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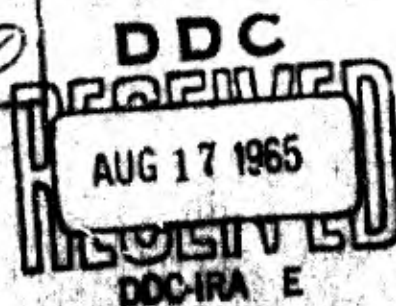
AEROMEDICAL REVIEWS

SURGICALLY PRODUCED ARTERIAL LOOPS FOR DETERMINING
BLOOD PRESSURES IN EXPERIMENTAL DOGS

Review 5-58

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**SURGICALLY PRODUCED ARTERIAL LOOPS FOR DETERMINING
BLOOD PRESSURES IN EXPERIMENTAL DOGS**

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**Air University
SCHOOL OF AVIATION MEDICINE, USAF
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SURGICALLY PRODUCED ARTERIAL LOOPS FOR DETERMINING BLOOD PRESSURES IN EXPERIMENTAL DOGS

During a series of experiments on dogs with hypertension, it was necessary to devise a simple means for determining blood pressures. The ordinary sphygmomanometer is not a satisfactory instrument for measuring blood pressures in the dog. The wedge shape of the dog's legs makes it almost impossible to keep an inflated cuff in proper position for the determinations. Blood pressures can be determined by femoral artery cannulation, but when numerous blood pressure measurements are required or when it is desirable to have an artery constantly available for instrumentation, this technic is not practical.

Exteriorizing one of the carotid arteries, so that a modified sphygmomanometer (fig. 1) can be used to give a direct reading of the blood pressure, is a simple surgical procedure. Researchers using a modified sphygmomanometer cuff on an exteriorized artery can take blood pressures as often as desired, with a minimum expenditure of time and effort. The animal requires no sedation or anesthetic agent for the procedure; therefore, more accurate pressure can be recorded without considering the variables in pressure that may be due to the influences of drugs. (See fig. 2.)

There is inference made in the medical literature of other investigators' having used "arterial loops" for blood pressure determinations. Markowitz et al.,¹ in describing Goldblatt's experiments, mentions that blood pressures were measured in artery loops; however, the technic for surgically exteriorizing one of the major arteries in experimental dogs has not been recorded per se. It is hoped that this description may be of value to those in research whose studies require numerous accurate blood pressure determinations.

In preparing the dog for carotid loop surgery, a general anesthetic agent is administered, and an area is shaved approximately 6 inches wide from the manubrium sterni to the larynx. With the dog secured in a ventrodorsal position, and with the head and neck extended, the prepared area is draped for aseptic surgery.

Two parallel incisions are made approximately $\frac{3}{4}$ to 1 inch apart, extending from the larynx to the sternum. (See fig. 3.)

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¹Markowitz, J., J. Archibald, and H. G. Downie. *Experimental Surgery*, 3d ed. Baltimore, Md.: Williams & Wilkins Co., 1954.

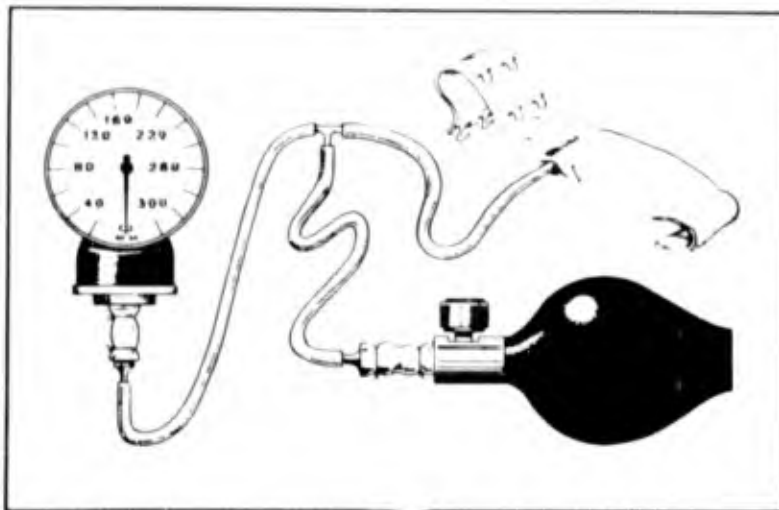


FIGURE 1

Modified sphygmomanometer for determining blood pressures in carotid artery loops.

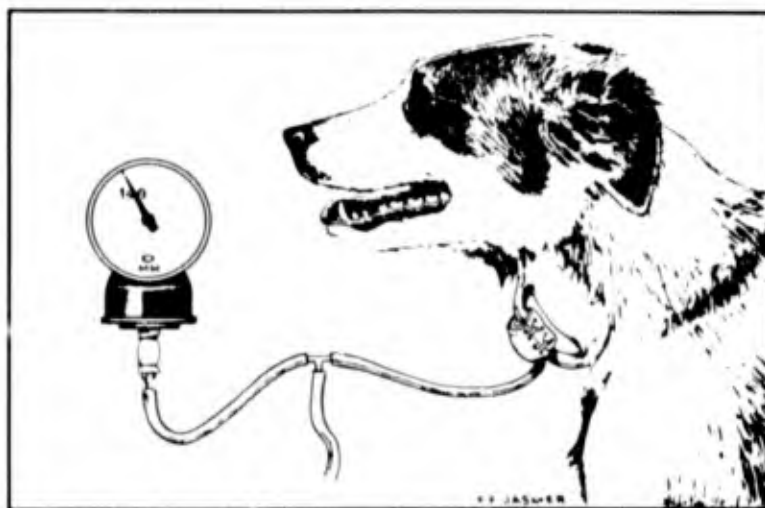


FIGURE 2

Technic routinely used in blood pressure determinations in a dog with a surgically produced carotid arterial loop.

The strip of skin between the two incisions is undermined and stripped of all extraneous tissue. When the skin strip is retracted, the sterno-cephalicus muscles can be identified. (See fig. 4.) Separating the fascia between these muscles will permit their retraction laterally.

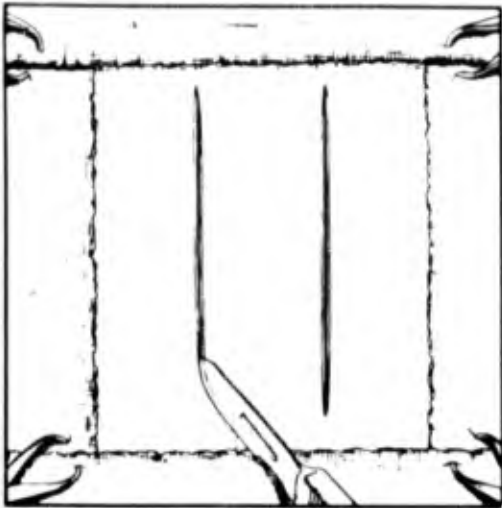


FIGURE 3

Two parallel incisions on the ventral aspect of the neck produce the skin flap for the exteriorized carotid artery.

FIGURE 4

Sterno-cephalicus muscles identified immediately under the incised skin.

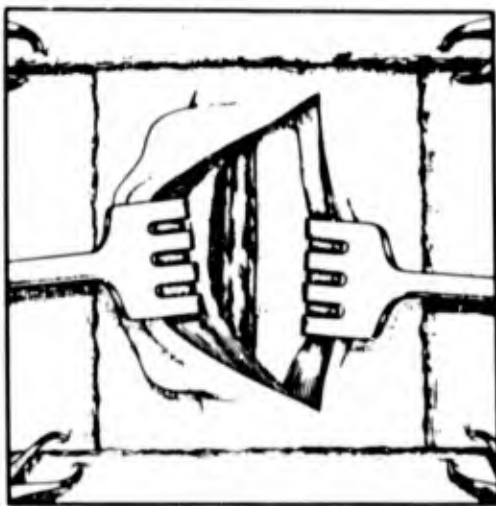
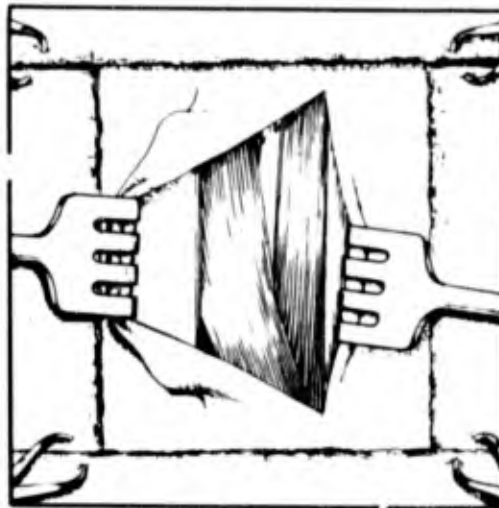


FIGURE 5

Carotid sheath, located to the right of the trachea.

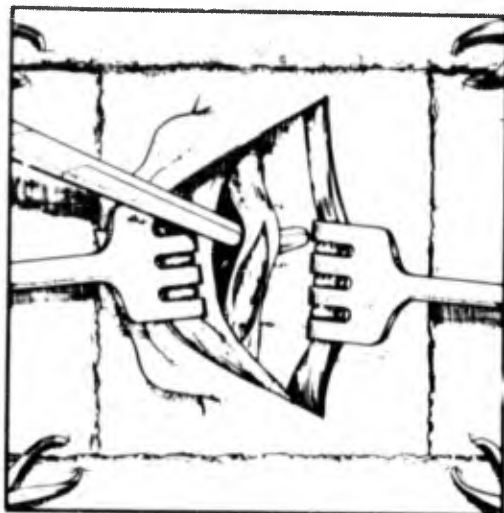


FIGURE 6

Carotid artery, elevated from the sheath and ready for enclosing in the skin fold.

FIGURE 7

Forming the skin tube with the exteriorized carotid artery within.

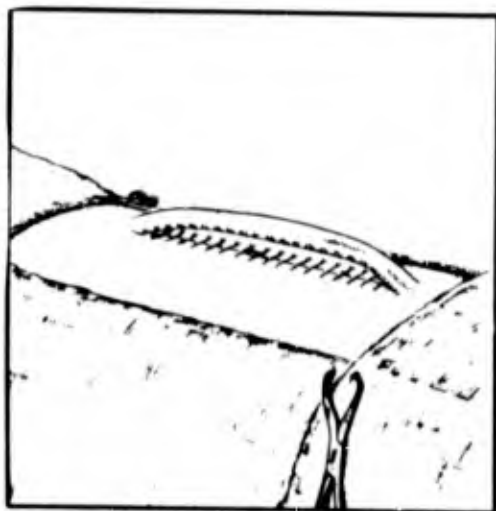
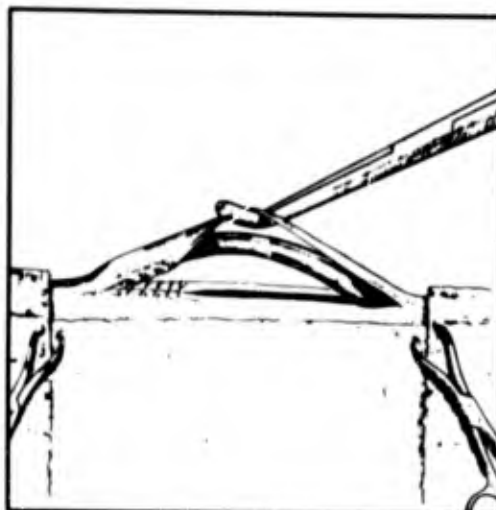


FIGURE 8

Surgically produced carotid arterial loop, showing loop and completed closure of skin defect.

The paired sterno-hyoideus muscles, which originate at the sterno-costal area and run anteriorly to the area of the hyoid bone, cover the ventral midline area of the neck. The trachea and esophagus are lateral and deep to these muscles; the right carotid sheath is located on the right side of the trachea, while the left carotid sheath is to the left of the esophagus. (See fig. 5.) Since the carotid sheath encloses not only the common carotid artery, but also the vago-sympathetic nerve trunk, the recurrent nerve, and not infrequently a small carotid vein, considerable care must be exercised not to injure these important structures by rough manipulations. The carotid artery is freed from the sheath and is elevated for a distance corresponding to the length of the skin strip. (See fig. 6.)

The skin strip is carefully folded over the artery and the skin edges apposed by simple interrupted sutures. This forms a tube of skin which encloses the carotid artery. (See fig. 7.) Under the tube or arterial loop, the neck defect is carefully closed. (See fig. 8.)

Postoperative care includes keeping the incisions covered with sterile dressings and removing the sutures after healing is complete. Hobbling the dog's hind feet will keep him from scratching the neck area during the healing process.