied violations in the interrelation of cortex and other departments of nervous system.

Beyond the limits inhibition can be extended to subcortical education, cause the sharp suppression of the series/row of vegetative mechanisms.

At the same time the presence of the braking process, which

predominates in the territory of the cerebral cortex, can not only free the mechanisms of subcortex from the permanent inhibiting effect of the cerebral cortex, but also it positively induce, which can lead to such condition of the reflector regulation of the functions of internal organs/controls, which by I. P. Pavlov was designated as "chaotic" (Vol. III, 2, 205, 1951).

And finally beyond the limits inhibition under conditions for strong injury and changes in the functions of nervous system can be extended also to its hanger-on department, causing the conditions, very risky for the life of patient. Beyond the limits inhibition, continuing to fulfill its guardian function with respect to nerve cell, becomes threatening for all organism as a whole.

In the second stage of the course of the reducing period chiefly are encountered first two of the possibilities indicated.

The wide acceptance of beyond the limits inhibition along central nervous system is encountered most frequently in the first period or in the case of the appearance of complications - the second.

Precise physiological representations about the reasons for the damage of the activity of internal organs/controls during the

violations of the functional condition of the cerebral cortex were given by K. M. Bykov.

K. M. Bykov and his laboratories showed the principle of the dependence of the so-called "vegetative functions of organism" on the cerebral cortex. After showing the dynamic, conditional-reflex mechanism of this regulation, K. M. Bykov emphasized important role in the regulation of the vegetative functions of the retention/preservation/maintaining the normal interrelations of cortico-cerebrum, subcortical ganglia/nodes and whole series of the located below nerve education with the leading roles cerebral cortex.

The given explanation of the origin of the vegetative violations which are considered as the result of changing the normal interrelations between cortex and subcortex, radically differs from those views which existed earlier, in light of which vegetative shifts/shears were considered as the consequence of primary diencephalic-truncal damages/defeats.

#### THIRD PERIOD OF THE COURSE OF THE PROCESSES WITH THE INJURY OF BRAIN.

The third period in the course of the injury of brain is characterized: 1) by the continuation of the process of the concentration of inhibition in area of the injury; 2) by the

normalization of the interrelations between the processes of excitation and inhibition; 3) by the continuation of shaping of the compensative mechanisms; 4) by the normalization of the interrelations between the cortex and subcortical mechanisms.

The braking process is concentrated more and it is more in area of injury, freeing/releasing the territories of cortex, its directly not tested activities. However, against the background of the scattering inhibition can be held the phase conditions of crust cells. Then cells, which were freed from hypnotic phases, can being able of yet completely not restored/reduced efficiency. This is expressed in the phenomena of irritable weakness, ease/lightness of the offensive of beyond the limits inhibition.

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The long held phase conditions, the inclination of the exciter and braking process to stagnancy can be the pathophysiological substratum of the onset of the series/row of the violations of higher nervous activity.

Prerequisite/premise for the restoration/reduction of function is, as has already been indicated, the liberation of the territory of the cerebral cortex from the condition of beyond the limits

inhibition, which is concentrated in area of injury.

The possibilities of the compensation for the occurred violations of cerebral functions are extremely great, that also finds its expression in the phenomenon, designated by I. P. Pavlov as the mechanical immunity: "In nervous system it is special in its most complex central department, which controls entire organism, which unites all particular activities of organism, this principle of mechanical self-defense, principle of mechanical immunity had to achieve the highest perfection" (Vol. III, 2, 176, 1951).

Mechanical defense is possible as a result of the "grandeur ... of communications" in central nervous system.

By the most important fact in the compensation functions is represented the "plasticity" of nervous system, in particular the cerebral cortex. "The principal, strong and constantly remaining impression from the study of higher nervous activity ... this is the extreme plasticity of this activity, its vast possibilities; nothing remains motionless, intractable, but everything always can be achieved, change to the best, provided would be realized the corresponding conditions" (Vol. III, 2, page 188).

In the latter case the discussion deals with the formation of

the neurodynamic systems, which ensure the functioning of new conditioned-reflex communications. The most important prerequisite/premise for the formation of these conditional communications is the restoration/reduction of the function of the crust ends of the analyzers. "It is obvious, wrote I. P. Pavlov, for individual analyzers replaceability it is necessary to count as the doubtless factor". Prerequisite/premise for this is the fact that "...cerebral end of the analyzer presents the common mass in which all units are located in close connection and can be replaced by others" (Vol. III, 1, 192, 1951). The education of new conditioned reflexes supposes, also as indispensable condition, sufficiently high exciter tone of crust cells.

In the third period of the course of cerebral injury vegetative violations usually begin to be smoothed, which is determined by the restoration/reduction of the normal interrelations between cortex and subcortical education.

However, during evaluation of the subsequent course of vegetative violations with the injuries of brain it is necessary to bear in mind, that morbid changes of functioning the internal organs/controls can prove to be occasion for pathological interoceptive pulsation within the limits of central nervous system. The result of this can be the onset of the focus of stagnant

excitation both in the cortex and in the nearest subcortex, which is one of the important teams of the onset of stable Cortico-visceral violations.

In particular, the source of the interoceptive impulses/momenta/pulses of this type can be the areas of the regional vascular spasm (migraine-like attacks/seizures/paroxysms, paroxysmal vascular spasms of vestibular apparatus, cooling and pallor of extremities, anginose of attack/seizure/paroxysm, general/common/total vascular crises, etc.). Characteristic for such patients condition of the lowered/reduced tone of crust cells, phase conditions in the cerebral cortex, it is doubtless, contribute to the education of the foci of stagnant excitation, i.e. fixation and progression vegetative symptomatology with the injury of brain.

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The advancing/attacking in the third period process of improvement can be delayed by the development of scar in cerebral tissue. Being formed/activated, scar comes forward in the role of the traumatizing factor, i.e. it reinforces the residual phenomena of the former injury, and it can be occasion for the onset of new, i.e. be the source of ultrapowerful stimulation. Even when scar will not traumatize cerebral tissue, it nevertheless proves to be the

irritant, which changes the functional condition of brain cells.

I. I. Smirnov considers that roughest irritants in connective scar are his collagenic elements/cells in the relation to the which surrounds scar cerebral tissue.

The stimulating activity of scar manifests itself, first of all, in the healthy/sound tissues, which surrcund cerebral scar. In the cells of these tissues appear the condition of stagnant excitation, which calls in periphery according to the law of induction as the "shaft" of inhibition, the surrounding focus of stagnant excitation. In the case of reinforcing the focus of stagnant excitation either weakening of the process of inhibition or presence simultaneously of both these conditions can occur the irradiation of excitation on cortex. This exciter process, causing the work of crust cells beyond the limit of their efficiency, leads to the onset of beyond the limits inhibition. The inhibition, which arose in ccrtex and which was extended on its territory, causes the removal/taking the usually existing inhibiting effect of cortex on the mechanisms of subcortex, the positive induction of subco-text and onset more or less extensive motor activity in the form of ccnvulsive attack/seizure/paroxysm.

Repeated epileptic attacks/seizures/paroxysms have by their result a descent in the limit of efficiency of crust cells, an

irritable weakness, an explosiveness. All these phenomena lead to the violation of all forms of conditioned-reflex activity, including those which compose the system of compensator mechanisms. Therefore during the development of the complication of the wound of brain in the form of epileptic attacks/seizures/paroxysms attacks/advances deterioration in the condition of patient and can be revealed/detected as the "return" of the occurred violations of functions.

One of the possible complications in the course of the injury of brain can be "fixation" of motor and vegetative violations. According to I. P. Pavlov, the violations of this type "<sup>in</sup> ~~the~~ people' ... with strong nervous system either in no way appear, they are suppressed, or rapidly they disappear, but in weak people they are involved/tightened for some time..." (Vol. III, 2, 209, 1951). Subsequently instead of gradually being effaced during the establishment of the normal interrelations between cortex and subcortex, they, on the contrary, are fixed/recorded and are reproduced.

In the description of three periods of pathophysiological changes in the functional condition of central nervous system it is necessary to explain also the pathological substratum of each of these periods. The periods of the course of the injury of skull and

brain were also given by classification of VII session of neuro-surgical advice/council in 1946. Were planned only five such periods, including the period of the distant consequences. Clear clinical delimitations their and pathoanatomical substantiation of this periodization can be used for the establishment of the pathoanatomical illustrations of those indicated above of the periods of the course of traumatic disease/sickness/illness/malady, isolated by A. G. Ivanov-Smolenskiy.

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With respect to the course of the first and second period "according to the classification of Neuro-surgical advice/council" are occasions for strong beyond the limits inhibition. <sup>Thus</sup> ~~and~~, L. I. Smirnov notes that in the second period appear jet changes in substance and shells of brain both in the area of wound and in distance from it. Are observed jet changes in the periphery of foreign bodies, the disorders of blood circulation and liquor circulation, restricted and diffuse infectious complications and jet aseptic inflammation i. distance from wound canal. Thus, during the second period, according to the classification of Neuro-surgical advice/council, occasions for the limitation of beyond the limits inhibition are absent. At this time there are all prerequisites/premises for further damage of the trophic system of cerebral tissue, i. e. to the alleviation of the

conditions of the onset of beyond the limits inhibition. It is completely possible to assume that first period of A. G. Ivanov-Smolenskiy's classification has by its pathoanatomical substratum the first and second period, accepted by Neuro-surgical advice/council.

The third period of this classification is characterized by the limitation of infectious foci, by the processes of substitution, by the elimination of aseptic tissue reactions. These phenomena can create prerequisites/premises for the decrease of inhibition, its concentration in area of injury, an improvement in the trophic system of cerebral tissue. On this foundation for possibly considering that this third period corresponds to the second period of A. G. Ivanov-Smolenskiy's classification.

In the fourth period of the classification of neuro-surgical advice/council in brain tissue occurs the elimination of the violations, which occurred in the preceding/previous periods. If this process proceeds without complications, then in the cerebral cortex receive priority development the phenomena of compensation. With the onset of epilepsy, and also when is formed rough scar, the formation of compensative mechanisms is held up and can attack/advance different disturbance of higher nervous activity.

During the subsequent years continue changes of the scar and tissues in its periphery. This, sometimes extremely lasting period, is designated, according to the classification, accepted at VII session of Neuro-surgical advice/council as "period of the distant consequences". Clinically it can be characterized by the phenomena of continuous or appearing through the prolonged period after injury traumatic epilepsy and connected with it changes in the higher nervous activity. It has the characteristic electrophysiological expressions (see below).

#### METHODS OF THE RESEARCH OF THE FUNCTIONAL CONDITION OF THE CEREBRAL CORTEX WITH THE COMBAT INJURY OF BRAIN.

The objective methods of studying the functional condition of higher nervous activity were little used in the period of the Great Patriotic War. In this direction is carried out only individual research.

A. A. Fadeyev utilized A. G. Ivanov-Smolenskiy's speech-motor procedure during the study of the higher nervous activity of patients with the late consequences of the injury of skull. The author revealed/detected that for such patients have the expressed phenomena of beyond the limits inhibition with distinct phase conditions.

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By the subsidiary method of the research whose basic designation/purpose consists in obtaining of supplementary data to a question about localization of the closed injury, is the removal/taking electroencephalograms. For target the establishment of the place of the damage/defeat of brain removes/takes "survey" electroencephalogram.

Detection in any of the removals/diversions, i.e. in the specific and restricted sector of skull, absence of bioelectric phenomena indicates the presence of the place of damage, defeat in the appropriate zone of brain. About this can testify the decrease in the restricted sector of alpha-rhythms.

Preferred localization of the injury of brain in one hemisphere causes the appearance of asymmetry of electrical activity of both cerebral hemispheres. As a rule, and the bioelectric phenomena of the more traumatized hemisphere prove to be less expressed (V. S. Rusinov, N. V. Golikov et al.).

In the diagnosis of the injury of brain the singular value had study of the reaction of cerebral electrical rhythms for external stimulations. Under normal conditions the action of the external

irritant, for example, photic, causes the suppression of the alpha-rhythms of electroencephalogram. With the injury of brain, depending on its degree, can be encountered the cases of reinforcing of alpha-rhythms or even appearance the place of the available rhythms of more frequent electrical oscillations/vibrations (M. N. Livanov, I. S. Beritov et al.). The same character/nature is distinctive the electrical reaction of brain, also, in response to sonic stimulations with air contusion (G. V. Gershuni).

According to M. N. Livanov, the study of the character/nature of the reaction of electrical cerebral rhythms to photic stimulation can lighten the accomplishment of the mission of the establishment of localization of injury. For this purpose is considered: 1) the value of the irritant, necessary so that this reaction would arise; 2) the latent period; 3) the character/nature of the reaction; 4) its duration. During the comparison of the value of stimulation and intensity of the response electrical reaction of brain sometimes it is possible to note the relations, which bear the character/nature of paradoxical ones, i.e. for weak external stimulations occur considerable changes in the electrical activity of cortex and vice versa.

In the diagnosis of the damages/defeats of brain the singular value is given to the so-called slow rhythms, i.e. to the

oscillations/vibrations of electric potential 2-4-8 in 1 second (delta-, theta wave). Slow waves usually are observed in area of stricken area, but they can be spread also to considerable from it distance.

Finally, among the special features/peculiarities of the electroencephalograms of those wounded the brain one should indicate the presence of rapid oscillations/vibrations. Rapid oscillations/vibrations asynchronous, small amplitude, in the initial periods of injury are stated/established in area of stricken area. According to V. S. Rusinova, the existence of such waves is the electrical expression of the available in area of injury steady stimulation. A number of the authors to a number of rapid waves of electroencephalograms relates the so-called pins, or axon-like joints. Their intensity is great and comprises to 250 millionth fractions/portions of volt with period of approximately 1-2 thousandths of a second. They appear either as single impulses/momenta/pulses or sometimes in the form of group discharges. whatever theoretical views to the origin of pins, according to S. A. Chugunov, they always testify about the "continuous deep pathological process in cortex and in the white substance of brain".

In the description of the form of the oscillations/vibrations of the electrical difference of potentials in the form of pins a number of the authors notes "ejections". They are great in amplitude, exceeding pins in terms of the value of the difference of electric potentials (to one hundredth of volt). The period of ejections is more lasting - 0.2-0.3 seconds. Being detected the patients have with the closed injury of skull, ejections testify about an improvement in the excitability of cerebral substance and greatly frequently they coincide with the advent of epileptic attacks/seizures/paroxysms. The latter fact gives the known basis to designate these bioelectric processes as epileptoid waves.

During the study of changes in the electroencephalogram with the injury of brain was discovered the known sequence of the dynamics of electroencephalogram with the course of wound. In this case is emphasized the possibility to observe in initial period the considerable of the variability of the picture of electrical phenomena in brain. This is placed in communications, on one hand, with an improvement in the course (decrease of edema, resorption of hemorrhages, restoration/reduction of circulation, etc.), and on the other hand - with the possibility of complications. In particular, with the meningoencephalites appear or are reinforced and is received greater dissemination slow waves. With the complication of the injury of brain of epilepsy at the side of wound appear high-voltage

potential differences, pins and some other forms of electrical activity. With traumatic epilepsy electrical picture receives the most specific features in the last stage of the course of wound. In the immense majority of such cases is noted the presence of the electroencephalographic changes, characteristic for the organic damage/defeat of brain, and also epileptoid waves. The limitation of these phenomena by the specific sectors of brain testifies in favor of traumatic epilepsy.

There are indications that electroencephalographic research gives of neurosurgeon foam supplementary data for deciding/solving a question about process/cperation. In the cases of the successful surgical treatment of traumatic epilepsy after certain time after the carving of scar is observed the normalization of electroencephalogram. The experiment/experience of the use of a method of electroencephalography showed the particular value of the repeated recording of electroencephalograms in patient. It not only more precisely formulates diagnosis, but also it makes it possible to follow the dynamics of the course of the pathological process, and to also in proper time consider the offensive of complications.

In the late period of cerebral injuries is noted the considerable staying power/persistency of the available in patient changes. In data sequence these changes can be noted in patient long

time, in spite of indisputable clinical recovery.

PHYSIOLOGICAL SUBSTANTIATION OF THE USE OF GUARDIAN INHIBITION IN A THERAPY OF THE COMBAT INJURY OF BRAIN.

One of most important questions of the therapy of the combat injury of brain is use with the therapeutic target of guardian inhibition.

The protective and therapeutic role of the braking process was discovered by I. P. Pavlov. They showed that nerve "cell under the effect of stimulation it is constant, although sometimes it is slow, it approaches the march/passage into braking condition". During the frequent repetition of the activity of irritant this march/passage into braking condition can be accomplished very rapidly. The most permanent condition of the onset of the braking process is the work of nerve cell beyond the limit of its efficiency.

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I. P. Pavlov explained the values of this phenomenon. Defining the nerve cell of the cerebral cortex as the education, which possesses the "highest reactivity, and consequently, by rapid functional destructibility, rapid enervation", it considered that

"the advancing/attacking ... inhibition, without being auto fatigue, is in the role of the guardian of cell, who warns further excessive, risky decomposition of this exceptional cell". Consequently, the development of the braking process prevents fatigue, depletion or functional decomposition of nerve cell. In this consists the guardian role of the braking process, in particular, beyond the limits inhibition.

However, under the effect of excessive on their force irritants nerve cell can prove to be in the condition of the functional decomposition of different degree of manifestation.

The manifestations of this "functional decomposition" can be different, being detected both in the changes in the excitation and the active internal inhibition. In the relation to active inhibition usually suffers the force of this process. Distinctly changes also mobility of both processes, most frequently to the side of tendency toward stagnancy. The important manifestation of "functional decomposition" is onset and fixation for more or less prolonged periods of phase conditions.

The braking process, which arose in the cells of the cerebral cortex, not only protects these cells from possible "functional decomposition", but also facilitates the elimination of its

manifestations when violations already arose. Thus, inhibition fulfills the guardian and healing functions, discovered by I. P. Pavlov.

As is known, by I. P. Pavlov it was proposed to utilize an inhibition with purpose of the treatment of such conditions where the nerve cells threaten the consequences of the "difficult destructive work". "We in laboratory now have a remarkable example, as lasting inhibition returns to weak crust cells to certain period capability for normal activity. There is the foundations for accepting, that, until performs the braking process, crust cell remains undamaged/uninjured deeply; for it is feasible the return to full/total/complete norm, it still can be set right from excessive depletion, its pathological process is still reversed" (Vol. III, 2, 131, 1951).

I. P. Pavlov's this thought completely justified itself in clinic during the treatment of schizophrenia. After revealing/detecting during the study of the pathogenesis of this disease of the phenomena which one ought not to have interpreted as weakening crust cells, it considered that for them any stimulation can be the harmful ones, which overstrain their efficiency. The series/row of the symptoms of this disease I. P. Pavlov treated as the manifestation of such inhibition by means of which the cerebral

cortex as if itself protects from the possible violations of functional condition. This gave occasion to propose and to utilize with the therapy of schizophrenia artificial, with the aid of pharmacological substances, reinforcing of braking process. In contrast to all other attempts of this type I. P. Pavlov decided to utilize this method of treatment in such cases of schizophrenia with which occurred the phenomena of inhibition in the cerebral cortex, i.e. organism to a certain degree already utilized an inhibition as auto/self-guardian measure. For the first time the instructions of I. P. Pavlov were realized by A. G. Ivanov-Smolenskiy, who organized the treatment of the patients with the narcotic mixture, which was being periodically introduced into the organism of patient and that ensuring the prolonged sleep of patient - on 16-18 hours in a 24 hours period during 10-12 days.

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It is completely logical that in the period of the Great Patriotic War was made the attempt utilize a therapy by sleep in wounded with the damage of brain. Higher than it was shown that the study of the pathogenesis of the combat injury of brain on the foundation of I. P. Pavlov's physiological exercise made by doubtless a presence in the first and second period of the disease of the distinctly expressed phenomena of beyond the limits inhibition. This

made with that completely substantiated the attempt to employ means, amplifying inhibition. A. G. Ivanov-Smolenskiy recommends for the treatment of the violations of higher nervous activity with contusion-concussion syndrome the "wide application of sedative and narcotic drugs". Yu. A. Povorinskiy recommends the treating of the violations of the interrelations between the excitation and the inhibition with the same phenomena by carotid guardian inhibition.

By itself is understandable that the therapy by sleep must be applied in complex with all other measures. Their number, besides surgical treatment, includes, especially in the first period of disease, every possible limitation of the activity of any genus extero- and interoceptive irritants.

Above has already been emphasized K. M. Bykov's instruction to the need for the creation of the favorable conditions of the trophic system of cerebral tissue for its normal functioning. So/such necessary is this for cursing the reduction processes under conditions of the braking condition of crust cells. I. P. Pavlov defined inhibition as the process which contributes to the restoration/reduction of the spent substance.

However, so that this would occur, it is necessary to ensure the possibility of the processes of assimilation in crust cells, i.e. the

delivery to it of nutrients, the activity of the corresponding enzymatic systems, etc. This is especially substantial with the wounds of the skulls and brain, with which occur the violations of blood circulation of brain, circulation of tissue fluid/liquid and liquor circulation. One of the measures, which improve the trophic system of cerebral tissue, is designation/purpose such patient of thiaminebromide, nicotinic acid, etc.

However, the excessively prolonged containment of inhibition in the cerebral cortex, i.e. such, when the already limitedly "stimulating" activity of injury, can impede recovery. In particular, the long existing inhibition holds up the elimination of the phenomena of surdimutism, the formation of compensative mechanisms. Therefore in accordance with the views to the pathogenesis of the injury of brain, developed by A. G. Ivanov-Smolenskiy, it is necessary to consider the basic task of the second period of treatment the "cautious, gradual removal/taking of the phenomena of stagnant excessive inert inhibition, in other words, the releasing the brakes therapy".

A. R. Luriya also indicates the possibility of the considerable compensation for the lost as a result of the injury of brain motor and vocal functions.

Always correctly throwing light on questions of the pathogenesis of the corresponding violations and questions of interrelations within central nervous system, the author, however, the completion correctly emphasize the role of doctors' active intervention during reduction processes in the form of the "external organization of the conduct" of patient.

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The "releasing the brakes therapy", but to A. G. Ivanov-Smolenskiy's expression, encompasses the substance, excitant of motor analyzer, psychotherapy, physiotherapy, that strengthens overall treatment, etc.

There is great interest in the instruction of A. G. Ivanov-Smolenskiy by the possibility of using the increase in the tone of motor analyzer, which is achieved by the substances of a therapeutic-physical culture and can be applied even in horizontal/lying patients. Relying on the propagation of the waves of excitation, which appear in motor analyzer, to the area of a speech-motor analyzer, the author sees in this reception/procedure one of the substances of therapy of surdimutism.

However, attempts at the excessively early removal/taking of

guardian inhibition are undesirable, since they can lead "to appearance or reinforcing of hysterical symptomatology (convulsive fits, astasia-abasia, etc.)" (A. G. Ivancv-Smclenskiy).

Any genus sharp actions, "stimulating the individual sections of cortex, will only even more reinforce the available inhibitions in the casualty areas of vocal and auditory projections thereby involve/tighten treatment" (Yu. A. Povorinskiy).

The clinical data about favorable effect on the course of the craniocerebral wounds of therapy by inhibition are found in complete agreement with the results of the corresponding experiments. According to data of E. A. Asratyan, during the diverse violations of the function of central nervous system in animals, including with the syndrome of a concussion-contusion of brain, use/application of somniferous preparations gives good results. According to data this author, is reduced the period of fallout or violation of functions, is accelerated their restoration/reduction and compensation violations, is improved the general condition of animal. However, the degree of this favorable activity depends on a number of factors. In particular, therapy by sleep is more effective with the injuries of the head and less spinal cord; with the injuries of average/mean severity the result is more favorable than with the injuries of heavy ones. Dosage, property of preparations, periods and duration of

prescription - all this has its effect on the course of the experimental injuries of central nervous system. Vital importance has also localization, intensity and extensiveness of delivering injury. By the author is emphasized the role of the substances, which have effect on the trophic system of the tissues of brain (vitamins B<sub>1</sub> and C).

Experiments E. A. Asratyan served as foundation for his work and of the colleagues in clinic of the craniocerebral wounds. The authors were voiced against the use as method of excessively prolonged and deep sleep. In this case "greatly soon is developed the overall weakness of patients, appear the signs/criteria of general/common/total toxicosis". In accordance with this E. A. Asratyan recommends the utilizing of the dose, which causing the onset of good, strong/firm sleep.

In preceding/previous volumes 4 on the technical reasons: 1) fell out the surname of the co-author of chapter "discharge and protrusion of brain" (page 425-431). One should read: <sup>P</sup> professor I. S. Babchin and professor Colonel MC Ye. M. Margorin; 2) stole in misprint on pages 175 and 176; instead of the word "ammonium chloride" should be read the "ammonium hydroxide".

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No typing.

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