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2012 ANTHROPOMETRIC SURVEY OF U.S. ARMY PILOT PERSONNEL: METHODS AND SUMMARY STATISTICS

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14. ABSTRACT This report presents results of an anthropometric survey of U.S. Army Pilots, a subset of a comprehensive U.S. Army anthropometric survey (ANSUR II) completed in 2012 by the Natick Soldier Research, Development and Engineering Center. Goals of the survey were to acquire a large body of data from comparably measured males and females to serve the Army Aviation's current design and engineering needs, as well as those anticipated well into the future. Ninety-four directly measured dimensions, 39 derived dimensions, and three-dimensional (3-D) head, foot, and full-body scans were obtained on each subject in this study. The pilot sample consisted of 977 men and 42 women. An augmented database of 395 women is reported for design purposes. Pilots of unmanned aircraft were not considered in this survey. Results of the directly measured dimensions are given here in the form of summary statistics, percentile data, and frequency distributions. Also included are well-illustrated descriptions of the measurements and of the landmarks used to define them; an explanation of the manual and 3-D procedures used in the study; demographic data characterizing the sample in terms of its racial/ethnic, gender, age, geographic, and occupational distribution; and, a detailed explanation of how observer error was calculated for this study to ensure optimum reliability. Appendices include information on the comparability of the measurement techniques used in this survey with those used in other large-scale military surveys, a discussion of the validity of using an augmented database for design, visual indices to help readers locate dimensions with unfamiliar names, and a cross-reference table to help readers accustomed to locating dimensions by number.					
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SCANNING	ARMY RESERVE	ANTHROPOMETRY	THREE DIMENSIONAL	CLOTHING	
BODY SIZE	METHODOLOGY	STANDARDIZATION	COMPUTER PROGRAMS	SAMPLING	
BODY SCANS	DEMOGRAPHY	SIZES(DIMENSIONS)	BODY MEASUREMENTS	STATISTICS	
COMPARISON	MEASUREMENT	WHOLE BODY SCAN	MEASURING INSTRUMENTS	ACCURACY	
HUMAN FACTORS	ENGINEERING	FREQUENCY DISTRIBUTIONS	INFORMATION RETRIEVAL		
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EXECUTIVE SUMMARY

An anthropometric survey of U. S. Army pilots was completed by the Natick Soldier Research, Development and Engineering Center (NSRDEC) in 2012 in conjunction with a comprehensive survey of U.S. Army personnel (ANSUR II). The goals of the survey were to acquire a sufficient body of data from comparably measured males and females to serve Army pilots' current design and engineering needs, as well as those anticipated well into the future. A total of 94 directly measured dimensions and 41 derived dimensions, as well as three-dimensional head, foot, and whole-body scans, were obtained in this study. The sample here, which represents the Total Army, was composed of 977 men and 42 women, measured between November 2010 and April 2012. Results of the traditionally measured and derived dimensions were compiled in the form of summary statistics, percentile data, and frequency distributions. Demographic data characterizing the sample were collected in terms of the racial/ethnic, gender, age, geographic, and occupational distribution of the participants.

The impetus for this survey was the concern that Army body size and shape had changed since the last anthropometric survey in 1987-1988 (ANSUR). A pilot study conducted in 2006 confirmed that significant changes had taken place. Army body size for a number of dimensions had increased, on average, and the variability had increased as well. Further, ANSUR included only Active Duty personnel, whereas today's forces are integrated as part of the Total Army concept, to the extent that the current anthropometry is different from ANSUR, equipment and workspaces may no longer be optimal.

2012 ANTHROPOMETRIC SURVEY OF U.S. ARMY PILOTS: METHODS AND SUMMARY STATISTICS

CHAPTER I

INTRODUCTION

This report contains the results of an anthropometric survey of U.S. Army pilots conducted, as part of the larger U.S. Army Anthropometric Survey (ANSUR II) (Gordon et al., 2014), between October 2010 and April 2012 by the Natick Soldier Research, Development and Engineering Center (NSRDEC), with data collection assistance from Anthrotech.

All U.S. military services and many foreign militaries compile and maintain extensive collections of body-size information used primarily to guide design and sizing of clothing, personal protective equipment, work stations, and computer-generated digital human models. In order to be effective, such a database must be updated periodically to accurately reflect the body sizes and proportions of the military population it represents. This is particularly important in aviation, where specific physical standards of height, weight, and body build are among the selection criteria used to determine which personnel qualify for Army aviator training. The pilot anthropometric selection criteria change over time depending on the dimensions of the training fleet cockpits and on the variation of the population of Army pilots. This report does not address the body dimensions of pilots of unmanned aircraft.

The last anthropometric database of U.S. Army men and women aviators was developed in 1991 (Donelson and Gordon, 1991), using data collected in the 1988 ANSUR survey (Gordon et al., 1989), more than two decades ago, the equivalent of a military generation. The 1988 survey only included active duty personnel, but today's forces include the National Guard and Army Reserve as part of the Total Army concept. As a result, anthropometric data for design and sizing of equipment and materiel to be used by Army pilots must include the body size data of all contingencies for which the equipment is intended. Historically, anthropometric data of Army National Guard and Army Reserve have been limited.

Furthermore, women now make up 5% of the total U.S. Army pilot personnel and nearly 16% of the overall U.S. Army population (DMDC, 2011). With each passing year, more jobs are filled by women. Therefore, clothing, protective equipment, and workspaces, originally sized and designed to accommodate only males, must be modified and redesigned to accommodate the larger variations represented by an integrated male/female population.

In 2006, amid concerns that the Army's anthropometric database no longer adequately represented Army personnel, a preliminary study was undertaken to determine whether a new anthropometric survey was needed. The results of that study (Bradtmiller et al., 2009; Paquette et al., 2009) indicated that the Army had become

larger in overall body size and more variable in body proportion. Dimensions consisting of significant fleshy components (e.g., Weight, Buttock Circumference, and Waist Circumference) had the largest increases in standard deviation substantially affecting product designs, which are developed from extreme low and high values. In addition, the different components of the Army were sufficiently different to necessitate a database not based exclusively on active duty personnel. Therefore, a new survey was needed to correct these deficiencies and to provide new data that were previously unavailable.

In 2009, NSRDEC undertook the task of developing a comprehensive body-size study of U.S. Army men and women. Since Army flying personnel must meet certain anthropometric criteria, pilots are anthropometrically distinct from the Army general population. Therefore, one of the goals of the U.S. Army anthropometric survey (ANSUR II) was to acquire a large body of data from comparably measured male and female pilots as part of the overall survey. These data will serve the current and future design and engineering needs of those creating aircraft cockpits and interior spaces. A specific innovation added to address future needs was the addition of three-dimensional (3-D) scans of the head, the foot, and the whole body. These scans provide geometric and morphological data on the human body that cannot be gathered using traditional body measurements alone.

This anthropometric survey of U.S. Army pilots (ANSUR II Pilots) was conducted in conjunction with the U.S. Marine Corps anthropometric survey (MC-ANSUR) (Gordon et al., 2013), and it was part of ANSUR II. Since MC-ANSUR preceded ANSUR II pilots, the majority of the planning occurred 6 months before the surveys began. During this time, candidate dimensions were reviewed for relevance, replicability, and comparability to arrive at the final selection, which included 94 directly measured dimensions and 41 derived dimensions. This volume reports summary statistics of a new Army pilot database for these traditional measurements, including percentile and frequency tables. Whole-body, head, and foot scans were also taken of each measured individual, but they are not included in this report.

1.1 SELECTION OF SURVEY DIMENSIONS

The list of dimensions for ANSUR II pilots was developed from the 1987-1988 ANSUR, the U.S. military's most comprehensive anthropometric survey. A team of government and contractor scientists evaluated each dimension on the list, assessing its usefulness for Army pilot needs. Dimensions that have not proved useful were dropped. Dimensions that could reliably be estimated from other measured dimensions were also dropped. Dimensions that would have been useful, but were not measured in ANSUR, as well as a few additional dimensions recommended by international standards, were added.

After the dimension list was established, the specific definition for each dimension was reviewed. In general, the ANSUR definitions were used, because: (1) they were well defined in 1987 and (2) a consistent definition would allow comparisons

between newly collected data and historic data. However, a few definitions were modified. In some cases, the modification simply improved the clarity of the original ANSUR definition. In other cases, the new definitions reflected international standards. Finally, some modifications were necessary due to changes in human physique over the decades. In every case where a definition in this report differs from the ANSUR definition, it is noted in the dimension description.

The final dimension list includes dimensions that can be used in many different applications. Appendix A shows 7 categories of uses (e.g., clothing design, workstation design, and human analog design) and identifies which of the 94 measured dimensions and 41 derived dimensions are most useful for meeting those needs.

1.2 OVERVIEW OF THE SAMPLE

The pilots participating in the survey were chosen using a stratified sampling strategy to obtain an appropriate mix of ages, racial/ethnic backgrounds, sex, and component. Chapter III provides more details of the sampling strategy. Tables 1 through 3 provide an overview of the ANSUR II pilots database by age, race/ethnicity, and gender.

TABLE 1

Age Distribution of the ANSUR II Pilots

Age Group	Males Pilots		Females Pilots	
	Frequency	Percent	Frequency	Percent
≤20	4	0.41	0	0.00
21-25	159	16.27	12	28.57
26-30	345	35.31	15	35.71
31-40	382	39.10	12	28.57
≥41	87	8.90	3	7.14
Total	977	99.99*	42	99.99*

* Percentages do not add up to 100% due to rounding.

TABLE 2

Racial/Ethnic Distribution of the ANSUR II Pilots

Race/Ethnicity	Males		Females	
	Frequency	Percent	Frequency	Percent
White, not of Hispanic descent	842	86.18	30	71.43
Black, not of Hispanic descent	20	2.05	1	2.38
Hispanic	35	3.58	3	7.14
Asian	5	.51	0	0.00
Native American	2	.20	0	0.00
Native Hawaiian/Pacific Islander	1	.10	0	0.00
More than one and Other	72	7.37	8	19.05
Total	977	99.99*	42	100

* Percentages do not add up to 100% due to rounding.

TABLE 3

Percentages of the ANSUR II Pilots
by Age Group and Racial/Ethnic Category

Age Group	White, not of Hispanic descent	Black, not of Hispanic descent	Hispanic	Asian	Native American	Native Hawaiian/Pacific Islander	More than one and Other
Males							
≤ 20	0.41	0.00	0.00	0.00	0.00	0.00	0.00
21-25	14.43	0.31	0.10	0.20	0.00	0.00	1.23
26-30	30.50	0.20	1.02	0.20	0.10	0.00	3.28
31-40	33.16	1.13	2.15	0.10	0.10	0.00	2.46
≥ 41	7.68	0.41	0.31	0.00	0.00	0.10	0.41
Females							
≤ 20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21-25	16.67	0.00	2.38	0.00	0.00	0.00	9.52
26-30	30.95	0.00	2.38	0.00	0.00	0.00	2.38
31-40	16.67	2.38	2.38	0.00	0.00	0.00	7.14
≥ 41	7.14	0.00	0.00	0.00	0.00	0.00	0.00

1.3 HOW TO USE THIS REPORT

The landmarks used to define the origin and termination of the measurements made in this survey are listed and briefly described in Chapter II. That chapter also summarizes the operational aspects of the survey and includes descriptions, illustrations, and sources of the instruments used. A full explanation of the sampling strategy appears in Chapter III, including the method for developing the female pilots database. Chapter III also includes a number of tables that describe the demographic characteristics of the ANSUR II pilots database, as well as the influence of aircraft cockpit geometries and the Medical Fitness Standard for Flying Duty on pilots' anthropometry.

The anthropometric data in this report are given in Chapters IV and V, which include summary statistics and descriptions of the body measurements and the derived measurements, respectively. Each dimension is described and illustrated. Summary statistics of the pilots database are reported separately for males and females.

Visual indices designed to help readers identify and locate those dimensions by their anthropometric designations appear in Appendices B (measured) and C (derived). Users should note that the body positions represented in the visual indices are approximate. To confirm exact body positions and measurement procedures for the body measurements, users should consult the specific dimension descriptions in the Measurer's Handbook (Hotzman et al., 2011). Appendix D contains a brief explanation of the summary statistics used to report the measurement data in Chapters IV and V.

Chapter VI discusses 3-D scanning equipment, landmarks, and scan protocols, and Chapter VII details the procedures developed to minimize observer error throughout the the survey.

For users familiar with the original numbers assigned to dimensions in the 1988 ANSUR survey, a cross-reference table is provided in Appendix E linking ANSUR II pilots dimension numbers to those of comparably measured dimensions from ANSUR. This table can also be used as a quick reference to determine which of the ANSUR dimensions were identically defined in the current survey and which dimensions were modified. An assessment of the comparability of measurements obtained in this survey with measurements from other major anthropometric surveys appears in tabular form in Appendix F. A copy of the demographic/biographical form completed by each participant is included as Appendix G. Finally, a glossary of anatomical and anthropometric terms (Appendix H) and an index are included to further help the reader understand the terminology used in this report and to quickly locate dimensions of interest.

CHAPTER II

THE SURVEY

2.1 PARTICIPANT PROCESSING AND MEASURER TRAINING

This anthropometric survey of Army pilots was conducted after the MC-ANSUR and in conjunction with ANSUR II. As part of ANSUR II, the survey team visited 12 Army installations during an 18-month period to collect body measurements and 3-D scans. However, aviators were only measured at seven locations and the majority of participants were from Fort Rucker, Alabama, a major training base for Army fliers.

Considerable advance planning took place both at Anthrotech (in Yellow Springs, Ohio) and at NSRDEC. In preparation for assembling a measuring team, project personnel prepared a training manual designed to serve as the primary instructional guide for the survey measurers (Hotzman et al., 2011). This handbook contained detailed written and illustrated instructions for marking and measuring participants, and explained the operation and maintenance of the whole-body, head, and foot scanners.

A streamlined procedure was devised for measuring approximately 50 participants a day. The measurements were divided into four manageable groups, based on principles of time and motion efficiency. Dimensions assigned to a given measuring station were those that could most easily be measured in sequence without excessive repositioning of participants and those that required a minimum of instrument handling. Dimensions were also grouped in such a way that the time required to measure all dimensions at each station was approximately equal. Two landmarking stations were similarly established, as were in- and out-processing stations. Figure 1 illustrates the plan for the flow of participants through the process.

In the meantime, NSRDEC and Army personnel made all the necessary arrangements at the Army installations where measuring teams were to work for periods ranging from 3 weeks to 2 months. Army pilots were measured at seven installations:

Fort Bliss, Texas – November 16, 2010 - February 25, 2011
Camp Atterbury, Indiana – March 9, 2011 - March 31, 2011
Fort Drum, New York – April 7, 2011 - May 4, 2011
Fort Stewart, Georgia – July 25, 2011 - August 16, 2011
Fort Rucker, Alabama – August 23, 2011 - September 23, 2011
Fort Huachuca, Arizona – January 12, 2012 - February 4, 2012
Camp Shelby, Mississippi – February 15, 2012 - April 5, 2012

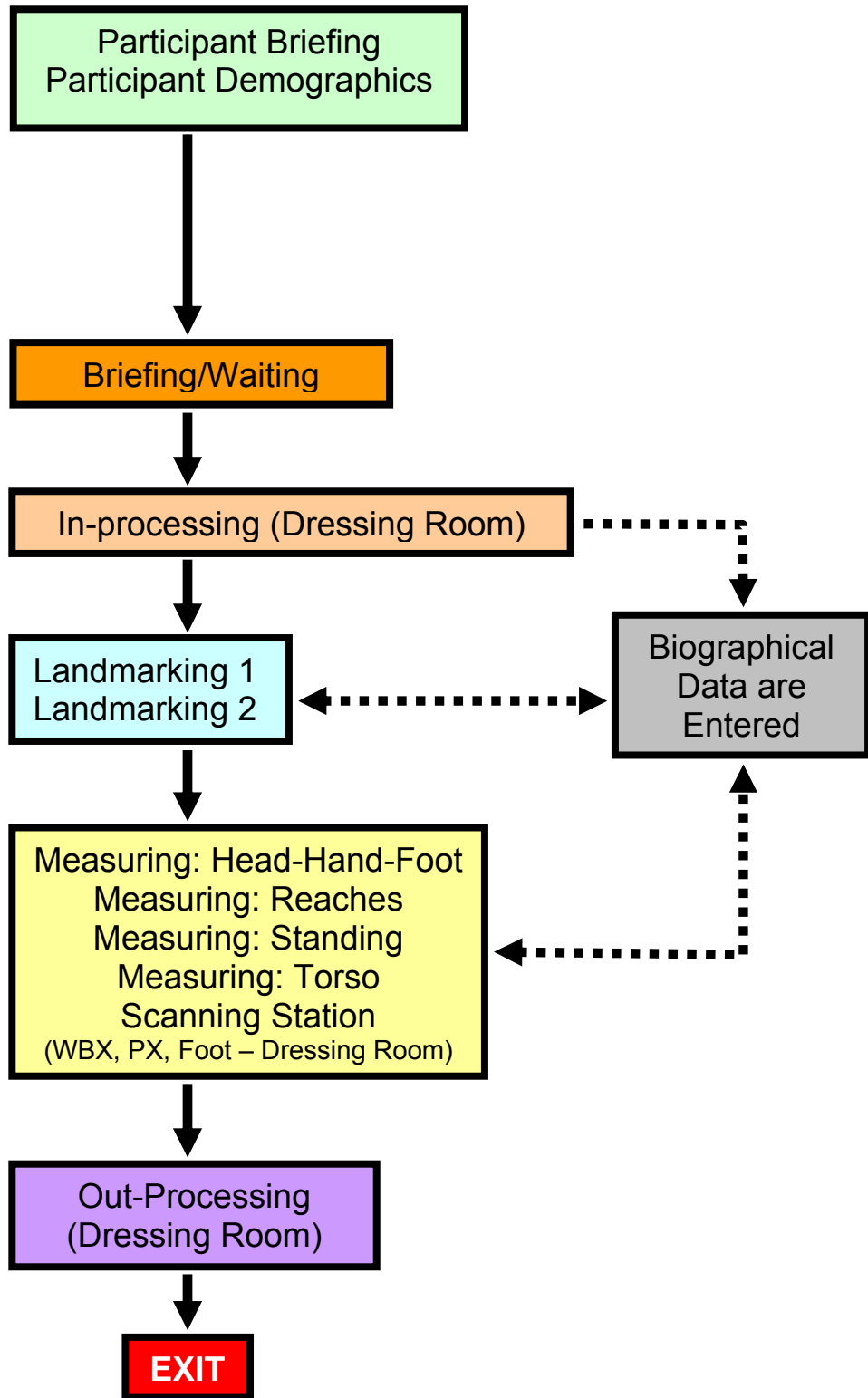


FIGURE 1
Participant Flow

This anthropometric survey was conducted immediately following the MC-ANSUR survey. Therefore, the measuring team assembled for MC-ANSUR was used for the ANSUR II Pilots data collection effort. In April 2010, the initial MC-ANSUR measuring team of 21 people began an intensive 4-week training period prior to their deployment in the field. Early in the training period, team members were assigned to one of the stations—landmarking, measuring, scanning, and demography— at which they would work. Thus, each team member, under the instruction of professional anthropometrists, concentrated for about 3 weeks on learning to locate and draw the landmarks or measure the dimensions for which he or she would be subsequently responsible. During and following MC-ANSUR, some personnel were replaced. The new personnel were trained for 1 week specifically for the station where they would work.

Two people were assigned to each measuring station: one to serve as a measurer and one as a recorder; pairs of team members alternated these functions throughout each day. Two women were permanently assigned to two of the measuring stations, Reaches and Standing, and two men were permanently assigned to the Head, Hand and Foot measuring station. Depending on whether participants were men or women, a male team alternated with a female team at the remaining station, Torso, where most dimensions between the waist and knees were measured. These same teams alternated assignments to the out-processing station. Male and female marking personnel at the landmarking stations also changed from day to day, depending on whether the participants were men or women. They alternated as in-processors when members of the opposite sex were being marked.

When pilots arrived at the measuring site, they were briefed on the general purposes of the survey by a Government representative. Pilots filled out machine-readable forms pertaining to their demographic and biographical background (see Appendix G). After the participants completed the biographical forms, an Anthrotech employee briefed the pilots on the specific landmarking, measurement, and scanning procedures to be conducted. Following the briefing, all pilots were given nylon tricot track shorts (see photos in Chapter IV) in which they were measured. Men were measured bare-chested. Women were measured in their own bras, unless they requested a jog bra—a cotton spandex sports bra with racer back design. Both were issued tank tops to wear while moving around between measuring stations and at stations where upper body exposure was not required. When participants reached the whole-body scanning station, they changed again into mid-thigh-length nylon spandex compression shorts (see Figure 26 in Section 6.1). Women who had been wearing their own bras changed into the cotton spandex sports bras.

While the pilots were changing into the track shorts prior to beginning the measuring process, the demographic forms were run through a form reader, and the scanned data were transferred to the demographic station. As the pilots moved through each of the measuring stations, one stop was the demographic station where an Anthrotech employee verified the entered information. Typically this occurred while the participant was waiting for an available measuring or scanning station. After

demographic data verification, the forms were shredded to protect the privacy of the pilots.

2.2 DATA MANAGEMENT PROCEDURES

Unlike its predecessors, this survey used networked laptops for data entry in the field. Networked computers were used for three reasons:

- Entering the data onto electronic media allowed the information to be readily available for analysis and eliminated transferring handwritten data as a source of error. The network made it possible for the data from each station to be assembled and sent daily to Anthrotech, from which they were forwarded to a NSRDEC server.
- The computers were equipped with proprietary software that reviewed data values as they were entered (see Section 2.3). If a questionable value was identified by the software, the measurers could repeat the measurement while the participant was still present. Thus, the data coming in from the field contained fewer measurement or entry errors and fewer questionable values to resolve during data editing.
- A final field data check was carried out at the out-processing station, where input dimensions from all stations were available for use in calculating regression estimates.

Barcodes representing participant numbers were pre-printed on each demographic form. This eliminated the possibility of duplicate participant numbers. As each pilot completed his or her demographic form, that barcode was scanned at the in-processing station, entering that participant into the data management system with an associated participant number but no personally identifiable information. At that time, the in-processing station printed out measurement forms for each of the four measuring stations. These forms—unique to each pilot—were also imprinted with each participant's bar-coded participant number.

When a pilot arrived at a measuring station, the barcode was scanned into the measuring station's laptop so that the participant's data could be associated with his or her data from each of the other stations. As each pilot was measured, the recorder entered the data into the station's computer. The recorder also manually recorded the measurements on the data forms as a back-up. At the scanning station, the operators also scanned the barcode on the demographic form. The participant number was then incorporated into the image file name generated by each of the scanners. After the pilot was measured and scanned, a team member at the out-processing station checked to verify that the participant had been processed at each of the previous stations. The barcode was scanned a final time to remove the participant from the list of "in-process" participants.

2.3 DATA EDITING ROUTINES

The editing routines in the software were based on procedures that had been used successfully by the contractor in a number of previous military surveys. The approach is essentially two-phased. A value is first checked against the highest value and the lowest value measured for that variable. If the measured value is higher than the highest value to date, or lower than the lowest value to date, a notification is given that instructs the measurer to take the measurement again. The software does not allow the measurer to continue until the measurement has been re-taken or an explanation is given as to why that value is correct (e.g., short torso, very long legs). This approach is very effective in screening out wildly aberrant values resulting from misassembling an instrument, misreading an instrument, transposing digits, or mis-entering a value by 100 or 1000.

After all dimensions at a given station were measured, the second phase of data editing began. The software contained a series of multiple regression equations in which the value for each dimension was predicted from the values of two other dimensions at that station. The measured value for a given participant, for a given dimension, was compared to the predicted value. If the measured and the predicted value differed by more than a preset amount, the measurer was asked to re-measure that dimension, as well as the associated dimensions from the regression. In that way, values which were not aberrant for the population as a whole but were disproportionate for that individual were identified and checked. The original version of the data entry and editing system, including program source code listing, is completely described in Churchill and coworkers (1988).

2.4 ANTHROPOMETRIC AND LANDMARKING INSTRUMENTS

The instruments used for measuring the body in this survey were:

Anthropometer	Poech sliding caliper
Beam caliper	Pupillometer
Foot scanner	Scale (weighing)
Head scanner	Sliding caliper
Holtain caliper	Spreading caliper
Modified beam caliper with dowel	Steel tape
Modified Brannock device	Wall chart
Modified height gauge	Whole-body scanner
Modified steel tape	

Standard anthropometric instruments are made by GPM, Switzerland and by Holtain LTD, Great Britain. Seritex, Inc., 1 Madison Street, East Rutherford NJ 07073 (www.seritex.com) is the U.S. distributor for both companies. The steel tape measure is a Lufkin Executive Diameter metric tape measure (W606PM) manufactured by Cooper Hand Tools and available from on-line retailers at www.grainger.com. These instruments are illustrated below in Figures 2 through 8.



FIGURE 2

Anthropometer: Assembled and in Parts

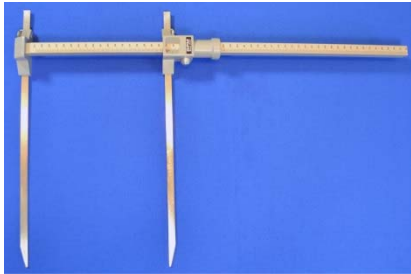


FIGURE 3

Beam Caliper



FIGURE 4

Spreading Caliper



FIGURE 5

Sliding Caliper



FIGURE 6

Holtain Caliper

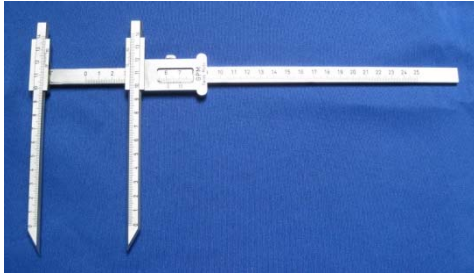


FIGURE 7

Poech Sliding Caliper



FIGURE 8

Steel Tape

The anthropometer is the basic tool of the anthropometrist and is used to measure all linear dimensions. The bottom portion of the anthropometer is detachable for use in measuring heights from a standing surface to the lower parts of the body, or from a sitting surface to the head or upper body parts of a seated participant. The detached upper half forms a beam caliper to measure breadths, depths, and body segment lengths. The smaller sliding, spreading, Holtain, and Poech sliding calipers were used primarily for measuring dimensions of the head, face, and hands. The steel tape was used to measure body circumferences and arcs.

A battery-operated digital scale, manufactured by Seca, was used for measuring body weight (Figure 9). It is widely available through a number of online retailers.



FIGURE 9

Scale

A digital read-out Hoya pupillometer, using the corneal reflection/hairline alignment method, was used to measure interpupillary distance (Figure 10). This pupillometer can be ordered online from www.GetOptic.com.



FIGURE 10

Pupillometer

Measuring instruments that were modified or created for the survey included: foot measuring devices, a modified Vernier height gauge, a wall chart, a modified steel tape, and a beam caliper modified to include a dowel on the fixed blade.

The foot measuring devices were a Men's Brannock Device® size 4-16/ width 3A-3E (used for both men and women) and a Pro Series Brannock Device® size 10-25 (used for large sizes); both were modified with a Kreg Model KMS729 L-R reading metric measuring tape (Figure 11). These materials can be obtained from The Brannock Device Company, Inc., 116 Luther Avenue, Liverpool, New York 13088 (www.brannock.com) and Kreg Tool Company, 201 Campus Drive, Huxley, Iowa 50124 (www.kregtool.com). The Brannock Device® facilitates positioning and measuring of the foot.

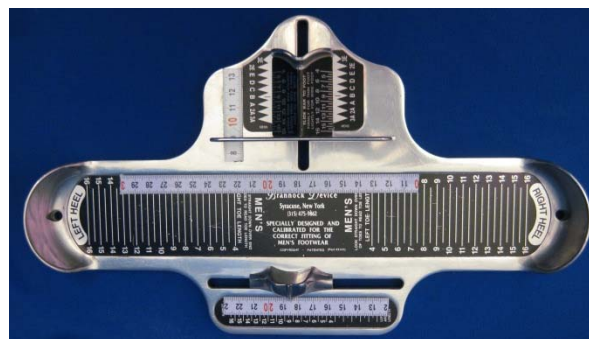


FIGURE 11

Modified Brannock Device®

A standard metric Vernier height gauge was modified (Figure 12) for use in measuring Lateral Malleolus Height. The metal base was replaced with a wooden base and its carbide tip was blunted. A similar model (Series H04, Id: 161-103k) can be obtained at the Tresna on-line-store (www.tresnainstrument.com).



FIGURE 12

Modified Height Gauge

A wall chart made of drafting mm graph paper sealed in Mylar® sheeting (Figure 13) was used to measure Thumbtip Reach and Span. The graph paper is marked at 5 cm and 10 cm intervals. This graph is 230 cm wide. It is placed 50 cm from an adjacent wall, which serves as the back plane for the measurements.

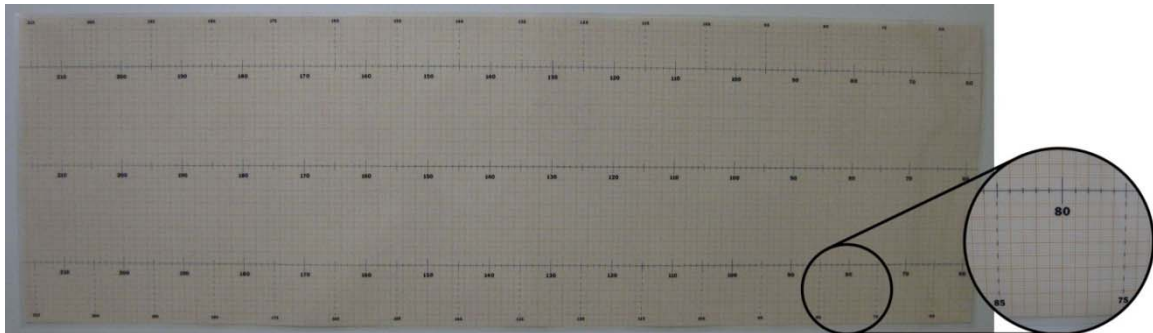


FIGURE 13

Wall Chart

The modified steel tape, used for Crotch Length, Posterior (Omphalion), was made by attaching a dowel (5 inches long by $\frac{1}{4}$ inch in diameter) to the zero end of the standard steel tape as a hand hold (Figure 14). A 2-cm triangular plastic pennant was affixed at the 0 mark of the tape.

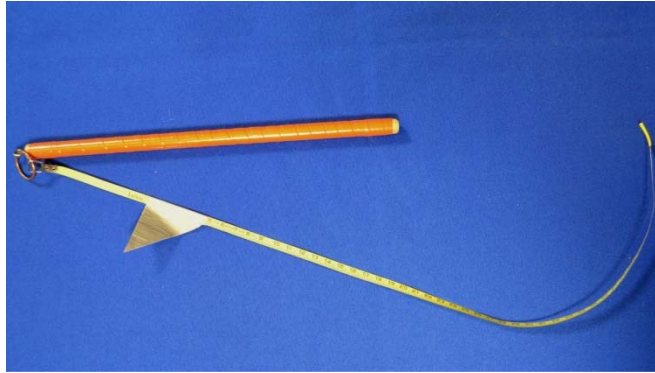


FIGURE 14

Modified Steel Tape

A beam caliper was modified with a 1¼-inch diameter wooden dowel and was used for measuring Forearm-Center of Grip Length (Figure 15). The measuring blade was inserted into the dowel so that the calibrated edge was located in the center of the dowel.

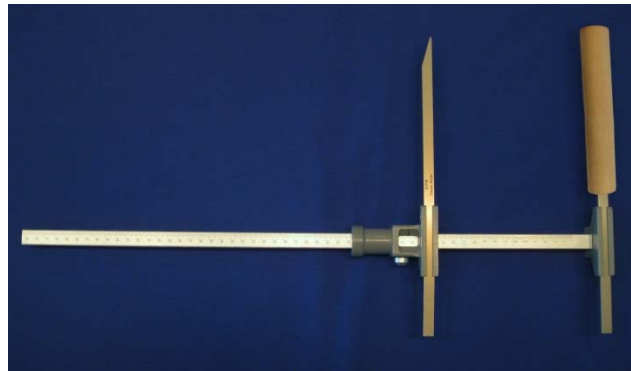


FIGURE 15

Modified Beam Caliper with Dowel

A number of marking aids were used in this study, including a landmark transfer rod (Figure 16) and a scye marking aid (Figure 17). The base of the landmark transfer rod has five casters on the bottom to permit the device to be easily rolled around the participant. A slide that can be moved up and down is mounted on the vertical rod. The device is used to transfer landmarks from one side of the body to the same level on the other side. The dimensions of the landmark transfer rod are as follows:

Total height = 184 cm

Pentagonal base = 21 cm on each of the five sides

Arm length = 34 cm

Arm end width = 35 cm

Rod diameter = 1.85 cm
Wheel circumference = 15.8 cm
Ground to base height (bottom) = 6.2 cm
Ground to base height (top) = 6.8 cm
Base thickness = 1.9 cm
Square base on pentagonal base = 20 cm x 20 cm



FIGURE 16

Landmark Transfer Rod

The scye marking aid is a rigid Plexiglas straight edge 480 mm long, 35 mm wide, and 3 mm thick. A line level was epoxied to the lower left margin of the straight edge. This device is used to establish the anterior and posterior scye marks.

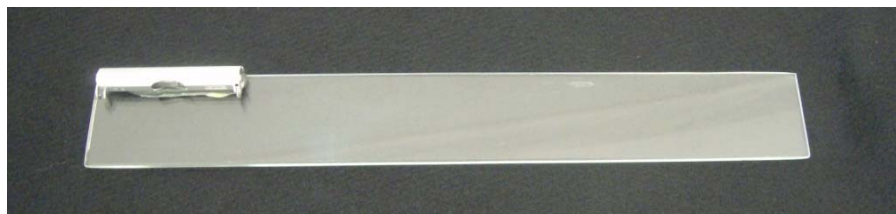


FIGURE 17

Scye Marking Aid

2.5 THREE-DIMENSIONAL SCANNERS

The whole-body scanner (WBX), head scanner (PX), and foot scanner are low-power laser systems (Figures 18, 19, and 20, respectively) that are completely safe for human use. The WBX and PX were government furnished property obtained from Cyberware, Inc., 2110 Del Monte Avenue, Monterey, California 93940. Cyberware ceased operations prior to the data collection for this survey; thus these scanners are no longer available for purchase. The INFOOT foot scanner is available from I-Ware Laboratory, MINOH Fureres Bldg. 5F, 1-10-9, Senba-Higashi, MINOH-City, Osaka 562-0035 Japan. Each of these scanners records surface images of the body to capture the overall morphology of the participants. Scanning in each of the scanners takes approximately 15-20 s to complete. The software for participant scanning, CyScan for the whole-body and head scanners and INFOOT for the foot scanner, runs on the Windows XP operating system. Each scanner had a separate computer attached that was solely responsible for collecting that scanner's data. CyScan software on the WBX ran in conjunction with the Enhanced Anthropometric Rating System (EARS) Program. EARS, developed by Arizona State University under contract to NSRDEC, was used as an evaluation step to assist the operator in gathering high quality scans. Scan data files from each scanner were transferred over a local network via Ethernet data cable connection to the system server. In addition to the daily uploads of all survey data to the NSRDEC server, the scan data and traditional measurement data were backed up daily onto a DVD. Detailed instructions for operating each of these scanners can be found in the Measurer's Handbook (Hotzman et al., 2011).

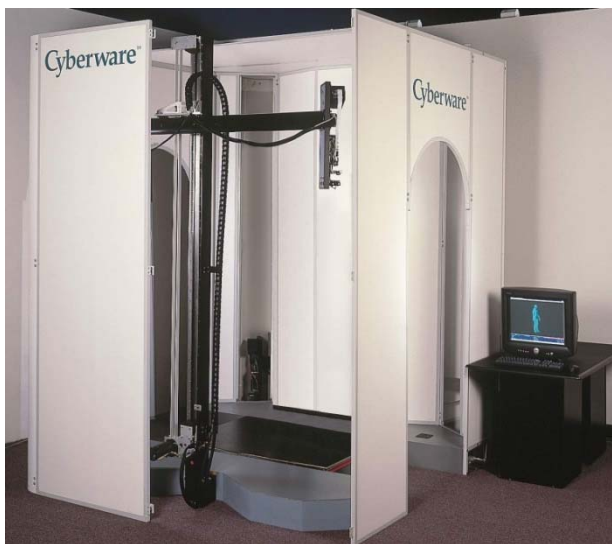


FIGURE 18
WBX Scanner



FIGURE 19
PX Scanner



FIGURE 20

Foot Scanner

2.6 THE LANDMARKS

Dimensions are measured from one point on the body (or a fixed surface such as the floor) to another or, in the case of circumferences, around a part of the body at a specified level. To ensure that each dimension is measured accurately and consistently from participant to participant, dimensions are defined in terms of body landmarks, which serve as the origin, termination, or level of measurement of a dimension.

Two men and two women were trained in locating the points to be marked by palpation or by sight, and in placing actual drawn marks on the bodies of all participants in this survey. Measurers were also trained to recognize other easily located landmarks such as Dactylion III, the tip of the middle finger, for which marking was not necessary.

The landmarks used to define the measurements in the survey are listed and briefly described on the following pages. Detailed instructions for locating these landmarks can be found in the Measurer's Handbook (Hotzman et al., 2011). The definition of some of these landmarks has changed from the previous survey of U.S. Army personnel (ANSUR) (Gordon et al., 1989) on which the current survey was modeled, although the names remain the same. These changes are summarized below.

Four landmarks from the original ANSUR survey were modified in the survey of Army pilots. The cervicale landmark was located at the "superior palpable point" of the spine of the seventh cervical vertebra in the ANSUR survey. This was changed to "most prominent point" in the current survey in order to bring the definition into compliance with standard anatomical usage (Martin, 1914) and international practice (ISO 7250-1, 2008). Typically the distance between the two landmarks is not more than 1 or 2 mm, with the new definition usually producing the lower mark.

A second modification occurred in this survey with the use of a landmark called chest point, anterior. In ANSUR this landmark was named bustpoint/thelion, and it

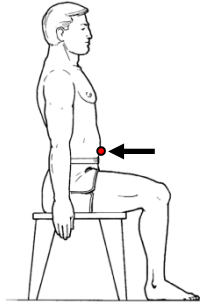
referred to the most anterior point on the bust for females and the center of the nipple (thelion) for males. The male landmark was used for ANSUR Chest Height, Chest Breadth and Chest Depth, while ANSUR Chest Circumference was measured at the fullest part of the chest. The definition of this landmark remains unchanged in the current survey for female participants, although the name has been changed to chest point, anterior. Now, chest point, anterior is used for both males and females. The change from thelion to chest point, anterior was made to ensure that measurements were made at the largest portion of the chest (regardless of nipple location) for all chest dimensions, which is required for determining clearance as well as for clothing and protective gear. For some males—those with relatively flat chests—there is no practical difference between the two landmarks. For those with heavier chest development, the new landmark will produce a larger Chest Depth and produce a higher Chest Height.

Deltoid point, right and left, is used to establish the level at which Shoulder Circumference is measured. On heavier participants, the previous ANSUR definition at the “lateral point of the deltoid muscle” results in a Shoulder Circumference measurement that is too low to be useful for clothing design. The definition for the deltoid landmarks were thus changed to the midpoint of the right and left deltoid muscles. For most individuals, there will be no change in Shoulder Circumference as a result of the landmark change. For heavier individuals, Shoulder Circumference will be somewhat smaller and higher.

The final modification was a name change for orbitale. This landmark was previously termed “infraorbitale” in ANSUR. The change to orbitale was made to bring the nomenclature into compliance with traditional anatomical usage (Martin, 1914) and standard international practice (ISO 7250-1, 2008).

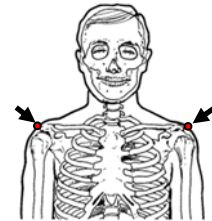
LANDMARKS

Abdominal point, anterior: The most protruding point of the relaxed abdomen on a sitting participant.



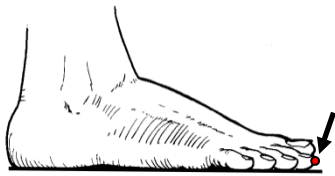
Acromion, right and left:

The point of intersection of the lateral border of the acromial process and a line running down the middle of the shoulder from the neck to the tip of the shoulder.



Acropodion:

The tip of the first or second toe of the right foot, whichever is longer.

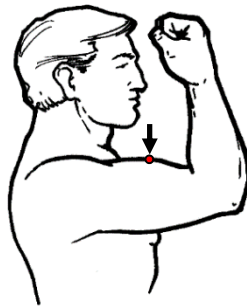


Axillary fold, posterior:

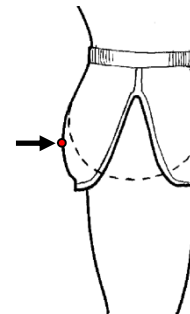
right and left: The highest points of the right and left axillary folds on the back.



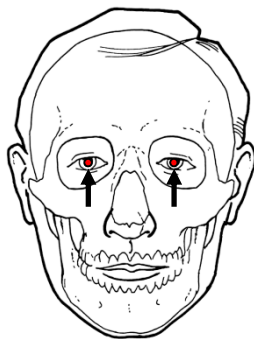
Biceps point: The highest point of the right flexed biceps brachii muscle as viewed from the participant's right side.



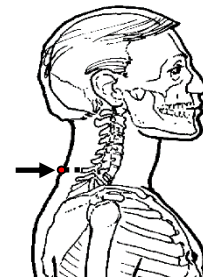
Buttock point, posterior: The point of maximum protrusion of the right buttock of a standing participant.



Center of pupil, right and left: The center of the pupil of the eye.

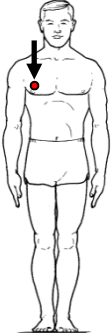
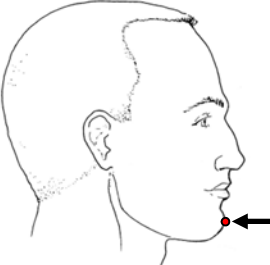
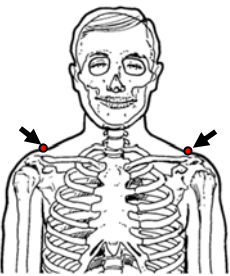
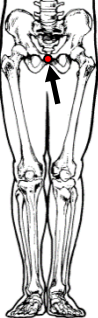
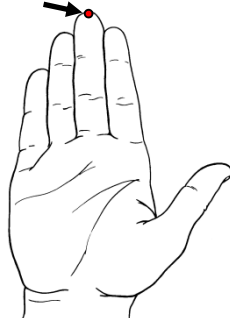
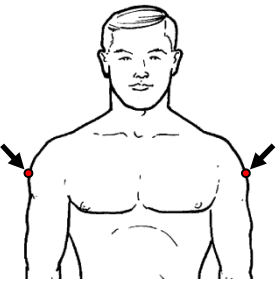
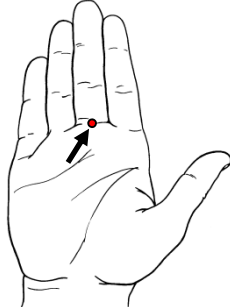
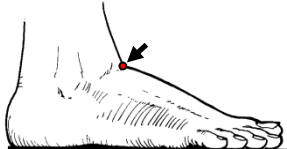


Cervicale*: The most prominent palpable point of the spine of the seventh cervical vertebra.



* Change from ANSUR. See page 18 for details.

LANDMARKS Continued

<p>Chest point, anterior*: The most anterior right point on the chest.</p>	 <p>Chin: The most protruding point on the bottom edge of the chin, along the jaw line.</p> 
<p>Clavicle, right and left: The superior points of the lateral ends of the clavicles (collar bones).</p>	<p>Crotch: The point at the level of the lower edge of the pubis bone of the <i>os coxa</i>.</p>  
<p>Dactylion III, right and left: The tip of the middle finger.</p>	<p>Deltoid point*, right and left: The midpoint of the left and right deltoid muscles.</p>  
<p>Digit III, base: The center of the crease at the base of the middle finger.</p>	<p>Dorsal juncture of the foot and leg: The top of a skin crease between the foot and the front of the ankle when the knees and ankles are flexed about 30°.</p>  

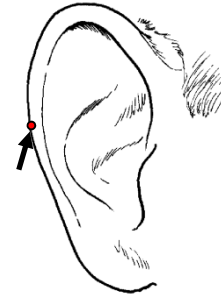
* Change from ANSUR. See page 18-19 for details.

LANDMARKS Continued

Ear, bottom: The lowest point of the right ear on its long axis.



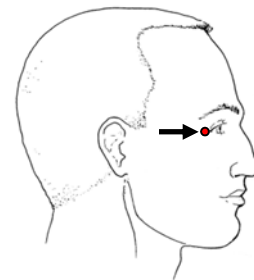
Ear point: The lateral point (farthest from the head) of the right ear.



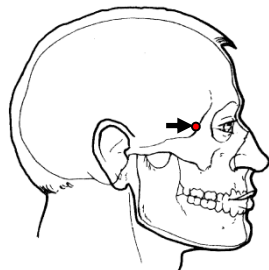
Ear, top: The highest point of the right ear on its long axis.



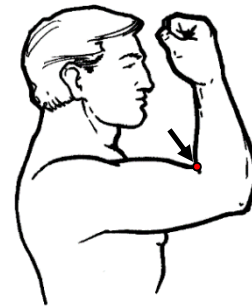
Ectocanthus: The outside corner of the right eye formed by the meeting of the upper and lower eyelids.



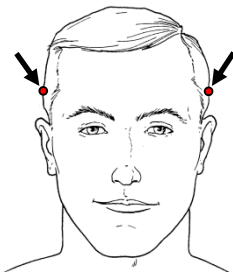
Ectoorbitale, right and left: The posterior point on the frontal process of the zygomatic bone at the level of the outer corner of the eye.



Elbow Crease: The skin crease on the inside of the elbow joint when the elbow is flexed 90°.



Euryon, right and left: The most lateral point in the region above plane of attachment of the ear.



Fifth metatarsophalangeal protrusion: The most lateral protrusion of the right foot in the region of the fifth metatarsophalangeal joint.

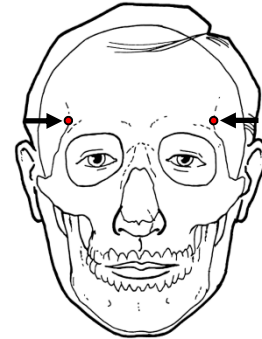


LANDMARKS Continued

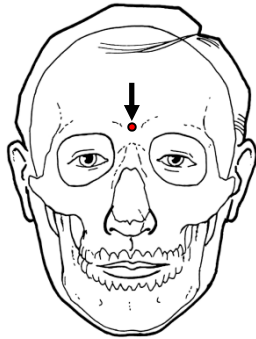
First metatarsophalangeal protrusion: The most medial protrusion of the right foot in the region of the first metatarsophalangeal joint.



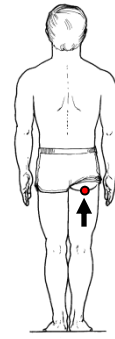
Frontotemporale, right and left: The point of deepest indentation of the temporal crest of the frontal bone above the browridges.



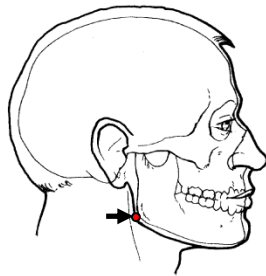
Glabella: The most anterior point on the frontal bone midway between the bony browridges.



Gluteal furrow point: The lowest point of the lowest furrow or crease at the juncture of the right buttock and the thigh.



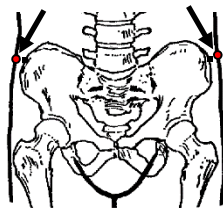
Gonion, right and left: The most lateral point on the posterior angle of the mandible (lower jawbone).



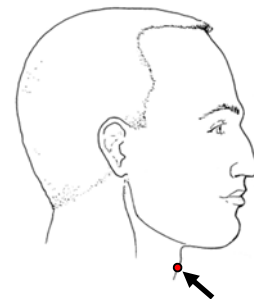
Heel point, lateral and medial: The lateral and medial points of the right heel located at or behind the most protruding point of the lateral malleolus (outside ankle bone).



Iliocristale, right and left: The highest palpable point of the right and left iliac crests of the pelvis, one-half the distance between the anterior superior iliac and posterior superior iliac spines.



Infrathyroid: The inferior point of the thyroid cartilage (Adam's apple) in the midsagittal plane.

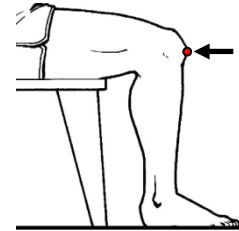


LANDMARKS Continued

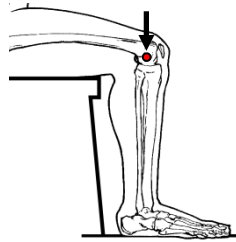
Inner thigh: A vertical line halfway between the front and back of the right inner thigh, extending downward from the level of the gluteal furrow.



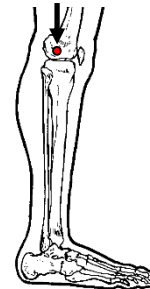
Knee point, anterior: The most protruding point of the right kneecap of a sitting participant.



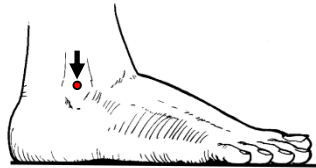
Lateral femoral epicondyle, sitting: The lateral point of the right femoral epicondyle (knee pivot point) of a sitting participant.



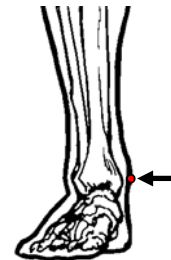
Lateral femoral epicondyle, standing: The lateral point of the right femoral epicondyle (knee pivot point) of a standing participant.



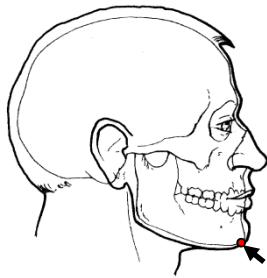
Lateral malleolus: The most lateral point of the right lateral malleolus (the ankle bone on the outside of the foot).



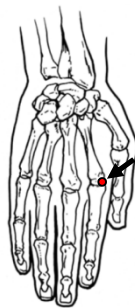
Medial malleolus: The medial point of the medial malleolus (inside ankle bone).



Menton: The inferior point of the mandible in the midsagittal plane (bottom of the chin).

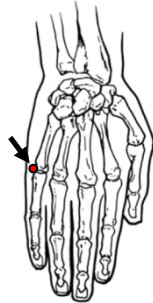


Metacarpale II: The most lateral point of the right metacarpophalangeal joint II (at the base of the index finger).

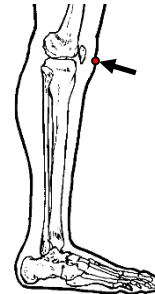


LANDMARKS Continued

Metacarpale V: The most medial point of the right metacarpophalangeal joint V (at the base of the little finger).



Midpatella: The anterior point halfway between the top and bottom of the patella (the kneecap).



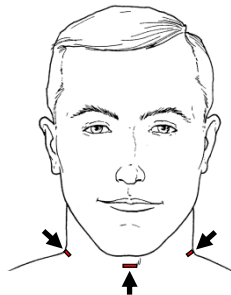
Midshoulder: The point on top of the right shoulder midway between the neck (trapezius point, right) and the tip of the shoulder (acromion, right).



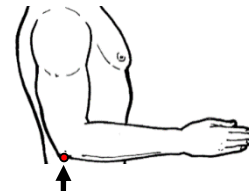
Midspine: A line down the center of the back.



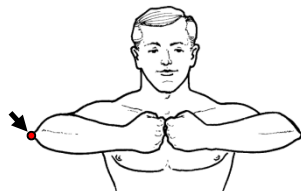
Neck, anterior, right and left lateral: The anterior and lateral points at the base of the neck.



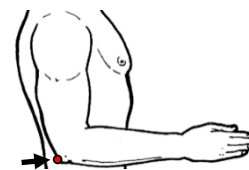
Olecranon, bottom: The lowest point of the elbow with the elbow flexed 90°.



Olecranon, center: A point on the center of the curvature of the right olecranon process with the elbow flexed about 115°.

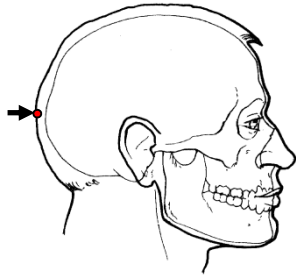


Olecranon, rear: The rearmost point of the elbow with the elbow flexed 90°.

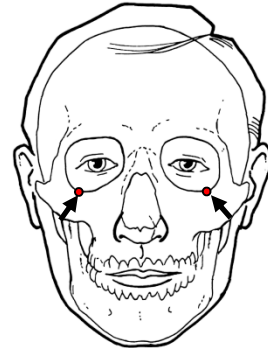


LANDMARKS Continued

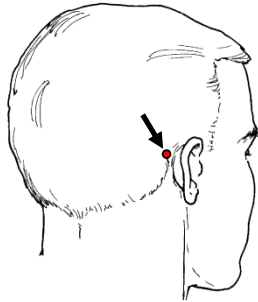
Opisthocranium:
The posterior point on the back of the head.



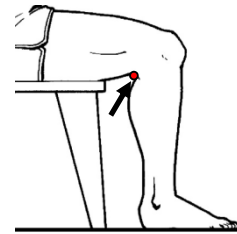
Orbitale*, right and left: The lowest point on the anterior border of the bony eye socket.



Otopasion, superior: The anterior superior point of the juncture between the right ear and the head.



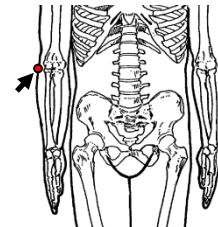
Popliteal fossa at the dorsal juncture of the calf and thigh: The bottom surface of the thigh just behind the knee.



Pternion:
The posterior point on the heel of the foot.



Radiale: The superior palpable point on the outside edge of the radius.

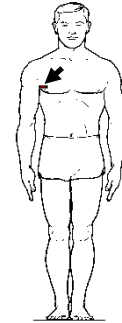


* Change from ANSUR. See page 19 for details.

LANDMARKS Continued

Scye: Landmarks on the upper arm and torso associated with the armhole of a garment.

Anterior scye on the torso: A short horizontal line on the torso originating at the apex of the right anterior axillary fold.



Midscye, right and left: A short horizontal line bisecting the posterior diagonal scye landmark.



Posterior diagonal scye, right and left: A diagonal line connecting the apex of the posterior axillary fold with the acromion landmark on the tip of the shoulder.



Posterior horizontal scye, right and left: A short horizontal line on the back originating at the apex of the posterior axillary fold.

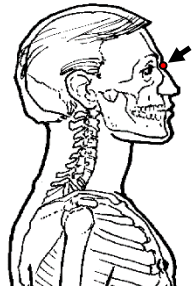


Posterior vertical scye, right and left: A short vertical line on the back originating at the apex of the posterior axillary fold.

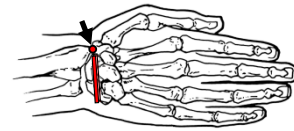


LANDMARKS Continued

Sellion: The point of the deepest depression of the nasal bones at the top of the nose.



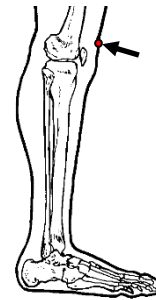
Stylian, dorsal stylian, and ventral stylian: The inferior point of the bottom of the radius and the extension of this landmark on the dorsal and ventral sides of the wrist.



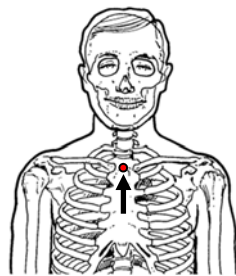
Submandibular: The juncture, in the midsagittal plane, of the lower jaw and the neck.



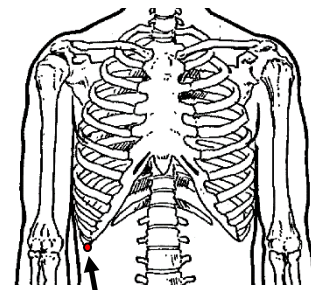
Suprapatella: The superior point of the patella (kneecap).



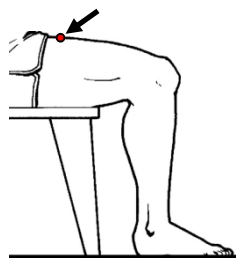
Suprasternale: The inferior point of the jugular notch of the sternum (top of the breastbone).



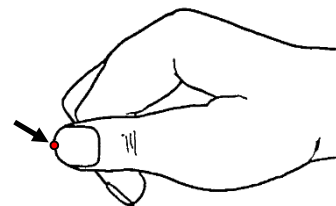
Tenth rib: The inferior point of the right tenth rib (bottom of the rib cage).



Thigh point, top: The highest point of the top of the right thigh of a sitting participant.

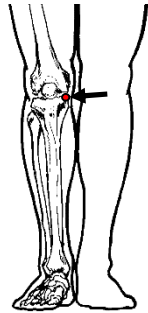


Thumbtip: The tip of the thumb.

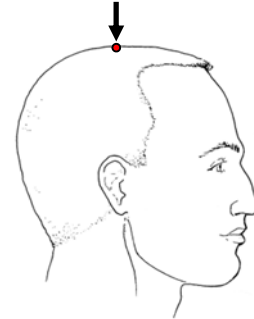


LANDMARKS Continued

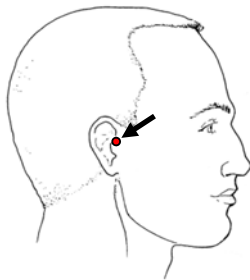
Tibiale: The superior palpable point on the medial condyle of the right tibia.



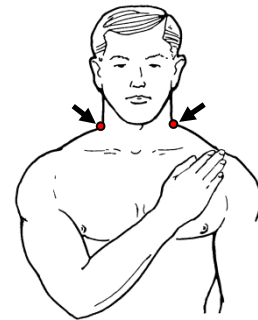
Top of head (vertex): The highest point on the head when the head is in the Frankfurt plane.



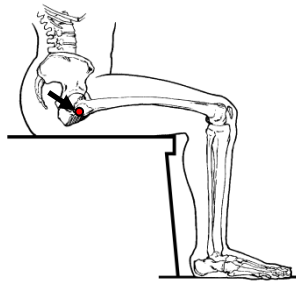
Tragion, right and left: The superior point on the juncture of the cartilaginous flap (tragus) of the ear with the head.



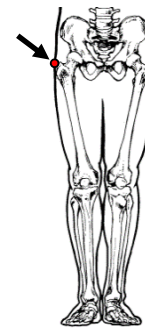
Trapezius, right and left: The point at which the anterior border of the trapezius muscle crosses the neck lateral landmark.



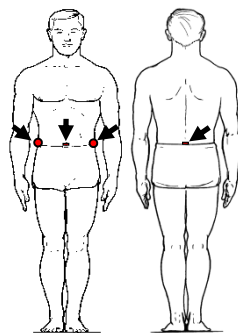
Trochanter: A point at the center of the lateral surface of the right greater trochanter of the right femur of a sitting participant.



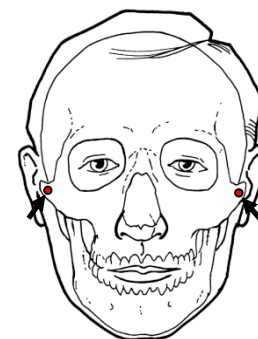
Trochanterion: The superior point of the greater trochanter of the right femur of a standing participant.



Waist (Omphalion), right, left, anterior, and posterior: The level at the center of the navel.

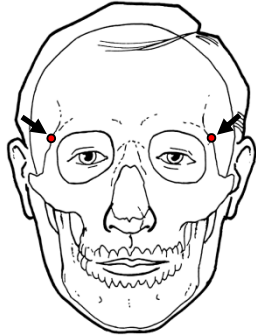


Zygion, right and left: The most lateral point on the zygomatic arch.



LANDMARKS Continued

Zygofrontale, right and left: The most lateral point of the frontal bone on its zygomatic process.



CHAPTER III

THE SAMPLE

Anthropometric data for design are most useful when the data are representative of the overall population for which the designs will be created. It is relatively easy, after the fact, to determine whether a particular sample is representative of the target population. It is a far greater challenge to collect a representative sample in real time, and it is particularly difficult when a large proportion of the target population is deployed in military operations.

Previous research (Bradt Miller et al., 1985; ISO 15535, 2012) has shown that age, racial/ethnic background, and gender are the key drivers of anthropometric variability in most target populations for ergonomic design. This is also undoubtedly true for pilots. However, pilot anthropometry is also directly influenced by Medical Fitness Standards for Flying Duty (U.S. Army, 2011) that are intended to ensure ergonomic compatibility between existing aircraft cockpit geometries and pilot body size and proportions.

At the time of this study, the following specific linear anthropometric requirements were in place: (1) Total Arm Reach (i.e., Span) ≥ 164.0 cm, to ensure that hand operated controls can be reached; (2) Sitting Height ≤ 102.0 cm, to ensure adequate clearance between head and canopy; and (3) Crotch Height ≥ 75.0 cm, to ensure that foot operated controls can be reached (U.S. Army, 2011). In addition, pilots and other aircrew are deemed to be medically unfit for flying duty “when the body weight or build prevents normal functions required for safe and effective aircraft flight such as interference with aircraft instruments, controls, and aviation life support equipment...” (U.S. Army, 2011, Paragraph 4-17, pg. 45). Unusually large thighs, for example, could inhibit full travel of the cyclic, which might be exacerbated if the pilot had a sitting height close to the upper limit and she/he were flying slightly hunched over. Unusually large body weight could compromise seat crashworthiness. An unusually deep chest or abdomen and/or unusually broad shoulders or hips could inhibit access to side-mounted controls and compromise rapid egress in emergency situations.

In practice, linear anthropometric requirements may be waived when a candidate is highly qualified and a “cockpit check” demonstrates that she/he can effectively actuate all critical controls and perform all critical tasks in the aircraft for which initial training or additional qualification is sought. The application of Paragraph 4-17 (U.S. Army, 2011) also relies on a “cockpit check,” and since the cockpit geometries, control locations, canopy and egress clearances vary among airframes, the type and prevalence of airframes in the Army inventory also indirectly influence the anthropometric distributions of Army pilots.

In short, pilot body size distributions are expected to be different from those of other Army personnel because the airframes themselves limit the range of variability in pilot body sizes/shapes that can be safely accommodated. So, in addition to ensuring

that pilot anthropometric databases are demographically representative of actual Army pilots, one must also ensure that the primary aircraft flown by pilots in the survey represent a good cross section of those in the Army inventory. In this chapter, the databases of the ANSUR II pilots are reviewed against both of these criteria for validity. Ideally one would want to randomize subject selection from within sampling cells defined by sex, age, race, and primary aircraft. However, the impact of operations in Iraq and Afghanistan during this study greatly limited access to the aviation community, so this was not possible.

A sample must not only be representative, but it must also be large enough to accurately reflect body size variability in the target population it is intended to represent. A power analysis is typically used to calculate the overall number of participants who should be measured to achieve reasonable confidence in the resulting statistics (see Gordon et al. 2014, for example). Since the number of pilots who could be measured in ANSUR II was limited by both access and funding, post-hoc power analyses were conducted to assess the precision of ANSUR II pilot statistics against those achieved for the ANSUR II ground troops (Gordon et al., 2014), where a priori sampling plans were more feasible.

Table 4 shows the ANSUR II pilot measuring sites and the number of participants measured at each site. As was the case in the 1988 Survey (Donelson & Gordon, 1991; Gordon et al., 1989), the vast majority of pilots measured came from Fort Rucker, Alabama.

TABLE 4

ANSUR II Pilots Database Measuring Sites

Site	Active Duty		National Guard		Reserve		Total
	Males	Females	Males	Females	Males	Females	
	Frequency	Frequency	Frequency	Frequency	Frequency	Frequency	
Fort Bliss, TX	11	0	1	0	0	0	12
Camp Atterbury, IN	0	0	2	0	0	0	2
Fort Drum, NY	7	0	0	0	0	0	7
Fort Stewart, GA	2	1	0	0	0	0	3
Fort Rucker, AL	732	33	204	7	34	1	1011
Fort Huachuca, AZ	7	0	0	0	0	0	7
Camp Shelby, MS	0	0	1	0	0	0	1
Total Measured	759*	34	208*	7	34	1	1043*

* Twenty-four male pilots had missing data for one or more body dimensions and have not been included in the working ANSUR II pilots database summarized in this report.

Table 5 compares the component distribution of ANSUR II pilots against the Defense Manpower Data Center (DMDC) census of Army pilots as of March 31, 2011 (DMDC, 2011). As can be seen in Table 5, the ANSUR II pilot samples slightly over-

represent Active Duty and slightly under-represent Army Reserve and Army National Guard Pilots relative to the Army pilot population as a whole. The potential impact of slightly under-representing Reserve and Guard pilots is unknown. A small-scale study of 2,811 ground troops (Gordon et al., 2008) showed that 9 of 12 key clothing/workstation dimensions had small but statistically significant differences among component means. However, once age and race differences among the components were controlled for in an analysis of variance, only 2 of the 12 body dimensions (Sitting Height and Crotch Height) still exhibited a statistically significant difference among components (Gordon et al., 2008).

TABLE 5

ANSUR II Pilots Database Sex and Component Distributions

Component	Male Pilots				Female Pilots			
	ANSUR II		Army*		ANSUR II		Army*	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Active Duty	737	75.44	8485	62.16	34	80.95	474	63.03
Reserve	34	3.48	821	6.01	1	2.38	55	7.31
Guard	206	21.08	4345	31.83	7	16.67	223	29.65
Total	977	100.00	13651	100.00	42	100.00	752	99.99**

* DMDC, 2011

** Percentages do not total 100% due to rounding.

Table 6 compares the age group distributions of ANSUR II pilots to the DMDC census for March 31, 2011. As can be seen, the oldest age groups in the ANSUR II pilot sample are substantially under-represented and the youngest age groups are over-represented.

TABLE 6

ANSUR II Pilots Database Sex and Age Group Distributions

Age Group	Male Pilots				Female Pilots			
	ANSUR II		Army*		ANSUR II		Army*	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
≤20	4	0.41	5	0.04	0	0.00	0	0.00
21-25	159	16.27	802	5.88	12	28.57	94	12.50
26-30	345	35.31	2,878	21.08	15	35.71	281	37.37
31-40	382	39.10	6,038	44.23	12	28.57	281	37.37
≥41	87	8.90	3,928	28.77	3	7.14	96	12.77
Total	977	99.99**	13,651	100.00	42	99.99**	752	100.01**

* DMDC, 2011

** Percentages do not total 100% due to rounding.

Table 7 reports the rank and grade distributions of ANSUR II pilots, which also reflect under-representation of the oldest age groups and over-representation of

younger age groups. This phenomenon is common in studies where random selection of subjects is not possible, and it usually occurs when training centers with high concentrations of younger Soldiers are primary sample sources and/or when older military personnel are able to avoid survey participation because of their higher ranks. The impact of this age bias on database validity is potentially serious because it will cause underestimation of body circumference distributions used to design and size pilot clothing and protective equipment and because the groups most disadvantaged will be the oldest, highest ranking, and most experienced pilots in the Army. Weighting participants in the database to match DMDC age distributions can correct for this bias and is discussed later in this chapter.

TABLE 7

ANSUR II Pilots Database Grade and Rank Distributions

Grade	Rank	Males		Females	
		Frequency	Percent	Frequency	Percent
O-1	Second Lieutenant	112	11.46	8	19.05
O-2	First Lieutenant	34	3.48	4	9.52
O-3	Captain	122	12.49	7	16.67
O-4	Major	22	2.25	3	7.14
O-5	Lieutenant Colonel	5	0.51	0	0.00
WO1	Warrant Officer	307	31.42	7	16.67
CW2	Chief Warrant Officer	105	10.75	1	2.38
CW3	Chief Warrant Officer	182	18.63	9	21.43
CW4	Chief Warrant Officer	75	7.68	2	4.76
CW5	Chief Warrant Officer	13	1.33	1	2.38
Total		977	100.00	42	100.00

Table 8 compares the Department of Defense (DOD) racial/ethnic distributions of ANSUR II pilots against the DMDC census from March 31, 2011. The DOD race/ethnicity is a self-identified category, and “mixed” or “two or more races/ethnicities” is not a possible choice, forcing pilots to select only one race/ethnicity. The overall distributions of the ANSUR II pilots and the DMDC census are similar, but the sample concordance with current Army pilot distributions can be improved by sample weighting, which is a relatively easy statistical technique to employ. It is important to note that contemporary pilots are overwhelmingly from the White (not of Hispanic descent) demographic subgroup (male pilots 83.8%, female pilots 82.6%). Since racial/ethnic group membership significantly influences skeletal size and proportions (Bradtmiller et al., 1985; Walker, 1993; Gordon et al., 2008), the preponderance of Whites means that minority group body size/proportions might not impact statistical values in a representative database. Should the Army desire to expand the accommodation envelopes of future aircraft in order to attract/retain pilots from minority groups, it might be wise to use design envelopes based on Army-wide statistics, which have more racial/ethnic diversity (Gordon et al., 2014).

TABLE 8

ANSUR II Pilots Database DOD Racial/Ethnic Distributions

Race/Ethnicity	Male Pilots				Female Pilots			
	ANSUR II		ARMY*		ANSUR II		ARMY*	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
White, not of Hispanic Descent	856	87.62	11,440	83.80	33	78.57	621	82.58
Black, not of Hispanic Descent	35	3.58	492	3.60	2	4.76	14	1.86
Hispanic	57	5.83	562	4.12	4	9.52	51	6.78
Asian	19	1.94	209	1.53	2	4.76	22	2.93
Native American	5	0.51	56	0.41	0	0.00	6	0.80
Pacific Islander	5	0.51	63	0.46	1	2.38	5	0.66
Other/Unknown	0	0.00	829	6.07	0	0.00	33	4.39
Total	977	99.99**	13,651	99.99**	42	99.99**	752	100.00

* DMDC, 2011

** Percentages do not add up to 100% due to rounding.

As previously mentioned, the accommodation envelopes of current Army aircraft indirectly influence the anthropometric distributions of pilots because the anthropometric criteria addressed in Medical Fitness for Flying Duty regulations (AR 40-501, Paragraphs 4-16 and 4-17, U.S. Army, 2011) are ultimately related to the anthropometric accommodation limitations of existing aircraft. Table 9 shows the primary airframes of pilots measured in ANSUR II, and Table 10 compares primary airframes for ANSUR II pilots against airframe inventories as of the fiscal year 2011. Note that airframes with common cockpit geometries have been combined for this comparison because the focus is pilot anthropometry. Variants of the same airframe may differ in engines, electronics, weapons systems, and other mission related design requirements that do not necessarily influence the range of body sizes/shapes of pilots who can effectively fly them.

TABLE 9

Primary Airframes of ANSUR II Pilots

Rotary Wing Airframes	Male Pilots		Female Pilots	
	Frequency	Percent	Frequency	Percent
UH-60/HH-60	404	41.69	19	45.24
AH-64	170	17.54	5	11.90
TH-67	150	15.48	5	11.90
CH-47/MH-47	101	10.42	8	19.05
OH-58	101	10.42	5	11.90
UH-72	9	0.93	0	0.00
MI-17	2	0.21	0	0.00
UH-1	1	0.10	0	0.00
Fixed Wing Airframes				
C-12/RC-12	24	2.48	0	0.00
O-5A/EO-5B/RC-7	6	0.62	0	0.00
C-23	1	0.10	0	0.00
Total	969*	99.99**	42	99.99**

* Male pilots n=969 due to 8 pilots having missing airframe data

** Percentages do not add up to 100% due to rounding.

TABLE 10

Fiscal Year 2011 Airframe Inventory and Primary Airframes of ANSUR II Pilots

Airframes	U.S. Army Fiscal Year 2011 Inventory	Primary Airframe For ANSUR II Male Pilots* (n=969)	Primary Airframe For ANSUR II Female Pilots (n=42)
ROTARY WING	Percent	Percent	Percent
UH-60 Blackhawk & Variants	44	41.7	45.2
AH-64 Apache & Variants	17	17.5	11.9
OH-58 Kiowa & Variants	12	10.4	11.9
CH-47 Chinook & Variants	10	10.4	19.0
UH-1 & Variants	5	0.1	0.0
TH-67 Creek & Variants	4	15.5	11.9
All Other	1	1.1	0.0
FIXED WING			
C-12, RC-12 Huron	4	2.5	0.0
C-23 Sherpa	1	0.1	0.0
All Other	2	0.6	0.0

* Male pilots n=969 due to 8 pilots having missing airframe data.

Because the ANSUR II female pilot sample is small (n=42) and because all but one participant came from Ft. Rucker rather than operational aviation units, there is some concern that these pilots are not representative of female Army pilots as a whole. However, it is not surprising to see substantially fewer female than male pilots with AH-64 attack helicopters as a primary airframe, but substantially more female than male pilots with the CH-47 cargo helicopters as a primary airframe because military occupations/combat roles for female Soldiers were more restrictive in the past than now.

ANSUR II male pilots reported a good cross-section of primary airframes, with a notable excess in TH-67 airframes. This is probably because both pilot instructors and students at Ft. Rucker were flying the TH-67, which is the primary aircraft for Initial Entry Rotary Wing training. Representation of the UH-1 as a primary airframe by males in the ANSUR II pilots sample is lower than the Army inventory because this airframe is being phased out. However, 31% of the pilots measured in ANSUR II were qualified to fly in more than one airframe, as shown in Table 11, and many pilots measured in ANSUR II reported the UH-1 as a second or third aircraft qualification, shown in Tables 12 and 13.

TABLE 11

Number of Airframe Qualifications Reported by ANSUR II Pilots

Number of Airframe Qualifications	Male Pilots		Female Pilots	
	Frequency	Percent	Frequency	Percent
1	678	69.40	28	66.67
2	171	17.50	7	16.67
3	87	8.90	6	14.29
4	25	2.56	1	2.38
5	5	0.51	0	0.00
6	3	0.31	0	0.00
Unknown	8	0.82	0	0.00
Total	977	100.00	42	100.01*

* Percentages do not add up to 100% due to rounding.

TABLE 12

ANSUR II Pilots Reporting Two Airframe Qualifications (n=178)

		Secondary Airframe										
		AH-64	CH-47	MH-47	OH-58	TH-67	UH-1	UH-60	HH-60	UH-72	C-12	RC-12
Primary Airframe	AH-64				31	16		2			1	1
	CH-47				8	9	2	2				
	MH-47				1							
	OH-58					17	5	3				
	TH-67											
	UH-1											
	UH-60		1		28	24	8		1	2	1	
	HH-60											
	UH-72		1					3				
	C-12						1	7				
	RC-12		1		1			1				

TABLE 13

ANSUR II Pilots Reporting Three Airframe Qualifications (n=93)

Primary Airframe	Secondary Airframes		Frequency
AH-64	CH-47	OH-58	1
AH-64	MD-530	OH-58	1
AH-64	OH-58	TH-67	20
AH-64	OH-58	UH-1	3
AH-64	OH-58	UH-72	1
AH-64	UH-1	TH-67	2
C-12	CH-47	OH-58	1
C-12	OH-58	TH-67	1
C-12	UH-60	TH-67	1
C-12	UH-60	UH-1	1
CH-47	OH-58	MI-17	1
CH-47	OH-58	TH-67	2
CH-47	UH-1	UH-72	1
EO-5	C-12	OH-58	1
MI-17	CH-47	OH-58	1
MI-17	UH-1	UH-60	1
OH-58	AH-64	TH-67	1
OH-58	C-12	UH-1	2
OH-58	UH-1	UH-60	1
OH-58	UH-60	TH-67	2
OH-58	UH-72	TH-67	1
RC-12	AH-64	EO-5	1
UH-60	AH-1	UH-1	2
UH-60	C-12	C-23	1
UH-60	C-12	UH-1	1
UH-60	OH-58	B 206	1
UH-60	OH-58	TH-67	33
UH-60	OH-58	UH-72	1
UH-60	UH-72	TH-67	4
UH-72	AH-64	UH-1	1
UH-72	UH-1	UH-60	2

3.1 WEIGHTING ANTHROPOMETRIC DATABASES

As mentioned above, both male and female pilot databases show a marked over-representation of younger pilots relative to DMDC pilot census data, and a concomitant under-representation of older pilots. Because age greatly influences body circumferences, these biases need to be corrected to ensure that design values for protective clothing and equipment and airframe clearances will represent older experienced pilots as well as young pilots. Since analytical weights are being calculated to match DMDC pilot age distributions, it is convenient to match pilot age/race distributions simultaneously. That approach optimizes the representativeness of the databases.

Generally speaking, analytical weights are calculated separately for males and females, and the following equation describes weight calculation for each sex-specific age/race sampling cell (Gordon, 1996):

$$\text{Cell Weight} = p(\text{Target})/p(\text{Database})$$

where p(Target) is the age/sex cell-specific proportion of DMDC census counts and p(Database) is the age/sex cell-specific proportion of ANSUR II pilot subjects measured.

When a sampling cell is under-represented in the database compared to the target population census, the resulting weight will be greater than one; when a cell is over-represented in the database compared to the target population census, the resulting weight will be less than one. In practice, when the database lacks subjects in a cell for which there are census counts and/or when the database has so few subjects in a cell that the weight required to match DMDC proportions is very large, then adjacent age categories are pooled before calculating the statistical weights.

Tables 14 and 15 provide the analytical sampling weights for male and female pilots measured in ANSUR II. The ability of these weights to calculate the male and female pilot summary statistics and to match DMDC census age and race distributions is illustrated in Tables 16 and 17.

TABLE 14

Representative Age/Race Group Weights for ANSUR II Male Pilots Database (n=977)

Age Group	White, Not of Hispanic Descent	Black, Not of Hispanic Descent	Hispanic	Asian	Native American	Pacific Islander
≤20	0.095246	-----	-----	-----	-----	-----
21-25	0.354343	0.228591	0.666725	0.272133	-----	1.117558
26-30	0.585436	0.761972	0.337918	0.355587	1.219155	
31-40	1.130296	1.116064	0.923510	3.606666	0.761972	
≥41	3.588378	2.628802	1.859211			0.723873

----- DMDC census counts for March 31, 2011 do not have Army pilots in these cells.

TABLE 15

Representative Age/Race Group Weights for ANSUR II Female Pilots Database (n=42)

Age Group	White, Not of Hispanic Descent	Black, Not of Hispanic Descent	Hispanic	Asian	Native American	Pacific Islander
≤ 20	-----	-----	-----	-----	-----	-----
21-25	0.633240	-----	0.147265	0.647966	-----	0.294530
26-30	1.037652	0.117812	1.237027		0.000000*	
31-40	1.446470	0.706872	1.472651			
≥41	1.669004					

----- DMDC census counts for March 31, 2011 do not have Army pilots in these cells.

* The Army has Native American female pilots in the older three age groups, but none were measured in this survey. Therefore, it is not possible to represent them.

TABLE 16

ANSUR II Pilots Database Sex and Age Group Distributions
After Weighting Participants to Match the DMDC Pilot Census of March 31, 2011

Age Group	Male Pilots			Female Pilots		
	ANSUR II		ARMY	ANSUR II		ARMY
	Unweighted Percent	Weighted Percent	Actual Percent	Unweighted Percent	Weighted Percent	Actual Percent
≤ 20	0.41	0.04	0.04	0.00	0.00	0.00
21-25	16.27	5.78	5.88	28.57	15.85	12.50
26-30	35.31	20.13	21.08	35.71	35.34	37.37
31-40	39.10	43.93	44.23	28.57	36.89	37.37
≥41	8.90	30.13	28.77	7.14	11.92	12.77

TABLE 17

ANSUR II Pilots Database Sex and DOD Racial/Ethnic Distributions
After Weighting Participants to Match the DMDC Pilot Census of March 31, 2011

Race/Ethnicity	Male Pilots			Female Pilots		
	ANSUR II		ARMY	ANSUR II		ARMY
	Unweighted Percent	Weighted Percent	Actual Percent	Unweighted Percent	Weighted Percent	Actual Percent
White, not of Hispanic descent	87.62	89.21	83.80	78.57	87.10	82.58
Black, not of Hispanic descent	3.58	3.84	3.60	4.76	1.96	1.86
Hispanic	5.83	4.39	4.12	9.52	7.15	6.78
Asian	1.94	1.63	1.53	4.76	3.09	2.93
Native American	0.51	0.44	0.41	0.00	0.00	0.80
Pacific Islander	0.51	0.49	0.46	2.38	0.70	0.66
Other/Unknown	0.00	0.00	6.07	0.00	0.00	4.39

It is evident from Tables 16 and 17 that use of analytical weights improves demographic concordance of the databases relative to DMDC census data of pilots. The relatively large differences between ANSUR II weighted percentages and DMDC target percentages for White males and females are most likely the result of the inclusion of an “Other/Unknown” category in the DMDC counts, which was not an option in the ANSUR II counts. The DMDC “Other/Unknown” category included individuals of mixed race and those refusing to answer the question. The absence of that option in ANSUR II forced participants to choose from one of the other options, and most of those respondents would have chosen “White”.

3.2 SAMPLE SIZE AND STATISTICAL POWER

It is not enough to have databases that are representative of the target population if their sample sizes are too small to provide statistics with high precision and

confidence for use in engineering design criteria and acquisition requirements. Ordinarily, power equations would be used in advance of a survey by establishing the confidence level (usually 95%) and precision (usually 1% of the mean) desired for critical statistics, then solving the power equations for the required sample size (see ISO 15535:2012). The most commonly used statistics for establishing sample size requirements in anthropometric design are the 5th/95th percentiles because they define the univariate range that must be accommodated to fit users and because the sample sizes required to provide precise specification of percentiles at the tails of body size distributions are larger than needed for most other statistical applications, rendering the 5th/95th sample size requirement a “worst case” scenario for planning purposes.

Sample size requirements for specifying 5th/95th percentiles with 95% confidence and precisions of ± 1% of the mean are given by the following equation (ISO, 2012):

$$n \geq (1.96 \cdot CV)^2 \cdot (1.534)^2$$

where CV is the coefficient of variation = (standard deviation/mean) *100.

Theoretically, the minimum sample size could be different for each body dimension in a survey because the relative variances for the various dimensions as measured by the CV might be different. In practice, one establishes the minimum sample size based on a commonly used body dimension with the highest CV, knowing that the sample size required for that body dimension will be more than sufficient for other important body dimensions with lower relative variance. For large-scale anthropometric surveys, Waist Circumference is nearly always chosen to set sample size because it has the highest CV of all commonly used body dimensions.

As mentioned previously, access to Army pilots in operational units was extremely limited during this survey due to deployments. Available funding also limited the number of military locations that the measuring team could travel to in order to access pilots. These logistical limitations rendered an *a priori* power analysis unhelpful because a stratified random sampling strategy to obtain the required sample sizes simply couldn't be executed in the field. Instead, a post-hoc power analysis is reported of the actual ANSUR II pilot samples obtained, and the results are compared to ideal power, precisions, and sample sizes for engineering applications such as those used in planning the ANSUR II survey of ground troops (Gordon et al., 2014).

Table 18 presents the sample size requirements needed to obtain 5th/95th percentiles with 95% confidence and precision of 1% of the mean for seven commonly used body dimensions in aviation engineering.

TABLE 18

Sample Size Required for 95% Confidence and
1% Precision of 5th/95th Percentile Statistics

Dimension	Male Pilots (n=977)		Female Pilots (n=42)	
	CV	Sample Size Required	CV	Sample Size Required
Stature	3.67	122 <input checked="" type="checkbox"/>	3.71	125 <input type="checkbox"/>
Total Arm Reach (Span)	4.17	158 <input checked="" type="checkbox"/>	4.59	191 <input type="checkbox"/>
Sitting Height	3.64	120 <input checked="" type="checkbox"/>	3.33	101 <input type="checkbox"/>
Crotch Height	4.87	215 <input checked="" type="checkbox"/>	4.69	199 <input type="checkbox"/>
Chest Circumference	7.19	468 <input checked="" type="checkbox"/>	9.98	901 <input type="checkbox"/>
Waist Circumference	9.92	890 <input checked="" type="checkbox"/>	11.84	1268 <input type="checkbox"/>
Buttock Circumference	6.29	358 <input checked="" type="checkbox"/>	7.69	535 <input type="checkbox"/>

The sample size requirements in Table 18 are based on the actual means and standard deviations from ANSUR II male (n=977) and female (n=42) pilots. As can be seen in Table 18 above, the male sample of 977 pilots is large enough to provide good statistical power, but the female sample of 42 pilots is much too small – even for body dimensions of relatively low variance such as Sitting Height with a CV of 3.33.

Table 19 illustrates the practical problem caused by low statistical power by comparing the size of 95% confidence intervals for means and 5th/95th percentiles obtained from the sample of n=42 female pilots with the size of 95% confidence limits for two larger hypothetical samples (n=400, n=1000) with the same mean and variance as the actual female pilots measured. A 95% confidence interval for any given statistic describes the range inside which the statistical values from 95% of samples from the same population would be expected. In essence, the size of the 95% confidence interval is an objective measure of uncertainty for the statistical value obtained from a particular sample. Equations A.2 and A.8 in Annex A of ISO 15535:2012 were used to generate the n=400 and n=1000 comparisons in Table 19 (ISO, 2012). The 95% confidence intervals for the n=42 sample were calculated using a t-value of 2.02 in equation A.2 and 1.68 in equation A.8 instead of the t-values 1.96 and 1.645 respectively because the latter are only appropriate for samples larger than 120 (Sokal and Rohlf, 2011).

TABLE 19

Comparison of Confidence Intervals for Female Pilot Statistics

Dimension	Female Pilots (n=42)		95% CI for Mean: ± mm			95% CI for 5th/95th Percentiles: ± mm		
	Mean (mm)	SD (mm)	n=42	n=400	n=1000	n=42	n=400	n=1000
Stature	1647.6	61.2	19.1	6.0	3.8	29.6	9.2	5.8
Total Arm Reach (Span)	1657.8	76.0	23.7	7.5	4.7	36.8	11.4	7.2
Sitting Height	873.4	29.1	9.1	2.8	1.8	14.1	4.4	2.8
Crotch Height	787.9	37.0	11.5	3.6	2.3	17.9	5.6	3.5
Chest Circumference	939.2	93.7	29.2	9.2	5.8	45.4	14.1	8.9
Waist Circumference	852.5	100.9	31.5	9.9	6.3	48.9	15.2	9.6
Buttock Circumference	1006.5	77.4	24.1	7.6	4.8	37.5	11.6	7.4

As can be seen in Table 19, using only the n=42 female pilots measured to represent all female pilots makes specification of female pilot mean and 5th/95th percentiles very difficult. The 95th percent confidence intervals for the means of Total Arm Reach and Buttock Circumference are nearly ± 1 inch from the n=42 sample estimates, and Waist and Chest Circumference 95% confidence intervals are more than ± 1 inch from the n=42 sample estimates. As would be expected since estimation of percentile values near the tails of the distribution is more difficult than the estimation at the mean, the 95% confidence intervals for 5th/95th percentiles are even larger. The “true” value of female pilot Total Arm Reach 5th/95th percentiles could be as much as ± 1.5 inches at either end of the n=42 sample values; the true value of female pilot Waist Circumference and Chest Circumference 5th/95th percentile values could be as much as ± 2 inches at either end of the n=42 sample values. These margins of uncertainty are simply unacceptable for ergonomic design criteria that will impact crew station design criteria and protective clothing and equipment requirements for the next several decades. Furthermore, the discussion so far has assumed that the n=42 female pilot sample is not biased in any way and that all the statistical uncertainty arises simply from small sample sizes. Unfortunately, since all but one of the ANSUR II female pilots were measured at Ft. Rucker, it cannot be assumed that the 42 measured are representative of the n=752 female pilots reported in the DMDC census of March 31, 2011.

Because the ANSUR II female pilot sample is too small to provide reliable statistics for design criteria, the n=42 sample is not reported in the main portion of this volume, but can be found in Appendix I. The statistics in Appendix I are provided **for information only**, and these statistics **are not recommended** for use in materiel systems design requirements. Instead, an augmented female sample is provided for aviation applications using Army officers and warrant officers whose Total Arm Reach, Crotch Height, Sitting Height, and Body Mass Index fall within the ranges of actual female pilots measured in ANSUR II. This augmented database has been weighted to match the age/race distributions of actual female pilots in the DMDC census of March 31, 2011. The validity of this approach is discussed in detail in Appendix J.

3.3 AUGMENTING THE FEMALE PILOT DATABASE FOR ENGINEERING DESIGN CRITERIA

Actual female pilot body size ranges have been used to limit inclusions for the augmented female database rather than the body size limits specified in the Medical Fitness Standards for Flying Duty (AR 40-501, 2011) because waivers to AR 40-501 are often granted when highly qualified candidates can actuate critical controls and conduct critical mission tasks during a cockpit check (U.S. Army, 2011). Among the ANSUR II pilots measured, for example, 17 of 977 males (1.74%) were outside the AR 40-501 anthropometric limits for at least one of the following: Total Arm Reach (Span), Sitting Height, or Crotch Height; and 16 of 42 females (38.10%) were outside the AR 40-501 limits for at least one of those same body measurements. That pilots are actively flying on waivers to anthropometric requirements in AR 40-501 is not surprising because the univariate Total Arm Reach, Sitting Height and Crotch Height requirements in AR 40-501 cannot perfectly predict cockpit compatibility – they function primarily as a screening device to identify candidates at high risk for cockpit incompatibility. Cockpit checks are needed to determine whether or not incompatibility actually exists because the compatibility problem is multivariate in nature (whereas the AR 40-501 limits are univariate), and even the multivariate limitations vary from aircraft frame to aircraft frame depending upon its development history. In addition to AR 40-501 body dimensions, the Body Mass Index (BMI) for ANSUR II female pilots ($BMI = \frac{\text{Weight in kg}}{(\text{Height in meters})^2}$) has also been calculated and the range of this derived variable has been used to limit inclusion in the augmented female database because anecdotal evidence from Army and Marine Corps studies suggests that career military, and especially those in high-profile jobs, are more likely to comply with body weight and body fat regulations than other military personnel. Table 20 summarizes the demographic and anthropometric requirements imposed when the augmented female pilot sample was constructed.

TABLE 20

Criteria for Inclusion in the Augmented Female Database

Inclusion Criteria	Selection Requirements	Result
Actual Female Pilots	Include all	n=42
Non-Pilot Females	No missing data	n=353
Rank	Officers & Warrant Officers	
Total Arm Reach (Span)	Span \geq 1554*	
Sitting Height	Sitting Height \leq 1020	
Crotch Height	Crotch Height \geq 724*	
Body Mass Index	BMI \leq 36.2*	

* Selection value is based on actual minimum/maximum of the 42 female pilots rather than on AR40-501 (U.S. Army, 2011).

The augmented female pilot database created using Table 20 criteria has a sample size of n=395, which is still less than ideal for some highly variable body dimensions. However, it clearly provides a substantial improvement in 5th/95th percentile precision, as can be seen in Table 19. The larger sample size also permits closer matching of DMDC census proportions in calculating analytical weights (see Table 21) because fewer sampling cells required pooling (compare Table 15 to Table 21) and because the augmented database has Native American pilots available for matching DMDC census counts. Table 21 presents the analytical weights used in calculating the female summary statistics presented in the body of this report.

TABLE 21

Representative Age/Race Group Weights for
ANSUR II Female Pilot Eligible Database (n=395)

Age Group	White, Not of Hispanic Descent	Black, Not of Hispanic Descent	Hispanic	Asian	Native American	Pacific Islander
≤ 20	-----	-----	-----	-----	-----	-----
21-25	0.859021	-----	0.249716	0.219750	-----	0.274687
26-30	1.612906	0.034336	1.281873	0.769124	1.648122	0.824061
31-40	1.839571	0.093114	0.755389	3.570932	0.824061	0.549374
≥41	1.867872	0.052321	0.549374			

----- DMDC census counts for March 31, 2011 do not have Army pilots in these cells.

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CHAPTER IV

THE BODY MEASUREMENTS

Ninety-four directly measured dimensions were obtained in this survey, using traditional measuring instruments and methods. Where there was a choice of right or left, all measurements were taken on the right side unless otherwise specified or in the rare cases where an injury or anatomical abnormality made it necessary to measure on the left side. All measurements were taken to the nearest millimeter. Weight was taken to the nearest 0.1 kilogram. Detailed illustrated instructions for making these measurements can be found in the Measurer's Handbook (Hotzman et al., 2011).

A visual index, designed to assist the reader in locating particular dimensions whose names may be unfamiliar, appears in Appendix B. The numbers on the visual index correspond to the dimension numbers. The following pages include brief dimension descriptions, summary statistics, and percentile and frequency tables for the male and female participants. Users of these data will note 0.00 standard error values for some means and standard deviations. This occurs because values in these tables are not listed beyond two decimal places.

Only 93 of the 94 measured dimensions are reported here. Acromion-Wall Depth was highly variable and it was poorly correlated with other dimensions. The variability was attributed to the posterior contour of many participants, which affected their positioning against the wall. Thus, the variability seen in the dimension comprised not only the variability of Acromion-Wall Depth itself, but also the depth of the buttock, the shape of the shoulders, the thickness of the calves, and sometimes other body shape characteristics.

Four head dimensions are not strictly equivalent to ANSUR dimensions for some females. Female pilots with hair in French braids or buns were asked to take down the hair style prior to measuring. When female pilots had braids or cornrows in their hair, it was not possible to have them alter the hair style in order to get the calipers or tape in contact with the scalp, as would normally be done. For these pilots, the four dimensions were measured to include the braids or cornrows. The rationale for this was that helmets and other protective equipment worn on the head need to accommodate the hair, as well as the head itself. To determine whether including these women's measurements in the database would adversely affect the resulting statistics, the mean values of the overall ANSUR II sample were compared with these individuals' measurements both included and excluded. There was no difference in the means (significance test at the 0.05 level). The affected dimensions were:

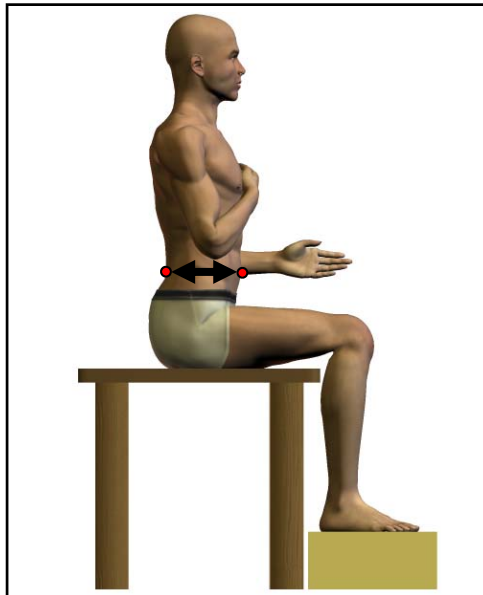
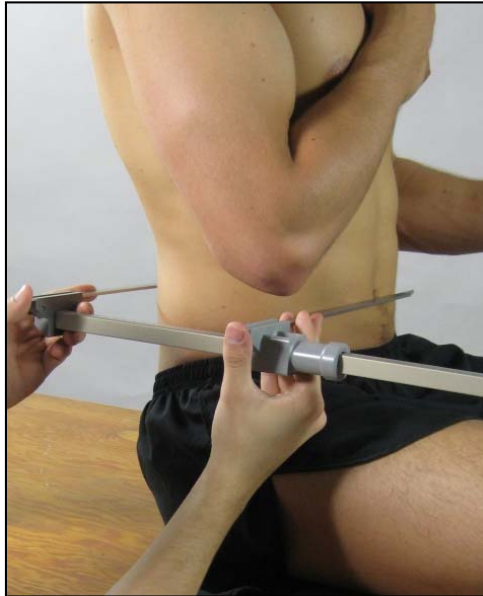
Head Breadth
Head Circumference

Head Length
Tragion-Top Of Head

Note that the issue did not arise for Stature, measured to the top of the head, as it was always possible to place the anthropometer blade between the cornrows or braids, and make contact with the skull in the usual way.

(1) ABDOMINAL EXTENSION DEPTH, SITTING

The horizontal distance between the abdominal point anterior and the back at the same level is measured with a beam caliper. The participant sits erect, looking straight ahead. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
17.00	6.69	1ST	19.50	7.68
17.20	6.77	2ND	20.10	7.91
17.30	6.81	3RD	20.50	8.07
17.60	6.93	5TH	21.00	8.27
18.70	7.36	10TH	21.70	8.54
19.00	7.48	15TH	22.40	8.82
19.60	7.72	20TH	22.80	8.98
20.10	7.91	25TH	23.40	9.21
20.40	8.03	30TH	23.80	9.37
20.80	8.19	35TH	24.20	9.53
21.00	8.27	40TH	24.60	9.69
21.50	8.46	45TH	25.00	9.84
21.70	8.54	50TH	25.40	10.00
22.00	8.66	55TH	25.70	10.12
22.30	8.78	60TH	26.10	10.28
22.70	8.94	65TH	26.60	10.47
23.10	9.09	70TH	27.20	10.71
23.70	9.33	75TH	27.70	10.91
24.30	9.57	80TH	28.40	11.18
25.00	9.84	85TH	29.10	11.46
26.60	10.47	90TH	29.70	11.69
28.20	11.10	95TH	31.70	12.48
28.50	11.22	97TH	33.30	13.11
30.10	11.85	98TH	33.90	13.35
30.80	12.13	99TH	35.20	13.86

(1) ABDOMINAL EXTENSION DEPTH, SITTING

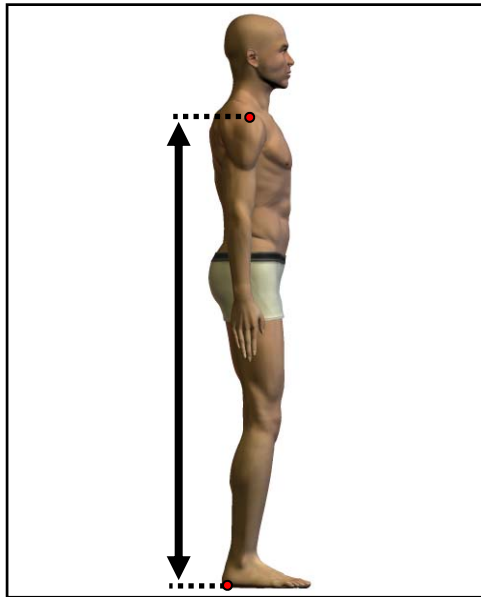
FEMALES		
CM		IN
22.11	MEAN	8.70
0.15	STD ERROR (MEAN)	0.06
3.04	STANDARD DEVIATION	1.20
0.11	STD ERROR (STD DEV)	0.04
16.30	MINIMUM	6.42
33.40	MAXIMUM	13.15
SKEWNESS		0.76
KURTOSIS		3.61
COEFFICIENT OF VARIATION		13.8%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
25.69	MEAN	10.12
0.10	STD ERROR (MEAN)	0.04
3.28	STANDARD DEVIATION	1.29
0.07	STD ERROR (STD DEV)	0.03
17.50	MINIMUM	6.89
35.60	MAXIMUM	14.02
SKEWNESS		0.55
KURTOSIS		3.27
COEFFICIENT OF VARIATION		12.8%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				CM	MALES						
F	FPct	CumF	CumFPct		F	FPct	CumF	CumFPct			
2	0.51	2	0.51	16.25	-	16.75					
5	1.27	7	1.77	16.75	-	17.25					
9	2.28	16	4.05	17.25	-	17.75	3	0.31	3	0.31	
9	2.28	25	6.33	17.75	-	18.25	2	0.20	5	0.51	
15	3.80	40	10.13	18.25	-	18.75	4	0.41	9	0.92	
24	6.08	64	16.20	18.75	-	19.25	8	0.82	17	1.74	
19	4.81	83	21.01	19.25	-	19.75	9	0.92	26	2.66	
18	4.56	101	25.57	19.75	-	20.25	17	1.74	43	4.40	
28	7.09	129	32.66	20.25	-	20.75	28	2.87	71	7.27	
32	8.10	161	40.76	20.75	-	21.25	40	4.09	111	11.36	
39	9.87	200	50.63	21.25	-	21.75	48	4.91	159	16.27	
25	6.33	225	56.96	21.75	-	22.25	39	3.99	198	20.27	
26	6.58	251	63.54	22.25	-	22.75	89	9.11	287	29.38	
27	6.84	278	70.38	22.75	-	23.25	58	5.94	345	35.31	
16	4.05	294	74.43	23.25	-	23.75	73	7.47	418	42.78	
15	3.80	309	78.23	23.75	-	24.25	58	5.94	476	48.72	
15	3.80	324	82.03	24.25	-	24.75	54	5.53	530	54.25	
11	2.78	335	84.81	24.75	-	25.25	64	6.55	594	60.80	
11	2.78	346	87.59	25.25	-	25.75	61	6.24	655	67.04	
7	1.77	353	89.37	25.75	-	26.25	52	5.32	707	72.36	
7	1.77	360	91.14	26.25	-	26.75	46	4.71	753	77.07	
9	2.28	369	93.42	26.75	-	27.25	32	3.28	785	80.35	
4	1.01	373	94.43	27.25	-	27.75	40	4.09	825	84.44	
3	0.76	376	95.19	27.75	-	28.25	27	2.76	852	87.21	
9	2.28	385	97.47	28.25	-	28.75	27	2.76	879	89.97	
1	0.25	386	97.72	28.75	-	29.25	26	2.66	905	92.63	
1	0.25	387	97.97	29.25	-	29.75	22	2.25	927	94.88	
2	0.51	389	98.48	29.75	-	30.25	12	1.23	939	96.11	
2	0.51	391	98.99	30.25	-	30.75	6	0.61	945	96.72	
2	0.51	393	99.49	30.75	-	31.25	2	0.20	947	96.93	
0	0.00	393	99.49	31.25	-	31.75	9	0.92	956	97.85	
0	0.00	393	99.49	31.75	-	32.25	5	0.51	961	98.36	
1	0.25	394	99.75	32.25	-	32.75	1	0.10	962	98.46	
0	0.00	394	99.75	32.75	-	33.25	2	0.20	964	98.67	
1	0.25	395	100.00	33.25	-	33.75	5	0.51	969	99.18	
				33.75	-	34.25	3	0.31	972	99.49	
				34.25	-	34.75	1	0.10	973	99.59	
				34.75	-	35.25	2	0.20	975	99.80	
				35.25	-	35.75	2	0.20	977	100.00	

(2) ACROMIAL HEIGHT

The vertical distance between a standing surface and the right acromion landmark is measured with an anthropometer. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
125.80	49.53	1ST	132.40	52.13
126.20	49.69	2ND	133.60	52.60
126.80	49.92	3RD	134.40	52.91
127.60	50.24	5TH	135.60	53.39
129.10	50.83	10TH	138.20	54.41
130.00	51.18	15TH	139.90	55.08
130.90	51.54	20TH	140.80	55.43
131.90	51.93	25TH	141.60	55.75
132.60	52.20	30TH	142.30	56.02
133.10	52.40	35TH	143.40	56.46
133.50	52.56	40TH	144.10	56.73
134.00	52.76	45TH	145.00	57.09
134.80	53.07	50TH	145.70	57.36
135.40	53.31	55TH	146.50	57.68
136.20	53.62	60TH	147.40	58.03
137.20	54.02	65TH	148.20	58.35
137.80	54.25	70TH	148.90	58.62
138.90	54.69	75TH	149.70	58.94
139.70	55.00	80TH	150.60	59.29
141.00	55.51	85TH	152.10	59.88
142.80	56.22	90TH	153.60	60.47
144.50	56.89	95TH	155.40	61.18
145.50	57.28	97TH	156.90	61.77
146.00	57.48	98TH	157.50	62.01
148.80	58.58	99TH	158.90	62.56

(2) ACROMIAL HEIGHT

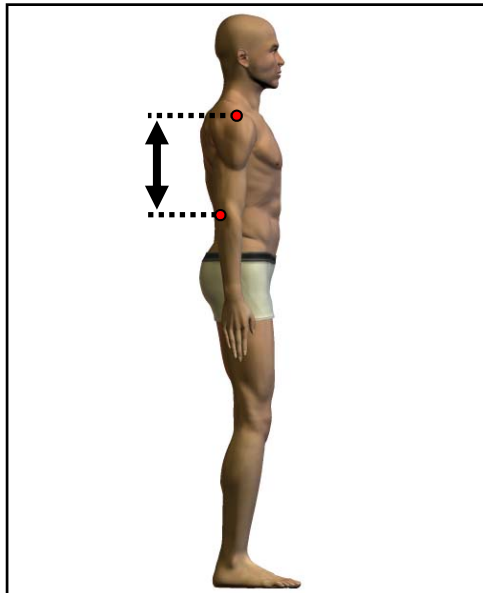
FEMALES		
CM		IN
135.41	MEAN	53.31
0.26	STD ERROR (MEAN)	0.10
5.17	STANDARD DEVIATION	2.03
0.18	STD ERROR (STD DEV)	0.07
122.60	MINIMUM	48.27
153.60	MAXIMUM	60.47
SKEWNESS		0.44
KURTOSIS		2.95
COEFFICIENT OF VARIATION		3.8%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
145.74	MEAN	57.38
0.19	STD ERROR (MEAN)	0.08
5.99	STANDARD DEVIATION	2.36
0.14	STD ERROR (STD DEV)	0.05
124.60	MINIMUM	49.06
168.10	MAXIMUM	66.18
SKEWNESS		0.00
KURTOSIS		2.99
COEFFICIENT OF VARIATION		4.1%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	CM	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	121.25	-	122.75					
0	0.00	1	0.25	122.75	-	124.25					
2	0.51	3	0.76	124.25	-	125.75	1	0.10			
17	4.30	20	5.06	125.75	-	127.25	0	0.00			
20	5.06	40	10.13	127.25	-	128.75	1	0.10			
35	8.86	75	18.99	128.75	-	130.25	4	0.41			
35	8.86	110	27.85	130.25	-	131.75	2	0.20			
48	12.15	158	40.00	131.75	-	133.25	8	0.82			
46	11.65	204	51.65	133.25	-	134.75	11	1.13			
38	9.62	242	61.27	134.75	-	136.25	16	1.64			
38	9.62	280	70.89	136.25	-	137.75	30	3.07			
34	8.61	314	79.49	137.75	-	139.25	30	3.07			
22	5.57	336	85.06	139.25	-	140.75	46	4.71			
18	4.56	354	89.62	140.75	-	142.25	64	6.55			
18	4.56	372	94.18	142.25	-	143.75	82	8.39			
12	3.04	384	97.22	143.75	-	145.25	89	9.11			
6	1.52	390	98.73	145.25	-	146.75	85	8.70			
2	0.51	392	99.24	146.75	-	148.25	94	9.62			
2	0.51	394	99.75	148.25	-	149.75	89	9.11			
0	0.00	394	99.75	149.75	-	151.25	93	9.52			
0	0.00	394	99.75	151.25	-	152.75	67	6.86			
0	0.00	394	99.75	152.75	-	154.25	58	5.94			
1	0.25	395	100.00	154.25	-	155.75	43	4.40			
				155.25	-	155.75	32	3.28			
				155.75	-	157.25	20	2.05			
				157.25	-	158.75	10	1.02			
				158.75	-	160.25	5	0.51			
				160.25	-	161.75	1	0.10			
				161.75	-	163.25	3	0.31			
				163.25	-	164.75	0	0.00			
				164.75	-	166.25	0	0.00			
				166.25	-	167.75	0	0.00			
				167.75	-	169.25	0	0.00			
							1	0.10			
							977	100.00			

(3) ACROMION-RADIALE LENGTH

The distance between the right acromion landmark and the radiale landmark is measured with a beam caliper held parallel to the long axis of the arm. The participant stands erect. The shoulders and upper extremities are relaxed with the palms facing the thighs.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
29.00	11.42	1ST	30.00	11.81
29.10	11.46	2ND	30.50	12.01
29.10	11.46	3RD	30.80	12.13
29.40	11.57	5TH	31.20	12.28
29.80	11.73	10TH	32.00	12.60
30.00	11.81	15TH	32.20	12.68
30.30	11.93	20TH	32.50	12.80
30.50	12.01	25TH	32.80	12.91
30.70	12.09	30TH	33.00	12.99
30.80	12.13	35TH	33.30	13.11
31.00	12.20	40TH	33.40	13.15
31.10	12.24	45TH	33.60	13.23
31.30	12.32	50TH	33.80	13.31
31.50	12.40	55TH	34.10	13.43
31.70	12.48	60TH	34.30	13.50
31.90	12.56	65TH	34.50	13.58
32.20	12.68	70TH	34.70	13.66
32.50	12.80	75TH	35.00	13.78
32.70	12.87	80TH	35.30	13.90
33.00	12.99	85TH	35.60	14.02
33.40	13.15	90TH	36.00	14.17
34.20	13.46	95TH	36.70	14.45
34.40	13.54	97TH	37.00	14.57
34.50	13.58	98TH	37.30	14.69
35.80	14.09	99TH	37.50	14.76

(3) ACROMION-RADIALE LENGTH

FEMALES		
CM		IN
31.49	MEAN	12.40
0.07	STD ERROR (MEAN)	0.03
1.43	STANDARD DEVIATION	0.56
0.05	STD ERROR (STD DEV)	0.02
28.00	MINIMUM	11.02
36.00	MAXIMUM	14.17
SKEWNESS		0.51
KURTOSIS		3.03
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
33.89	MEAN	13.34
0.05	STD ERROR (MEAN)	0.02
1.63	STANDARD DEVIATION	0.64
0.04	STD ERROR (STD DEV)	0.01
28.20	MINIMUM	11.10
39.20	MAXIMUM	15.43
SKEWNESS		0.01
KURTOSIS		3.07
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE										
FEMALES							MALES			
F	FPct	CumF	CumFPct	CM		F	FPct	CumF	CumFPct	
1	0.25	1	0.25	27.75	-	28.25	1	0.10	1	0.10
1	0.25	2	0.51	28.25	-	28.75	0	0.00	1	0.10
18	4.56	20	5.06	28.75	-	29.25	2	0.20	3	0.31
23	5.82	43	10.89	29.25	-	29.75	4	0.41	7	0.72
36	9.11	79	20.00	29.75	-	30.25	3	0.31	10	1.02
58	14.68	137	34.68	30.25	-	30.75	18	1.84	28	2.87
52	13.16	189	47.85	30.75	-	31.25	28	2.87	56	5.73
45	11.39	234	59.24	31.25	-	31.75	34	3.48	90	9.21
38	9.62	272	68.86	31.75	-	32.25	72	7.37	162	16.58
45	11.39	317	80.25	32.25	-	32.75	79	8.09	241	24.67
27	6.84	344	87.09	32.75	-	33.25	102	10.44	343	35.11
23	5.82	367	92.91	33.25	-	33.75	133	13.61	476	48.72
13	3.29	380	96.20	33.75	-	34.25	108	11.05	584	59.77
10	2.53	390	98.73	34.25	-	34.75	111	11.36	695	71.14
2	0.51	392	99.24	34.75	-	35.25	85	8.70	780	79.84
0	0.00	392	99.24	35.25	-	35.75	70	7.16	850	87.00
3	0.76	395	100.00	35.75	-	36.25	57	5.83	907	92.84
				36.25	-	36.75	32	3.28	939	96.11
				36.75	-	37.25	21	2.15	960	98.26
				37.25	-	37.75	9	0.92	969	99.18
				37.75	-	38.25	4	0.41	973	99.59
				38.25	-	38.75	2	0.20	975	99.80
				38.75	-	39.25	2	0.20	977	100.00

(4) ANKLE CIRCUMFERENCE

The minimum horizontal circumference of the right ankle is measured with a tape. The participant stands with the feet about 10 cm apart and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
18.90	7.44	1ST	20.10	7.91
19.00	7.48	2ND	20.50	8.07
19.20	7.56	3RD	20.60	8.11
19.40	7.64	5TH	20.80	8.19
20.00	7.87	10TH	21.30	8.39
20.30	7.99	15TH	21.50	8.46
20.50	8.07	20TH	21.70	8.54
20.70	8.15	25TH	21.80	8.58
20.80	8.19	30TH	22.10	8.70
21.00	8.27	35TH	22.30	8.78
21.20	8.35	40TH	22.40	8.82
21.30	8.39	45TH	22.60	8.90
21.50	8.46	50TH	22.80	8.98
21.70	8.54	55TH	23.00	9.06
21.80	8.58	60TH	23.10	9.09
22.00	8.66	65TH	23.30	9.17
22.20	8.74	70TH	23.60	9.29
22.50	8.86	75TH	23.70	9.33
22.80	8.98	80TH	24.00	9.45
23.20	9.13	85TH	24.30	9.57
23.60	9.29	90TH	24.60	9.69
24.40	9.61	95TH	25.30	9.96
24.70	9.72	97TH	25.70	10.12
24.80	9.76	98TH	26.00	10.24
26.10	10.28	99TH	26.40	10.39

(4) ANKLE CIRCUMFERENCE

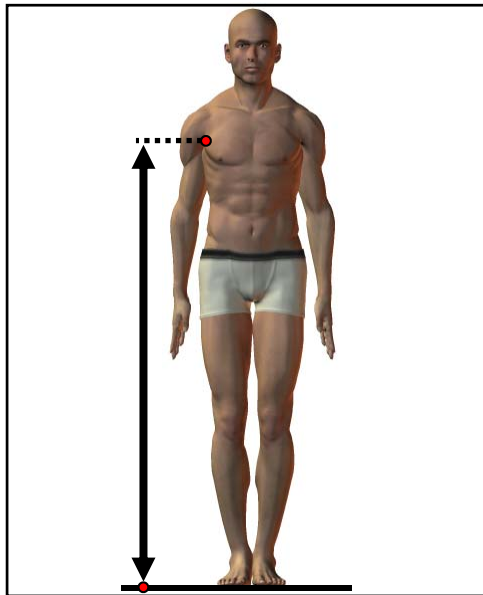
FEMALES		
<u>CM</u>		<u>IN</u>
21.66	MEAN	8.53
0.07	STD ERROR (MEAN)	0.03
1.46	STANDARD DEVIATION	0.57
0.05	STD ERROR (STD DEV)	0.02
17.50	MINIMUM	6.89
26.60	MAXIMUM	10.47
SKEWNESS		0.59
KURTOSIS		3.59
COEFFICIENT OF VARIATION		6.7%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
22.88	MEAN	9.01
0.04	STD ERROR (MEAN)	0.02
1.35	STANDARD DEVIATION	0.53
0.03	STD ERROR (STD DEV)	0.01
18.60	MINIMUM	7.32
27.50	MAXIMUM	10.83
SKEWNESS		0.40
KURTOSIS		3.30
COEFFICIENT OF VARIATION		5.9%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	17.35 - 17.60							
0	0.00	1	0.25	17.60 - 17.85							
0	0.00	1	0.25	17.85 - 18.10							
1	0.25	2	0.51	18.10 - 18.35							
0	0.00	2	0.51	18.35 - 18.60							
2	0.51	4	1.01	18.60 - 18.85	1	0.10	1	0.10			
5	1.27	9	2.28	18.85 - 19.10	0	0.00	1	0.10			
8	2.03	17	4.30	19.10 - 19.35	2	0.20	3	0.31			
6	1.52	23	5.82	19.35 - 19.60	1	0.10	4	0.41			
15	3.80	38	9.62	19.60 - 19.85	5	0.51	9	0.92			
10	2.53	48	12.15	19.85 - 20.10	4	0.41	13	1.33			
29	7.34	77	19.49	20.10 - 20.35	7	0.72	20	2.05			
19	4.81	96	24.30	20.35 - 20.60	12	1.23	32	3.28			
32	8.10	128	32.41	20.60 - 20.85	31	3.17	63	6.45			
22	5.57	150	37.97	20.85 - 21.10	17	1.74	80	8.19			
44	11.14	194	49.11	21.10 - 21.35	44	4.50	124	12.69			
19	4.81	213	53.92	21.35 - 21.60	45	4.61	169	17.30			
37	9.37	250	63.29	21.60 - 21.85	93	9.52	262	26.82			
20	5.06	270	68.35	21.85 - 22.10	38	3.89	300	30.71			
21	5.32	291	73.67	22.10 - 22.35	79	8.09	379	38.79			
14	3.54	305	77.22	22.35 - 22.60	50	5.12	429	43.91			
19	4.81	324	82.03	22.60 - 22.85	109	11.16	538	55.07			
5	1.27	329	83.29	22.85 - 23.10	55	5.63	593	60.70			
15	3.80	344	87.09	23.10 - 23.35	67	6.86	660	67.55			
11	2.78	355	89.87	23.35 - 23.60	42	4.30	702	71.85			
10	2.53	365	92.41	23.60 - 23.85	83	8.50	785	80.35			
5	1.27	370	93.67	23.85 - 24.10	35	3.58	820	83.93			
5	1.27	375	94.94	24.10 - 24.35	28	2.87	848	86.80			
5	1.27	380	96.20	24.35 - 24.60	30	3.07	878	89.87			
8	2.03	388	98.23	24.60 - 24.85	32	3.28	910	93.14			
0	0.00	388	98.23	24.85 - 25.10	16	1.64	926	94.78			
2	0.51	390	98.73	25.10 - 25.35	11	1.13	937	95.91			
0	0.00	390	98.73	25.35 - 25.60	11	1.13	948	97.03			
0	0.00	390	98.73	25.60 - 25.85	10	1.02	958	98.06			
0	0.00	390	98.73	25.85 - 26.10	5	0.51	963	98.57			
3	0.76	393	99.49	26.10 - 26.35	3	0.31	966	98.87			
1	0.25	394	99.75	26.35 - 26.60	3	0.31	969	99.18			
1	0.25	395	100.00	26.60 - 26.85	4	0.41	973	99.59			
				26.85 - 27.10	0	0.00	973	99.59			
				27.10 - 27.35	1	0.10	974	99.69			
				27.35 - 27.60	3	0.31	977	100.00			

(5) AXILLA HEIGHT

The vertical distance between a standing surface and the anterior-scye-on-the-torso landmark is measured with an anthropometer. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed with the palms facing the thighs. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
116.30	45.79	1ST	121.20	47.72
117.50	46.26	2ND	123.10	48.46
117.90	46.42	3RD	123.80	48.74
118.10	46.50	5TH	125.20	49.29
119.50	47.05	10TH	127.40	50.16
120.30	47.36	15TH	128.70	50.67
121.30	47.76	20TH	129.50	50.98
122.00	48.03	25TH	130.50	51.38
122.60	48.27	30TH	131.40	51.73
123.40	48.58	35TH	132.20	52.05
124.20	48.90	40TH	132.90	52.32
124.70	49.09	45TH	133.80	52.68
125.20	49.29	50TH	134.50	52.95
126.00	49.61	55TH	135.30	53.27
126.60	49.84	60TH	136.00	53.54
127.00	50.00	65TH	136.80	53.86
127.60	50.24	70TH	137.30	54.06
128.60	50.63	75TH	138.10	54.37
130.20	51.26	80TH	139.00	54.72
131.60	51.81	85TH	140.10	55.16
133.00	52.36	90TH	141.90	55.87
134.50	52.95	95TH	143.40	56.46
135.70	53.43	97TH	144.90	57.05
136.00	53.54	98TH	146.40	57.64
139.30	54.84	99TH	147.30	57.99

(5) AXILLA HEIGHT

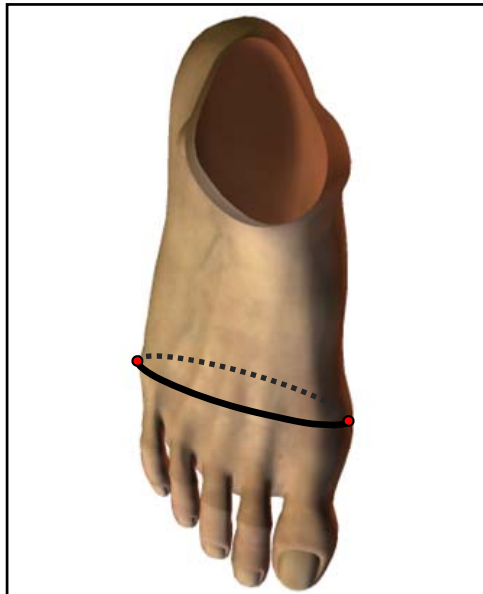
FEMALES		
<u>CM</u>		<u>IN</u>
125.70	MEAN	49.49
0.25	STD ERROR (MEAN)	0.10
4.99	STANDARD DEVIATION	1.96
0.18	STD ERROR (STD DEV)	0.07
112.70	MINIMUM	44.37
141.50	MAXIMUM	55.71
SKEWNESS		0.43
KURTOSIS		2.81
COEFFICIENT OF VARIATION		4.0%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
134.45	MEAN	52.93
0.18	STD ERROR (MEAN)	0.07
5.63	STANDARD DEVIATION	2.21
0.13	STD ERROR (STD DEV)	0.05
114.30	MINIMUM	45.00
155.20	MAXIMUM	61.10
SKEWNESS		0.02
KURTOSIS		3.02
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	112.55 - 113.55	1	0.10	1	0.10			
0	0.00	1	0.25	113.55 - 114.55	0	0.00	1	0.10			
2	0.51	3	0.76	114.55 - 115.55	0	0.00	1	0.10			
4	1.01	7	1.77	115.55 - 116.55	0	0.00	1	0.10			
4	1.01	11	2.78	116.55 - 117.55	0	0.00	1	0.10			
13	3.29	24	6.08	117.55 - 118.55	1	0.10	2	0.20			
21	5.32	45	11.39	118.55 - 119.55	0	0.00	2	0.20			
25	6.33	70	17.72	119.55 - 120.55	4	0.41	6	0.61			
25	6.33	95	24.05	120.55 - 121.55	3	0.31	9	0.92			
26	6.58	121	30.63	121.55 - 122.55	5	0.51	14	1.43			
33	8.35	154	38.99	122.55 - 123.55	12	1.23	26	2.66			
28	7.09	182	46.08	123.55 - 124.55	14	1.43	40	4.09			
34	8.61	216	54.68	124.55 - 125.55	17	1.74	57	5.83			
24	6.08	240	60.76	125.55 - 126.55	21	2.15	78	7.98			
35	8.86	275	69.62	126.55 - 127.55	31	3.17	109	11.16			
21	5.32	296	74.94	127.55 - 128.55	32	3.28	141	14.43			
18	4.56	314	79.49	128.55 - 129.55	52	5.32	193	19.75			
14	3.54	328	83.04	129.55 - 130.55	53	5.42	246	25.18			
11	2.78	339	85.82	130.55 - 131.55	53	5.42	299	30.60			
14	3.54	353	89.37	131.55 - 132.55	65	6.65	364	37.26			
17	4.30	370	93.67	132.55 - 133.55	55	5.63	419	42.89			
8	2.03	378	95.70	133.55 - 134.55	61	6.24	480	49.13			
6	1.52	384	97.22	134.55 - 135.55	77	7.88	557	57.01			
5	1.27	389	98.48	135.55 - 136.55	63	6.45	620	63.46			
2	0.51	391	98.99	136.55 - 137.55	70	7.16	690	70.62			
1	0.25	392	99.24	137.55 - 138.55	58	5.94	748	76.56			
2	0.51	394	99.75	138.55 - 139.55	53	5.42	801	81.99			
0	0.00	394	99.75	139.55 - 140.55	42	4.30	843	86.28			
1	0.25	395	100.00	140.55 - 141.55	26	2.66	869	88.95			
				141.55 - 142.55	38	3.89	907	92.84			
				142.55 - 143.55	26	2.66	933	95.50			
				143.55 - 144.55	10	1.02	943	96.52			
				144.55 - 145.55	12	1.23	955	97.75			
				145.55 - 146.55	8	0.82	963	98.57			
				146.55 - 147.55	6	0.61	969	99.18			
				147.55 - 148.55	2	0.20	971	99.39			
				148.55 - 149.55	3	0.31	974	99.69			
				149.55 - 150.55	1	0.10	975	99.80			
				150.55 - 151.55	1	0.10	976	99.90			
				151.55 - 152.55	0	0.00	976	99.90			
				152.55 - 153.55	0	0.00	976	99.90			
				153.55 - 154.55	0	0.00	976	99.90			
				154.55 - 155.55	1	0.10	977	100.00			

(6) BALL OF FOOT CIRCUMFERENCE

The circumference of the foot at the first and fifth metatarsophalangeal landmarks is measured with a tape. The participant stands with the feet about 10 cm apart and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
20.20	7.95	1ST	22.40	8.82
20.40	8.03	2ND	22.60	8.90
20.40	8.03	3RD	22.80	8.98
20.70	8.15	5TH	23.30	9.17
21.20	8.35	10TH	23.60	9.29
21.50	8.46	15TH	23.80	9.37
21.70	8.54	20TH	24.10	9.49
21.90	8.62	25TH	24.40	9.61
22.20	8.74	30TH	24.50	9.65
22.40	8.82	35TH	24.70	9.72
22.60	8.90	40TH	24.70	9.72
22.70	8.94	45TH	24.90	9.80
22.80	8.98	50TH	25.10	9.88
22.90	9.02	55TH	25.30	9.96
23.10	9.09	60TH	25.40	10.00
23.30	9.17	65TH	25.60	10.08
23.40	9.21	70TH	25.70	10.12
23.70	9.33	75TH	26.00	10.24
23.80	9.37	80TH	26.30	10.35
24.20	9.53	85TH	26.60	10.47
24.40	9.61	90TH	26.80	10.55
24.80	9.76	95TH	27.50	10.83
25.00	9.84	97TH	27.70	10.91
25.40	10.00	98TH	27.90	10.98
25.70	10.12	99TH	28.40	11.18

(6) BALL OF FOOT CIRCUMFERENCE

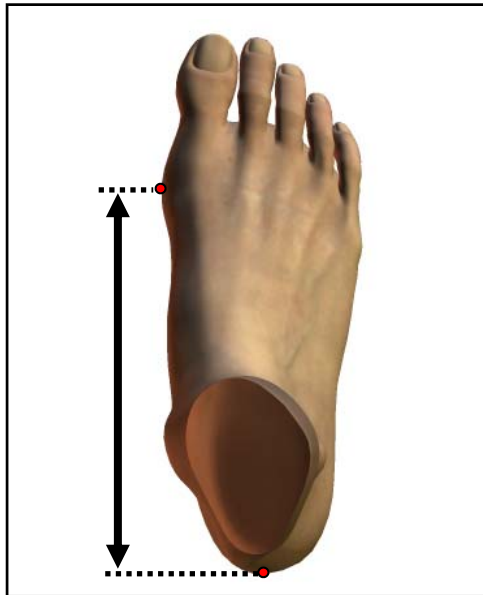
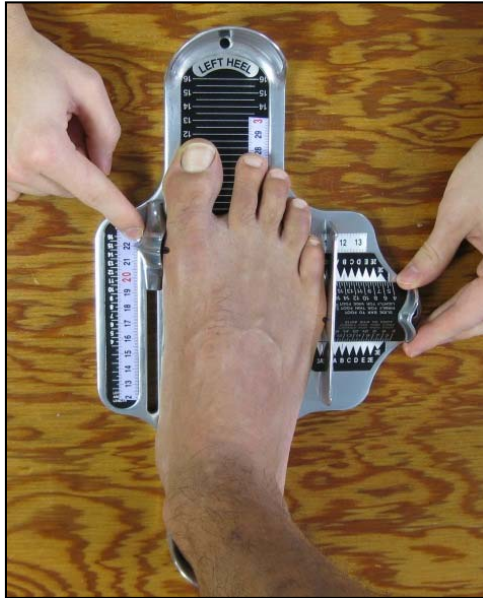
FEMALES		
<u>CM</u>		<u>IN</u>
22.81	MEAN	8.98
0.06	STD ERROR (MEAN)	0.02
1.22	STANDARD DEVIATION	0.48
0.04	STD ERROR (STD DEV)	0.02
19.70	MINIMUM	7.76
26.50	MAXIMUM	10.43
SKEWNESS		0.08
KURTOSIS		2.75
COEFFICIENT OF VARIATION		5.4%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
25.17	MEAN	9.91
0.04	STD ERROR (MEAN)	0.02
1.28	STANDARD DEVIATION	0.50
0.03	STD ERROR (STD DEV)	0.01
21.50	MINIMUM	8.46
29.30	MAXIMUM	11.54
SKEWNESS		0.26
KURTOSIS		3.00
COEFFICIENT OF VARIATION		5.1%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES								MALES			
F	FPct	CumF	CumFPct	<u>CM</u>				F	FPct	CumF	CumFPct
1	0.25	1	0.25	19.60	-	19.85					
1	0.25	2	0.51	19.85	-	20.10					
4	1.01	6	1.52	20.10	-	20.35					
4	1.01	10	2.53	20.35	-	20.60					
8	2.03	18	4.56	20.60	-	20.85					
4	1.01	22	5.57	20.85	-	21.10					
13	3.29	35	8.86	21.10	-	21.35					
15	3.80	50	12.66	21.35	-	21.60		1	0.10	1	0.10
37	9.37	87	22.03	21.60	-	21.85		0	0.00	1	0.10
18	4.56	105	26.58	21.85	-	22.10		1	0.10	2	0.20
24	6.08	129	32.66	22.10	-	22.35		12	1.23	14	1.43
21	5.32	150	37.97	22.35	-	22.60		6	0.61	20	2.05
56	14.18	206	52.15	22.60	-	22.85		20	2.05	40	4.09
26	6.58	232	58.73	22.85	-	23.10		9	0.92	49	5.02
32	8.10	264	66.84	23.10	-	23.35		27	2.76	76	7.78
23	5.82	287	72.66	23.35	-	23.60		28	2.87	104	10.64
32	8.10	319	80.76	23.60	-	23.85		61	6.24	165	16.89
19	4.81	338	85.57	23.85	-	24.10		24	2.46	189	19.34
11	2.78	349	88.35	24.10	-	24.35		65	6.65	254	26.00
15	3.80	364	92.15	24.35	-	24.60		59	6.04	313	32.04
13	3.29	377	95.44	24.60	-	24.85		123	12.59	436	44.63
5	1.27	382	96.71	24.85	-	25.10		63	6.45	499	51.07
4	1.01	386	97.72	25.10	-	25.35		83	8.50	582	59.57
2	0.51	388	98.23	25.35	-	25.60		70	7.16	652	66.73
3	0.76	391	98.99	25.60	-	25.85		83	8.50	735	75.23
1	0.25	392	99.24	25.85	-	26.10		37	3.79	772	79.02
0	0.00	392	99.24	26.10	-	26.35		35	3.58	807	82.60
3	0.76	395	100.00	26.35	-	26.60		37	3.79	844	86.39
				26.60	-	26.85		54	5.53	898	91.91
				26.85	-	27.10		16	1.64	914	93.55
				27.10	-	27.35		19	1.94	933	95.50
				27.35	-	27.60		11	1.13	944	96.62
				27.60	-	27.85		18	1.84	962	98.46
				27.85	-	28.10		5	0.51	967	98.98
				28.10	-	28.35		4	0.41	971	99.39
				28.35	-	28.60		1	0.10	972	99.49
				28.60	-	28.85		2	0.20	974	99.69
				28.85	-	29.10		1	0.10	975	99.80
				29.10	-	29.35		2	0.20	977	100.00

(7) BALL OF FOOT LENGTH

The distance from the back of the heel to the landmark at the first metatarsophalangeal protrusion is measured with the Brannock Device®. The participant stands erect with the right foot in the Brannock Device® and the other foot on a board of equal height. The weight is distributed equally on both feet. The medial side of the right foot is parallel with the long axis of the device.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
16.40	6.46	1ST	18.00	7.09
16.40	6.46	2ND	18.10	7.13
16.60	6.54	3RD	18.40	7.24
16.90	6.65	5TH	18.70	7.36
17.20	6.77	10TH	19.00	7.48
17.30	6.81	15TH	19.30	7.60
17.40	6.85	20TH	19.40	7.64
17.60	6.93	25TH	19.50	7.68
17.70	6.97	30TH	19.70	7.76
17.80	7.01	35TH	19.80	7.80
17.90	7.05	40TH	19.90	7.83
18.00	7.09	45TH	20.00	7.87
18.10	7.13	50TH	20.10	7.91
18.30	7.20	55TH	20.20	7.95
18.40	7.24	60TH	20.40	8.03
18.60	7.32	65TH	20.50	8.07
18.70	7.36	70TH	20.70	8.15
18.80	7.40	75TH	20.80	8.19
19.00	7.48	80TH	21.00	8.27
19.30	7.60	85TH	21.10	8.31
19.40	7.64	90TH	21.40	8.43
19.60	7.72	95TH	21.80	8.58
19.90	7.83	97TH	22.10	8.70
20.00	7.87	98TH	22.30	8.78
20.30	7.99	99TH	22.50	8.86

(7) BALL OF FOOT LENGTH

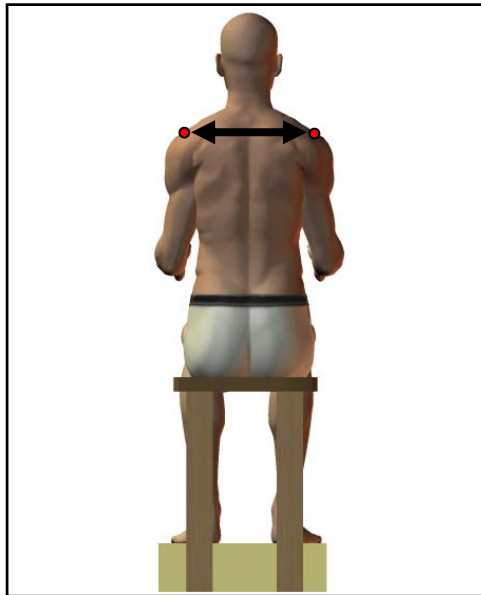
FEMALES		
<u>CM</u>		<u>IN</u>
18.21	MEAN	7.17
0.05	STD ERROR (MEAN)	0.02
0.89	STANDARD DEVIATION	0.35
0.03	STD ERROR (STD DEV)	0.01
15.70	MINIMUM	6.18
20.80	MAXIMUM	8.19
SKEWNESS		0.08
KURTOSIS		2.73
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
20.18	MEAN	7.94
0.03	STD ERROR (MEAN)	0.01
0.94	STANDARD DEVIATION	0.37
0.02	STD ERROR (STD DEV)	0.01
17.00	MINIMUM	6.69
23.30	MAXIMUM	9.17
SKEWNESS		0.12
KURTOSIS		3.13
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES								MALES			
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct		
2	0.51	2	0.51	15.55	-	15.75					
0	0.00	2	0.51	15.75	-	15.95					
0	0.00	2	0.51	15.95	-	16.15					
0	0.00	2	0.51	16.15	-	16.35					
3	0.76	5	1.27	16.35	-	16.55					
5	1.27	10	2.53	16.55	-	16.75					
3	0.76	13	3.29	16.75	-	16.95					
12	3.04	25	6.33	16.95	-	17.15					
22	5.57	47	11.90	17.15	-	17.35	1	0.10	1	0.10	
26	6.58	73	18.48	17.35	-	17.55	0	0.00	1	0.10	
19	4.81	92	23.29	17.35	-	17.55	1	0.10	2	0.20	
37	9.37	129	32.66	17.55	-	17.75	2	0.20	4	0.41	
35	8.86	164	41.52	17.75	-	17.95	6	0.61	10	1.02	
35	8.86	199	50.38	17.95	-	18.15	10	1.02	20	2.05	
28	7.09	227	57.47	18.15	-	18.35	6	0.61	26	2.66	
30	7.59	257	65.06	18.35	-	18.55	12	1.23	38	3.89	
29	7.34	286	72.41	18.55	-	18.75	15	1.54	53	5.42	
24	6.08	310	78.48	18.75	-	18.95	37	3.79	90	9.21	
23	5.82	333	84.30	18.95	-	19.15	36	3.68	126	12.90	
27	6.84	360	91.14	19.15	-	19.35	44	4.50	170	17.40	
11	2.78	371	93.92	19.35	-	19.55	80	8.19	250	25.59	
8	2.03	379	95.95	19.55	-	19.75	70	7.16	320	32.75	
6	1.52	385	97.47	19.75	-	19.95	76	7.78	396	40.53	
4	1.01	389	98.48	19.95	-	20.15	88	9.01	484	49.54	
4	1.01	393	99.49	20.15	-	20.35	61	6.24	545	55.78	
4	1.01	393	99.49	20.35	-	20.55	95	9.72	640	65.51	
1	0.25	394	99.75	20.55	-	20.75	82	8.39	722	73.90	
1	0.25	395	100.00	20.75	-	20.95	52	5.32	774	79.22	
				20.95	-	21.15	64	6.55	838	85.77	
				21.15	-	21.35	33	3.38	871	89.15	
				21.35	-	21.55	36	3.68	907	92.84	
				21.55	-	21.75	18	1.84	925	94.68	
				21.75	-	21.95	13	1.33	938	96.01	
				21.95	-	22.15	13	1.33	951	97.34	
				22.15	-	22.35	8	0.82	959	98.16	
				22.35	-	22.55	12	1.23	971	99.39	
				22.55	-	22.75	3	0.31	974	99.69	
				22.75	-	22.95	0	0.00	974	99.69	
				22.95	-	23.15	1	0.10	975	99.80	
				23.15	-	23.35	2	0.20	977	100.00	

(8) BIACROMIAL BREADTH

The distance between the right and left acromion landmarks is measured with a beam caliper. The participant sits erect. The shoulders and upper arms are relaxed, and the forearms and hands are extended forward horizontally with the palms facing each other. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
33.30	13.11	1ST	36.10	14.21
33.40	13.15	2ND	37.40	14.72
33.70	13.27	3RD	37.90	14.92
34.10	13.43	5TH	38.70	15.24
34.40	13.54	10TH	39.30	15.47
35.00	13.78	15TH	39.70	15.63
35.30	13.90	20TH	40.10	15.79
35.50	13.98	25TH	40.30	15.87
35.70	14.06	30TH	40.60	15.98
36.00	14.17	35TH	40.90	16.10
36.20	14.25	40TH	41.20	16.22
36.40	14.33	45TH	41.40	16.30
36.60	14.41	50TH	41.70	16.42
36.70	14.45	55TH	41.90	16.50
37.00	14.57	60TH	42.20	16.61
37.20	14.65	65TH	42.30	16.65
37.50	14.76	70TH	42.60	16.77
37.80	14.88	75TH	43.00	16.93
38.00	14.96	80TH	43.40	17.09
38.30	15.08	85TH	43.70	17.20
38.70	15.24	90TH	44.20	17.40
39.50	15.55	95TH	45.10	17.76
39.70	15.63	97TH	45.60	17.95
40.00	15.75	98TH	45.90	18.07
40.40	15.91	99TH	46.40	18.27

(8) BIACROMIAL BREADTH

FEMALES		
<u>CM</u>		<u>IN</u>
36.64	MEAN	14.42
0.08	STD ERROR (MEAN)	0.03
1.63	STANDARD DEVIATION	0.64
0.06	STD ERROR (STD DEV)	0.02
30.50	MINIMUM	12.01
42.00	MAXIMUM	16.54
SKEWNESS		0.14
KURTOSIS		2.78
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
41.68	MEAN	16.41
0.06	STD ERROR (MEAN)	0.03
1.99	STANDARD DEVIATION	0.78
0.05	STD ERROR (STD DEV)	0.02
34.40	MINIMUM	13.54
50.30	MAXIMUM	19.80
SKEWNESS		-0.03
KURTOSIS		3.66
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	30.25 - 30.75							
0	0.00	1	0.25	30.75 - 31.25							
0	0.00	1	0.25	31.25 - 31.75							
0	0.00	1	0.25	31.75 - 32.25							
1	0.25	2	0.51	32.25 - 32.75							
3	0.76	5	1.27	32.75 - 33.25							
7	1.77	12	3.04	33.25 - 33.75							
11	2.78	23	5.82	33.75 - 34.25							
19	4.81	42	10.63	34.25 - 34.75	2	0.20	2	0.20			
25	6.33	67	16.96	34.75 - 35.25	2	0.20	4	0.41			
46	11.65	113	28.61	35.25 - 35.75	2	0.20	6	0.61			
37	9.37	150	37.97	35.75 - 36.25	5	0.51	11	1.13			
50	12.66	200	50.63	36.25 - 36.75	2	0.20	13	1.33			
41	10.38	241	61.01	36.75 - 37.25	5	0.51	18	1.84			
44	11.14	285	72.15	37.25 - 37.75	15	1.54	33	3.38			
39	9.87	324	82.03	37.75 - 38.25	13	1.33	46	4.71			
27	6.84	351	88.86	38.25 - 38.75	17	1.74	63	6.45			
10	2.53	361	91.39	38.75 - 39.25	38	3.89	101	10.34			
18	4.56	379	95.95	39.25 - 39.75	67	6.86	168	17.20			
7	1.77	386	97.72	39.75 - 40.25	75	7.68	243	24.87			
5	1.27	391	98.99	40.25 - 40.75	89	9.11	332	33.98			
1	0.25	392	99.24	40.75 - 41.25	81	8.29	413	42.27			
1	0.25	393	99.49	41.25 - 41.75	120	12.28	533	54.55			
2	0.51	395	100.00	41.75 - 42.25	103	10.54	636	65.10			
				42.25 - 42.75	81	8.29	717	73.39			
				42.75 - 43.25	67	6.86	784	80.25			
				43.25 - 43.75	68	6.96	852	87.21			
				43.75 - 44.25	40	4.09	892	91.30			
				44.25 - 44.75	31	3.17	923	94.47			
				44.75 - 45.25	18	1.84	941	96.32			
				45.25 - 45.75	17	1.74	958	98.06			
				45.75 - 46.25	10	1.02	968	99.08			
				46.25 - 46.75	7	0.72	975	99.80			
				46.75 - 47.25	0	0.00	975	99.80			
				47.25 - 47.75	1	0.10	976	99.90			
				47.75 - 48.25	0	0.00	976	99.90			
				48.25 - 48.75	0	0.00	976	99.90			
				48.75 - 49.25	0	0.00	976	99.90			
				49.25 - 49.75	0	0.00	976	99.90			
				49.75 - 50.25	0	0.00	976	99.90			
				50.25 - 50.75	1	0.10	977	100.00			

(9) BICEPS CIRCUMFERENCE, FLEXED

The circumference of the right upper arm around the flexed biceps brachii muscle at the biceps point landmark is measured with a tape held perpendicular to the long axis of the upper arm. The participant stands with the upper arm extended horizontally and the elbow flexed 90°. The fist is clenched and held facing the head, and the participant exerts maximum effort in contracting the biceps brachii muscle.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
25.10	9.88	1ST	30.00	11.81
25.30	9.96	2ND	30.90	12.17
25.50	10.04	3RD	31.50	12.40
26.10	10.28	5TH	32.20	12.68
26.90	10.59	10TH	33.20	13.07
27.50	10.83	15TH	33.60	13.23
28.00	11.02	20TH	34.10	13.43
28.40	11.18	25TH	34.50	13.58
28.60	11.26	30TH	34.90	13.74
29.00	11.42	35TH	35.30	13.90
29.60	11.65	40TH	35.50	13.98
29.90	11.77	45TH	36.00	14.17
30.40	11.97	50TH	36.30	14.29
30.60	12.05	55TH	36.70	14.45
30.90	12.17	60TH	37.10	14.61
31.20	12.28	65TH	37.40	14.72
31.60	12.44	70TH	37.90	14.92
32.20	12.68	75TH	38.50	15.16
32.80	12.91	80TH	38.90	15.31
33.70	13.27	85TH	39.50	15.55
34.40	13.54	90TH	40.40	15.91
36.00	14.17	95TH	42.00	16.54
36.90	14.53	97TH	42.90	16.89
37.30	14.69	98TH	44.00	17.32
38.80	15.28	99TH	45.10	17.76

(9) BICEPS CIRCUMFERENCE, FLEXED

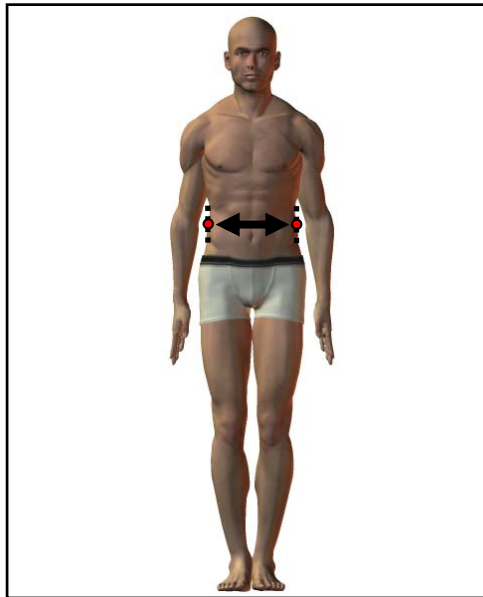
FEMALES		
<u>CM</u>		<u>IN</u>
30.47	MEAN	12.00
0.15	STD ERROR (MEAN)	0.06
2.94	STANDARD DEVIATION	1.16
0.10	STD ERROR (STD DEV)	0.04
24.50	MINIMUM	9.65
39.20	MAXIMUM	15.43
SKEWNESS		0.52
KURTOSIS		3.04
COEFFICIENT OF VARIATION		9.6%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
36.57	MEAN	14.40
0.10	STD ERROR (MEAN)	0.04
2.98	STANDARD DEVIATION	1.17
0.07	STD ERROR (STD DEV)	0.03
27.60	MINIMUM	10.87
46.90	MAXIMUM	18.46
SKEWNESS		0.45
KURTOSIS		3.48
COEFFICIENT OF VARIATION		8.1%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES								MALES			
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct		
				24.25	-	24.75					
2	0.51	2	0.51	24.75	-	25.25					
6	1.52	8	2.03	25.25	-	25.75					
8	2.03	16	4.05	25.75	-	26.25					
6	1.52	22	5.57	26.25	-	26.75					
10	2.53	32	8.10	26.75	-	27.25					
14	3.54	46	11.65	27.25	-	27.75					
20	5.06	66	16.71	27.75	-	28.25	1	0.10	1	0.10	
25	6.33	91	23.04	28.25	-	28.75	1	0.10	2	0.20	
26	6.58	117	29.62	28.75	-	29.25	3	0.31	5	0.51	
25	6.33	142	35.95	29.25	-	29.75	0	0.00	5	0.51	
21	5.32	163	41.27	29.75	-	30.25	4	0.41	9	0.92	
28	7.09	191	48.35	30.25	-	30.75	7	0.72	16	1.64	
33	8.35	224	56.71	30.75	-	31.25	4	0.41	20	2.05	
43	10.89	267	67.59	31.25	-	31.75	12	1.23	32	3.28	
19	4.81	286	72.41	31.75	-	32.25	15	1.54	47	4.81	
16	4.05	302	76.46	32.25	-	32.75	24	2.46	71	7.27	
16	4.05	318	80.51	32.75	-	33.25	37	3.79	108	11.05	
10	2.53	328	83.04	33.25	-	33.75	38	3.89	146	14.94	
10	2.53	338	85.57	33.75	-	34.25	51	5.22	197	20.16	
15	3.80	353	89.37	34.25	-	34.75	60	6.14	257	26.31	
6	1.52	359	90.89	34.75	-	35.25	51	5.22	308	31.53	
5	1.27	364	92.15	35.25	-	35.75	61	6.24	369	37.77	
7	1.77	371	93.92	35.75	-	36.25	76	7.78	445	45.55	
6	1.52	377	95.44	36.25	-	36.75	68	6.96	513	52.51	
5	1.27	382	96.71	36.75	-	37.25	69	7.06	582	59.57	
3	0.76	385	97.47	37.25	-	37.75	75	7.68	657	67.25	
2	0.51	387	97.97	37.75	-	38.25	44	4.50	701	71.75	
1	0.25	388	98.23	38.25	-	38.75	39	3.99	740	75.74	
2	0.51	390	98.73	38.75	-	39.25	42	4.30	782	80.04	
5	1.27	395	100.00	39.25	-	39.75	43	4.40	825	84.44	
				39.75	-	40.25	26	2.66	851	87.10	
				40.25	-	40.75	34	3.48	885	90.58	
				40.75	-	41.25	19	1.94	904	92.53	
				41.25	-	41.75	19	1.94	923	94.47	
				41.75	-	42.25	8	0.82	931	95.29	
				42.25	-	42.75	9	0.92	940	96.21	
				42.75	-	43.25	6	0.61	946	96.83	
				43.25	-	43.75	9	0.92	955	97.75	
				43.75	-	44.25	4	0.41	959	98.16	
				44.25	-	44.75	3	0.31	962	98.46	
				44.75	-	45.25	4	0.41	966	98.87	
				45.25	-	45.75	4	0.41	970	99.28	
				45.75	-	46.25	3	0.31	973	99.59	
				46.25	-	46.75	1	0.10	974	99.69	
				46.75	-	47.25	2	0.20	976	99.90	
				47.25	-		1	0.10	977	100.00	

(10) BICRISTAL BREADTH

The straight-line distance between the right and left iliacristale landmarks is measured with a beam caliper. The participant stands erect, looking straight ahead. The tissue is firmly compressed to ensure the measurement is taken on the bony landmarks.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
23.90	9.41	1ST	24.50	9.65
24.00	9.45	2ND	24.90	9.80
24.10	9.49	3RD	25.10	9.88
25.00	9.84	5TH	25.50	10.04
25.60	10.08	10TH	26.00	10.24
26.00	10.24	15TH	26.40	10.39
26.30	10.35	20TH	26.70	10.51
26.60	10.47	25TH	26.90	10.59
27.00	10.63	30TH	27.20	10.71
27.10	10.67	35TH	27.40	10.79
27.30	10.75	40TH	27.70	10.91
27.50	10.83	45TH	28.00	11.02
27.70	10.91	50TH	28.20	11.10
28.00	11.02	55TH	28.40	11.18
28.20	11.10	60TH	28.60	11.26
28.40	11.18	65TH	28.80	11.34
28.60	11.26	70TH	29.00	11.42
29.00	11.42	75TH	29.20	11.50
29.40	11.57	80TH	29.50	11.61
29.80	11.73	85TH	29.80	11.73
30.40	11.97	90TH	30.20	11.89
31.00	12.20	95TH	30.70	12.09
31.90	12.56	97TH	31.10	12.24
32.20	12.68	98TH	31.30	12.32
33.40	13.15	99TH	32.20	12.68

(10) BICRISTAL BREADTH

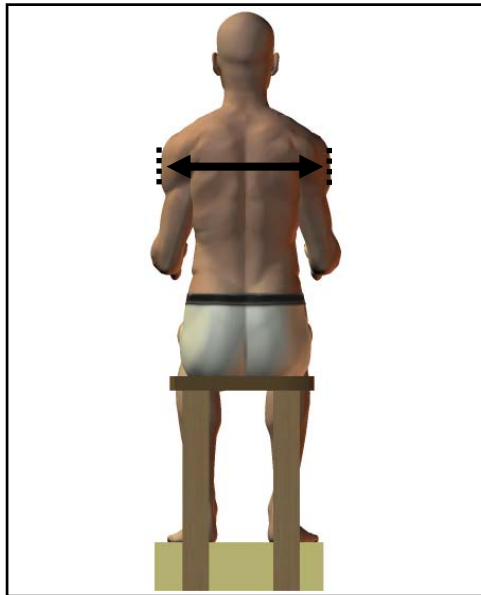
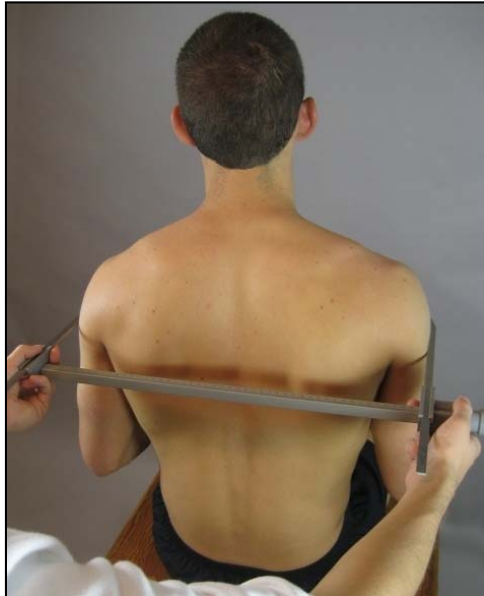
FEMALES		
CM		IN
27.87	MEAN	10.97
0.10	STD ERROR (MEAN)	0.04
1.90	STANDARD DEVIATION	0.75
0.07	STD ERROR (STD DEV)	0.03
22.50	MINIMUM	8.86
34.70	MAXIMUM	13.66
SKEWNESS		0.41
KURTOSIS		3.61
COEFFICIENT OF VARIATION		6.8%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
28.10	MEAN	11.06
0.05	STD ERROR (MEAN)	0.02
1.64	STANDARD DEVIATION	0.65
0.04	STD ERROR (STD DEV)	0.01
22.90	MINIMUM	9.02
34.20	MAXIMUM	13.46
SKEWNESS		0.06
KURTOSIS		3.04
COEFFICIENT OF VARIATION		5.8%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	CM	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	22.35	-	22.60					
1	0.25	2	0.51	22.60	-	22.85					
2	0.51	4	1.01	22.85	-	23.10	1	0.10			
2	0.51	6	1.52	23.10	-	23.35	1	0.10			
3	0.76	9	2.28	23.35	-	23.60	0	0.00			
4	1.01	13	3.29	23.60	-	23.85	3	0.31			
7	1.77	20	5.06	23.85	-	24.10	1	0.10			
7	1.77	27	6.84	24.10	-	24.35	2	0.20			
3	0.76	30	7.59	24.35	-	24.60	6	0.61			
4	1.01	34	8.61	24.60	-	24.85	8	0.82			
12	3.04	46	11.65	24.85	-	25.10	11	1.13			
13	3.29	59	14.94	25.10	-	25.35	14	1.43			
8	2.03	67	16.96	25.35	-	25.60	22	2.25			
16	4.05	83	21.01	25.60	-	25.85	29	2.97			
14	3.54	97	24.56	25.85	-	26.10	12	1.23			
21	5.32	118	29.87	26.10	-	26.35	47	4.81			
8	2.03	126	31.90	26.35	-	26.60	38	3.89			
19	4.81	145	36.71	26.60	-	26.85	68	6.96			
14	3.54	159	40.25	26.85	-	27.10	37	3.79			
26	6.58	185	46.84	27.10	-	27.35	53	5.42			
23	5.82	208	52.66	27.35	-	27.60	45	4.61			
25	6.33	233	58.99	27.60	-	27.85	63	6.45			
12	3.04	245	62.03	27.85	-	28.10	43	4.40			
23	5.82	268	67.85	28.10	-	28.35	78	7.98			
23	5.82	291	73.67	28.35	-	28.60	38	3.89			
18	4.56	309	78.23	28.60	-	28.85	72	7.37			
12	3.04	321	81.27	28.85	-	29.10	38	3.89			
12	3.04	333	84.30	29.10	-	29.35	55	5.63			
9	2.28	342	86.58	29.35	-	29.60	35	3.58			
9	2.28	351	88.86	29.60	-	29.85	33	3.38			
6	1.52	357	90.38	29.85	-	30.10	20	2.05			
7	1.77	364	92.15	30.10	-	30.35	32	3.28			
7	1.77	371	93.92	30.35	-	30.60	17	1.74			
5	1.27	376	95.19	30.60	-	30.85	20	2.05			
3	0.76	379	95.95	30.85	-	31.10	8	0.82			
2	0.51	381	96.46	31.10	-	31.35	10	1.02			
2	0.51	383	96.96	31.35	-	31.60	4	0.41			
0	0.00	383	96.96	31.60	-	31.85	4	0.41			
3	0.76	386	97.72	31.85	-	32.10	2	0.20			
2	0.51	388	98.23	32.10	-	32.35	2	0.20			
2	0.51	390	98.73	32.35	-	32.60	1	0.10			
2	0.51	392	99.24	32.60	-	32.85	1	0.10			
0	0.00	392	99.24	32.85	-	33.10	0	0.00			
0	0.00	392	99.24	33.10	-	33.35	1	0.10			
1	0.25	393	99.49	33.35	-	33.60	0	0.00			
1	0.25	394	99.75	33.60	-	33.85	0	0.00			
0	0.00	394	99.75	33.85	-	34.10	1	0.10			
0	0.00	394	99.75	34.10	-	34.35	1	0.10			
0	0.00	394	99.75	34.35	-	34.60					
1	0.25	395	100.00	34.60	-	34.85					

(11) BIDELTOID BREADTH

The maximum horizontal distance between the lateral margins of the upper arms on the deltoid muscles is measured with a beam caliper. The participant sits erect, looking straight ahead. The shoulders and upper arms are relaxed, and the forearms and hands are extended forward horizontally with the palms facing each other. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
38.90	15.31	1ST	44.70	17.60
40.40	15.91	2ND	45.40	17.87
40.50	15.94	3RD	45.70	17.99
40.70	16.02	5TH	46.60	18.35
41.40	16.30	10TH	47.90	18.86
42.10	16.57	15TH	48.50	19.09
42.60	16.77	20TH	49.00	19.29
43.00	16.93	25TH	49.50	19.49
43.50	17.13	30TH	49.90	19.65
44.00	17.32	35TH	50.30	19.80
44.50	17.52	40TH	50.70	19.96
44.70	17.60	45TH	51.10	20.12
45.00	17.72	50TH	51.50	20.28
45.30	17.83	55TH	51.90	20.43
45.60	17.95	60TH	52.20	20.55
46.20	18.19	65TH	52.70	20.75
46.70	18.39	70TH	53.20	20.94
47.00	18.50	75TH	53.90	21.22
47.40	18.66	80TH	54.50	21.46
48.00	18.90	85TH	54.90	21.61
48.80	19.21	90TH	55.80	21.97
49.80	19.61	95TH	56.80	22.36
50.50	19.88	97TH	57.70	22.72
51.40	20.24	98TH	58.20	22.91
51.90	20.43	99TH	59.40	23.39

(11) BIDELOID BREADTH

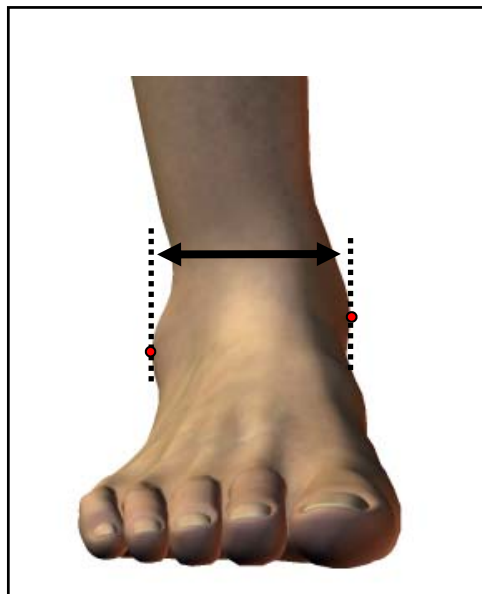
FEMALES		
CM		IN
45.12	MEAN	17.76
0.14	STD ERROR (MEAN)	0.06
2.84	STANDARD DEVIATION	1.12
0.10	STD ERROR (STD DEV)	0.04
38.40	MINIMUM	15.12
54.60	MAXIMUM	21.50
SKEWNESS		0.35
KURTOSIS		3.27
COEFFICIENT OF VARIATION		6.3%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
51.66	MEAN	20.34
0.10	STD ERROR (MEAN)	0.04
3.17	STANDARD DEVIATION	1.25
0.07	STD ERROR (STD DEV)	0.03
41.20	MINIMUM	16.22
62.70	MAXIMUM	24.69
SKEWNESS		0.16
KURTOSIS		3.13
COEFFICIENT OF VARIATION		6.1%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	CM	F	FPct	CumF	CumFPct			
2	0.51	2	0.51	38.25	-	38.75					
3	0.76	5	1.27	38.75	-	39.25					
2	0.51	7	1.77	39.25	-	39.75					
0	0.00	7	1.77	39.75	-	40.25					
11	2.78	18	4.56	40.25	-	40.75					
14	3.54	32	8.10	40.75	-	41.25	1	0.10			
18	4.56	50	12.66	41.25	-	41.75	1	0.10			
15	3.80	65	16.46	41.75	-	42.25	1	0.10			
14	3.54	79	20.00	42.25	-	42.75	2	0.20			
28	7.09	107	27.09	42.75	-	43.25	0	0.00			
17	4.30	124	31.39	43.25	-	43.75	2	0.20			
26	6.58	150	37.97	43.75	-	44.25	4	0.41			
27	6.84	177	44.81	44.25	-	44.75	6	0.61			
37	9.37	214	54.18	44.75	-	45.25	3	0.31			
29	7.34	243	61.52	45.25	-	45.75	13	1.33			
16	4.05	259	65.57	45.75	-	46.25	17	1.74			
22	5.57	281	71.14	46.25	-	46.75	18	1.84			
30	7.59	311	78.73	46.75	-	47.25	17	1.74			
18	4.56	329	83.29	47.25	-	47.75	36	3.68			
13	3.29	342	86.58	47.75	-	48.25	44	4.50			
10	2.53	352	89.11	48.25	-	48.75	50	5.12			
11	2.78	363	91.90	48.75	-	49.25	48	4.91			
7	1.77	370	93.67	49.25	-	49.75	73	7.47			
6	1.52	376	95.19	49.75	-	50.25	73	7.47			
3	0.76	379	95.95	50.25	-	50.75	60	6.14			
4	1.01	383	96.96	50.75	-	51.25	54	5.53			
6	1.52	389	98.48	51.25	-	51.75	62	6.35			
2	0.51	391	98.99	51.75	-	52.25	67	6.86			
1	0.25	392	99.24	52.25	-	52.75	52	5.32			
0	0.00	392	99.24	52.75	-	53.25	44	4.50			
0	0.00	392	99.24	53.25	-	53.75	30	3.07			
1	0.25	393	99.49	53.75	-	54.25	38	3.89			
2	0.51	395	100.00	54.25	-	54.75	42	4.30			
				54.75	-	55.25	23	2.35			
				55.25	-	55.75	20	2.05			
				55.75	-	56.25	19	1.94			
				56.25	-	56.75	16	1.64			
				56.75	-	57.25	7	0.72			
				57.25	-	57.75	12	1.23			
				57.75	-	58.25	6	0.61			
				58.25	-	58.75	2	0.20			
				58.75	-	59.25	4	0.41			
				59.25	-	59.75	3	0.31			
				59.75	-	60.25	1	0.10			
				60.25	-	60.75	1	0.10			
				60.75	-	61.25	1	0.10			
				61.25	-	61.75	3	0.31			
				61.75	-	62.25	0	0.00			
				62.25	-	62.75	1	0.10			

(12) BIMALLEOLAR BREADTH

The horizontal distance between the maximum protrusions of the ankle bones (lateral and medial malleoli) of the right foot is measured with a Holtain caliper. The participant stands with the weight equally distributed on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
6.00	2.36	1ST	6.80	2.68
6.00	2.36	2ND	6.90	2.72
6.10	2.40	3RD	6.90	2.72
6.20	2.44	5TH	7.00	2.76
6.30	2.48	10TH	7.10	2.80
6.40	2.52	15TH	7.20	2.83
6.50	2.56	20TH	7.30	2.87
6.50	2.56	25TH	7.40	2.91
6.50	2.56	30TH	7.40	2.91
6.60	2.60	35TH	7.40	2.91
6.60	2.60	40TH	7.50	2.95
6.70	2.64	45TH	7.50	2.95
6.70	2.64	50TH	7.60	2.99
6.70	2.64	55TH	7.60	2.99
6.80	2.68	60TH	7.70	3.03
6.80	2.68	65TH	7.70	3.03
6.90	2.72	70TH	7.80	3.07
6.90	2.72	75TH	7.80	3.07
7.00	2.76	80TH	7.90	3.11
7.00	2.76	85TH	8.00	3.15
7.10	2.80	90TH	8.10	3.19
7.30	2.87	95TH	8.20	3.23
7.40	2.91	97TH	8.30	3.27
7.40	2.91	98TH	8.40	3.31
7.50	2.95	99TH	8.40	3.31

(12) BIMALLEOLAR BREADTH

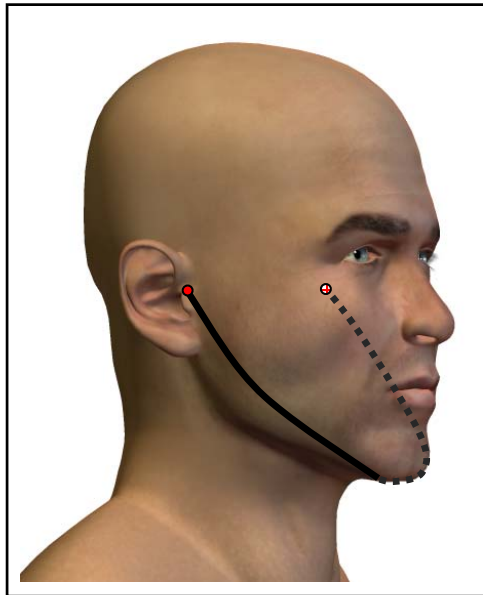
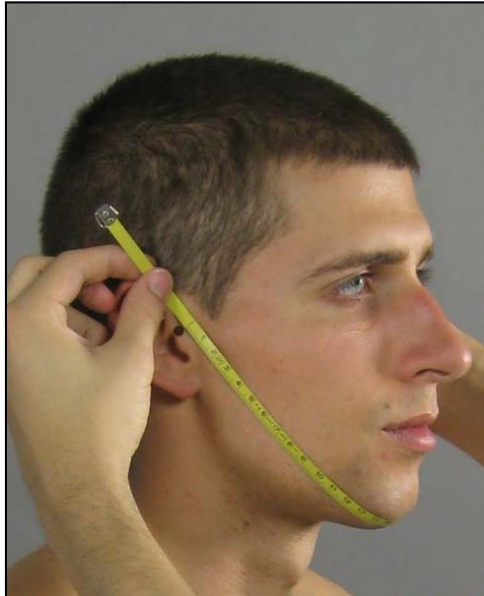
FEMALES		
<u>CM</u>		<u>IN</u>
6.72	MEAN	2.65
0.02	STD ERROR (MEAN)	0.01
0.32	STANDARD DEVIATION	0.13
0.01	STD ERROR (STD DEV)	0.00
5.90	MINIMUM	2.32
8.20	MAXIMUM	3.23
SKEWNESS		0.15
KURTOSIS		3.05
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
7.60	MEAN	2.99
0.01	STD ERROR (MEAN)	0.00
0.36	STANDARD DEVIATION	0.14
0.01	STD ERROR (STD DEV)	0.00
6.30	MINIMUM	2.48
8.90	MAXIMUM	3.50
SKEWNESS		0.11
KURTOSIS		3.16
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
2	0.51	2	0.51	5.85 - 5.95							
6	1.52	8	2.03	5.95 - 6.05							
8	2.03	16	4.05	6.05 - 6.15							
11	2.78	27	6.84	6.15 - 6.25							
10	2.53	37	9.37	6.25 - 6.35	1	0.10	1	0.10			
35	8.86	72	18.23	6.35 - 6.45	1	0.10	2	0.20			
42	10.63	114	28.86	6.45 - 6.55	1	0.10	3	0.31			
54	13.67	168	42.53	6.55 - 6.65	2	0.20	5	0.51			
48	12.15	216	54.68	6.65 - 6.75	2	0.20	7	0.72			
49	12.41	265	67.09	6.75 - 6.85	7	0.72	14	1.43			
35	8.86	300	75.95	6.85 - 6.95	18	1.84	32	3.28			
38	9.62	338	85.57	6.95 - 7.05	30	3.07	62	6.35			
23	5.82	361	91.39	7.05 - 7.15	48	4.91	110	11.26			
10	2.53	371	93.92	7.15 - 7.25	49	5.02	159	16.27			
6	1.52	377	95.44	7.25 - 7.35	61	6.24	220	22.52			
12	3.04	389	98.48	7.35 - 7.45	127	13.00	347	35.52			
2	0.51	391	98.99	7.45 - 7.55	98	10.03	445	45.55			
3	0.76	394	99.75	7.55 - 7.65	102	10.44	547	55.99			
0	0.00	394	99.75	7.65 - 7.75	116	11.87	663	67.86			
0	0.00	394	99.75	7.75 - 7.85	100	10.24	763	78.10			
0	0.00	394	99.75	7.85 - 7.95	58	5.94	821	84.03			
0	0.00	394	99.75	7.95 - 8.05	50	5.12	871	89.15			
0	0.00	394	99.75	8.05 - 8.15	46	4.71	917	93.86			
1	0.25	395	100.00	8.15 - 8.25	24	2.46	941	96.32			
				8.25 - 8.35	10	1.02	951	97.34			
				8.35 - 8.45	16	1.64	967	98.98			
				8.45 - 8.55	3	0.31	970	99.28			
				8.55 - 8.65	3	0.31	973	99.59			
				8.65 - 8.75	3	0.31	976	99.90			
				8.75 - 8.85	0	0.00	976	99.90			
				8.85 - 8.95	1	0.10	977	100.00			

(13) BITRAGION CHIN ARC

The surface distance between the right and left trignon landmarks across the chin landmark is measured with a tape. The teeth are lightly occluded.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
28.10	11.06	1ST	30.40	11.97
28.40	11.18	2ND	30.60	12.05
28.60	11.26	3RD	30.80	12.13
28.80	11.34	5TH	31.10	12.24
29.10	11.46	10TH	31.60	12.44
29.50	11.61	15TH	31.90	12.56
29.60	11.65	20TH	32.10	12.64
29.80	11.73	25TH	32.40	12.76
30.00	11.81	30TH	32.50	12.80
30.20	11.89	35TH	32.70	12.87
30.30	11.93	40TH	32.80	12.91
30.40	11.97	45TH	33.00	12.99
30.70	12.09	50TH	33.30	13.11
30.80	12.13	55TH	33.30	13.11
31.00	12.20	60TH	33.50	13.19
31.20	12.28	65TH	33.70	13.27
31.30	12.32	70TH	33.80	13.31
31.50	12.40	75TH	34.10	13.43
31.70	12.48	80TH	34.40	13.54
32.00	12.60	85TH	34.60	13.62
32.20	12.68	90TH	34.80	13.70
32.60	12.83	95TH	35.50	13.98
33.10	13.03	97TH	35.70	14.06
33.30	13.11	98TH	36.00	14.17
33.60	13.23	99TH	36.40	14.33

(13) BITRAGON CHIN ARC

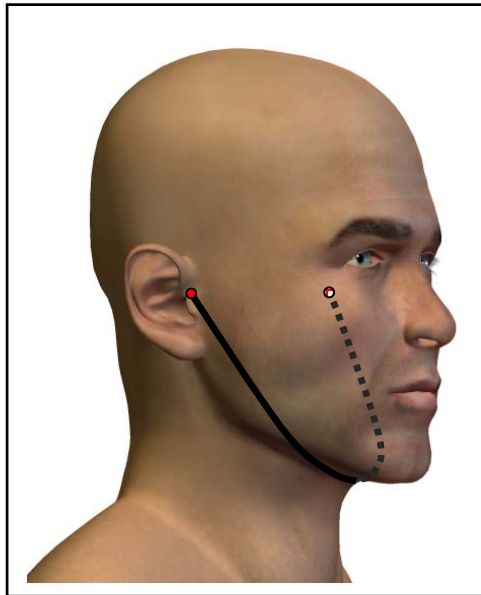
FEMALES		
CM		IN
30.69	MEAN	12.08
0.06	STD ERROR (MEAN)	0.02
1.20	STANDARD DEVIATION	0.47
0.04	STD ERROR (STD DEV)	0.02
27.50	MINIMUM	10.83
36.40	MAXIMUM	14.33
SKEWNESS		0.13
KURTOSIS		2.84
COEFFICIENT OF VARIATION		3.9%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
33.22	MEAN	13.08
0.04	STD ERROR (MEAN)	0.02
1.30	STANDARD DEVIATION	0.51
0.03	STD ERROR (STD DEV)	0.01
28.40	MINIMUM	11.18
37.00	MAXIMUM	14.57
SKEWNESS		0.12
KURTOSIS		3.00
COEFFICIENT OF VARIATION		3.9%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	CM	F	FPct	CumF	CumFPct			
2	0.51	2	0.51	27.35 - 27.60							
2	0.51	4	1.01	27.60 - 27.85							
0	0.00	4	1.01	27.85 - 28.10							
2	0.51	6	1.52	28.10 - 28.35							
2	0.51	8	2.03	28.35 - 28.60	1	0.10	1	0.10			
9	2.28	17	4.30	28.60 - 28.85	1	0.10	2	0.20			
5	1.27	22	5.57	28.85 - 29.10	0	0.00	2	0.20			
18	4.56	40	10.13	29.10 - 29.35	0	0.00	2	0.20			
12	3.04	52	13.16	29.35 - 29.60	0	0.00	2	0.20			
29	7.34	81	20.51	29.60 - 29.85	3	0.31	5	0.51			
19	4.81	100	25.32	29.85 - 30.10	2	0.20	7	0.72			
24	6.08	124	31.39	30.10 - 30.35	5	0.51	12	1.23			
24	6.08	148	37.47	30.35 - 30.60	9	0.92	21	2.15			
31	7.85	179	45.32	30.60 - 30.85	22	2.25	43	4.40			
20	5.06	199	50.38	30.85 - 31.10	13	1.33	56	5.73			
36	9.11	235	59.49	31.10 - 31.35	32	3.28	88	9.01			
28	7.09	263	66.58	31.35 - 31.60	19	1.94	107	10.95			
23	5.82	286	72.41	31.60 - 31.85	61	6.24	168	17.20			
18	4.56	304	76.96	31.85 - 32.10	46	4.71	214	21.90			
29	7.34	333	84.30	32.10 - 32.35	69	7.06	283	28.97			
8	2.03	341	86.33	32.35 - 32.60	55	5.63	338	34.60			
14	3.54	355	89.87	32.60 - 32.85	109	11.16	447	45.75			
8	2.03	363	91.90	32.85 - 33.10	52	5.32	499	51.07			
16	4.05	379	95.95	33.10 - 33.35	84	8.60	583	59.67			
4	1.01	383	96.96	33.35 - 33.60	58	5.94	641	65.61			
5	1.27	388	98.23	33.60 - 33.85	94	9.62	735	75.23			
2	0.51	390	98.73	33.85 - 34.10	31	3.17	766	78.40			
4	1.01	394	99.75	34.10 - 34.35	48	4.91	814	83.32			
0	0.00	394	99.75	34.35 - 34.60	44	4.50	858	87.82			
0	0.00	394	99.75	34.60 - 34.85	44	4.50	902	92.32			
0	0.00	394	99.75	34.85 - 35.10	17	1.74	919	94.06			
0	0.00	394	99.75	35.10 - 35.35	15	1.54	934	95.60			
0	0.00	394	99.75	35.35 - 35.60	11	1.13	945	96.72			
0	0.00	394	99.75	35.60 - 35.85	13	1.33	958	98.06			
0	0.00	394	99.75	35.85 - 36.10	7	0.72	965	98.77			
0	0.00	394	99.75	36.10 - 36.35	4	0.41	969	99.18			
1	0.25	395	100.00	36.35 - 36.60	2	0.20	971	99.39			
				36.60 - 36.85	5	0.51	976	99.90			
				36.85 - 37.10	1	0.10	977	100.00			

(14) BITRAGON SUBMANDIBULAR ARC

The surface distance between the right and left trignon landmarks across the submandibular landmark is measured with a tape. The head is in the Frankfurt plane, and the teeth are lightly occluded.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
25.70	10.12	1ST	28.70	11.30
26.00	10.24	2ND	29.00	11.42
26.10	10.28	3RD	29.30	11.54
26.40	10.39	5TH	29.50	11.61
26.80	10.55	10TH	30.00	11.81
27.10	10.67	15TH	30.40	11.97
27.40	10.79	20TH	30.70	12.09
27.60	10.87	25TH	30.90	12.17
27.80	10.94	30TH	31.10	12.24
28.00	11.02	35TH	31.40	12.36
28.20	11.10	40TH	31.50	12.40
28.40	11.18	45TH	31.70	12.48
28.60	11.26	50TH	32.00	12.60
28.80	11.34	55TH	32.10	12.64
28.90	11.38	60TH	32.30	12.72
29.10	11.46	65TH	32.50	12.80
29.40	11.57	70TH	32.60	12.83
29.60	11.65	75TH	32.80	12.91
29.80	11.73	80TH	33.20	13.07
30.20	11.89	85TH	33.50	13.19
30.40	11.97	90TH	34.00	13.39
31.00	12.20	95TH	34.70	13.66
31.50	12.40	97TH	34.80	13.70
31.80	12.52	98TH	35.00	13.78
32.20	12.68	99TH	35.40	13.94

(14) BITRAGON SUBMANDIBULAR ARC

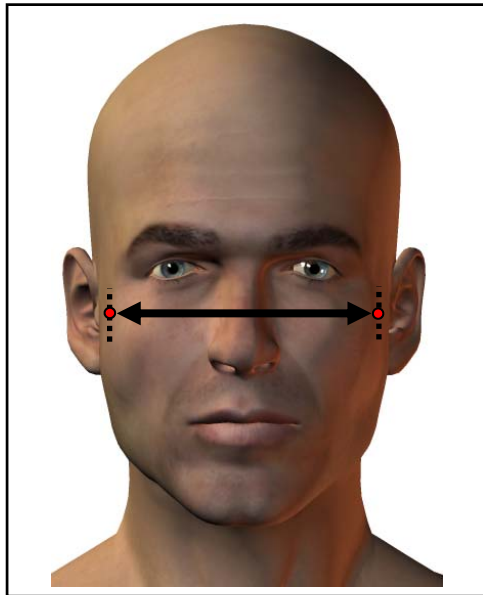
FEMALES		
CM		IN
28.62	MEAN	11.27
0.07	STD ERROR (MEAN)	0.03
1.41	STANDARD DEVIATION	0.56
0.05	STD ERROR (STD DEV)	0.02
25.40	MINIMUM	10.00
37.80	MAXIMUM	14.88
SKEWNESS		0.24
KURTOSIS		2.96
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
31.95	MEAN	12.58
0.05	STD ERROR (MEAN)	0.02
1.51	STANDARD DEVIATION	0.59
0.03	STD ERROR (STD DEV)	0.01
26.90	MINIMUM	10.59
36.40	MAXIMUM	14.33
SKEWNESS		0.14
KURTOSIS		2.77
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	CM	F	FPct	CumF	CumFPct			
4	1.01	4	1.01	25.25 - 25.75							
9	2.28	13	3.29	25.75 - 26.25							
17	4.30	30	7.59	26.25 - 26.75							
25	6.33	55	13.92	26.75 - 27.25	1	0.10	1	0.10			
48	12.15	103	26.08	27.25 - 27.75	0	0.00	1	0.10			
46	11.65	149	37.72	27.75 - 28.25	4	0.41	5	0.51			
48	12.15	197	49.87	28.25 - 28.75	15	1.54	20	2.05			
52	13.16	249	63.04	28.75 - 29.25	24	2.46	44	4.50			
49	12.41	298	75.44	29.25 - 29.75	48	4.91	92	9.42			
35	8.86	333	84.30	29.75 - 30.25	63	6.45	155	15.86			
28	7.09	361	91.39	30.25 - 30.75	109	11.16	264	27.02			
11	2.78	372	94.18	30.75 - 31.25	107	10.95	371	37.97			
13	3.29	385	97.47	31.25 - 31.75	151	15.46	522	53.43			
8	2.03	393	99.49	31.75 - 32.25	143	14.64	665	68.07			
1	0.25	394	99.75	32.25 - 32.75	110	11.26	775	79.32			
0	0.00	394	99.75	32.75 - 33.25	58	5.94	833	85.26			
0	0.00	394	99.75	33.25 - 33.75	55	5.63	888	90.89			
0	0.00	394	99.75	33.75 - 34.25	33	3.38	921	94.27			
0	0.00	394	99.75	34.25 - 34.75	33	3.38	954	97.65			
0	0.00	394	99.75	34.75 - 35.25	12	1.23	966	98.87			
0	0.00	394	99.75	35.25 - 35.75	9	0.92	975	99.80			
0	0.00	394	99.75	35.75 - 36.25	0	0.00	975	99.80			
0	0.00	394	99.75	36.25 - 36.75	2	0.20	977	100.00			
0	0.00	394	99.75	36.75 - 37.25							
0	0.00	394	99.75	37.25 - 37.75							
1	0.25	395	100.00	37.75 - 38.25							

(15) BIZYGOMATIC BREADTH

The maximum horizontal breadth of the face (between the zygomatic arches) at the left and right zygion landmarks is measured with a spreading caliper.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
12.10	4.76	1ST	13.00	5.12
12.20	4.80	2ND	13.20	5.20
12.20	4.80	3RD	13.20	5.20
12.30	4.84	5TH	13.30	5.24
12.50	4.92	10TH	13.60	5.35
12.60	4.96	15TH	13.70	5.39
12.70	5.00	20TH	13.70	5.39
12.80	5.04	25TH	13.80	5.43
12.90	5.08	30TH	13.90	5.47
13.00	5.12	35TH	14.00	5.51
13.10	5.16	40TH	14.00	5.51
13.10	5.16	45TH	14.10	5.55
13.20	5.20	50TH	14.20	5.59
13.30	5.24	55TH	14.30	5.63
13.30	5.24	60TH	14.40	5.67
13.40	5.28	65TH	14.50	5.71
13.50	5.31	70TH	14.60	5.75
13.50	5.31	75TH	14.60	5.75
13.60	5.35	80TH	14.70	5.79
13.80	5.43	85TH	14.80	5.83
13.90	5.47	90TH	15.00	5.91
14.00	5.51	95TH	15.20	5.98
14.20	5.59	97TH	15.40	6.06
14.40	5.67	98TH	15.40	6.06
14.60	5.75	99TH	15.60	6.14

(15) BIZYGOMATIC BREADTH

FEMALES		
<u>CM</u>		<u>IN</u>
13.20	MEAN	5.20
0.03	STD ERROR (MEAN)	0.01
0.54	STANDARD DEVIATION	0.21
0.02	STD ERROR (STD DEV)	0.01
11.90	MINIMUM	4.69
15.00	MAXIMUM	5.91
SKEWNESS		0.19
KURTOSIS		3.18
COEFFICIENT OF VARIATION		4.1%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
14.24	MEAN	5.61
0.02	STD ERROR (MEAN)	0.01
0.56	STANDARD DEVIATION	0.22
0.01	STD ERROR (STD DEV)	0.01
12.50	MINIMUM	4.92
16.30	MAXIMUM	6.42
SKEWNESS		0.17
KURTOSIS		2.92
COEFFICIENT OF VARIATION		4.0%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	11.85 - 11.95							
1	0.25	2	0.51	11.95 - 12.05							
3	0.76	5	1.27	12.05 - 12.15							
5	1.27	10	2.53	12.15 - 12.25							
4	1.01	14	3.54	12.25 - 12.35							
8	2.03	22	5.57	12.35 - 12.45							
14	3.54	36	9.11	12.45 - 12.55	1	0.10	1	0.10			
14	3.54	50	12.66	12.55 - 12.65	1	0.10	2	0.20			
15	3.80	65	16.46	12.65 - 12.75	2	0.20	4	0.41			
18	4.56	83	21.01	12.75 - 12.85	1	0.10	5	0.51			
16	4.05	99	25.06	12.85 - 12.95	1	0.10	6	0.61			
34	8.61	133	33.67	12.95 - 13.05	10	1.02	16	1.64			
30	7.59	163	41.27	13.05 - 13.15	8	0.82	24	2.46			
20	5.06	183	46.33	13.15 - 13.25	17	1.74	41	4.20			
38	9.62	221	55.95	13.25 - 13.35	22	2.25	63	6.45			
25	6.33	246	62.28	13.35 - 13.45	26	2.66	89	9.11			
31	7.85	277	70.13	13.45 - 13.55	22	2.25	111	11.36			
23	5.82	300	75.95	13.55 - 13.65	54	5.53	165	16.89			
18	4.56	318	80.51	13.65 - 13.75	65	6.65	230	23.54			
19	4.81	337	85.32	13.75 - 13.85	71	7.27	301	30.81			
17	4.30	354	89.62	13.85 - 13.95	54	5.53	355	36.34			
17	4.30	371	93.92	13.95 - 14.05	72	7.37	427	43.71			
2	0.51	373	94.43	14.05 - 14.15	53	5.42	480	49.13			
4	1.01	377	95.44	14.15 - 14.25	68	6.96	548	56.09			
3	0.76	380	96.20	14.25 - 14.35	57	5.83	605	61.92			
4	1.01	384	97.22	14.35 - 14.45	78	7.98	683	69.91			
3	0.76	387	97.97	14.45 - 14.55	45	4.61	728	74.51			
2	0.51	389	98.48	14.55 - 14.65	54	5.53	782	80.04			
0	0.00	389	98.48	14.65 - 14.75	49	5.02	831	85.06			
2	0.51	391	98.99	14.75 - 14.85	32	3.28	863	88.33			
0	0.00	391	98.99	14.85 - 14.95	31	3.17	894	91.50			
4	1.01	395	100.00	14.95 - 15.05	25	2.56	919	94.06			
				15.05 - 15.15	9	0.92	928	94.98			
				15.15 - 15.25	10	1.02	938	96.01			
				15.25 - 15.35	11	1.13	949	97.13			
				15.35 - 15.45	10	1.02	959	98.16			
				15.45 - 15.55	5	0.51	964	98.67			
				15.55 - 15.65	5	0.51	969	99.18			
				15.65 - 15.75	3	0.31	972	99.49			
				15.75 - 15.85	3	0.31	975	99.80			
				15.85 - 15.95	1	0.10	976	99.90			
				15.95 - 16.05	0	0.00	976	99.90			
				16.05 - 16.15	0	0.00	976	99.90			
				16.15 - 16.25	0	0.00	976	99.90			
				16.25 - 16.35	1	0.10	977	100.00			

(16) BUTTOCK CIRCUMFERENCE

The horizontal circumference of the trunk at the level of the buttock point, posterior, right and left lateral landmarks, is measured with a tape. The participant stands erect with the heels together and the weight equally distributed on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
87.30	34.37	1ST	89.50	35.24
88.80	34.96	2ND	91.10	35.87
89.80	35.35	3RD	91.70	36.10
91.40	35.98	5TH	93.20	36.69
92.90	36.57	10TH	95.70	37.68
94.90	37.36	15TH	96.80	38.11
96.00	37.80	20TH	97.90	38.54
97.50	38.39	25TH	98.80	38.90
98.30	38.70	30TH	99.80	39.29
99.10	39.02	35TH	100.60	39.61
100.00	39.37	40TH	101.20	39.84
100.90	39.72	45TH	102.00	40.16
102.10	40.20	50TH	103.10	40.59
103.00	40.55	55TH	103.90	40.91
103.70	40.83	60TH	104.60	41.18
104.80	41.26	65TH	105.50	41.54
105.90	41.69	70TH	106.20	41.81
107.20	42.20	75TH	107.30	42.24
108.30	42.64	80TH	108.40	42.68
109.70	43.19	85TH	109.90	43.27
112.40	44.25	90TH	112.10	44.13
114.70	45.16	95TH	114.90	45.24
116.00	45.67	97TH	117.00	46.06
117.10	46.10	98TH	117.40	46.22
120.00	47.24	99TH	118.30	46.57

(16) BUTTOCK CIRCUMFERENCE

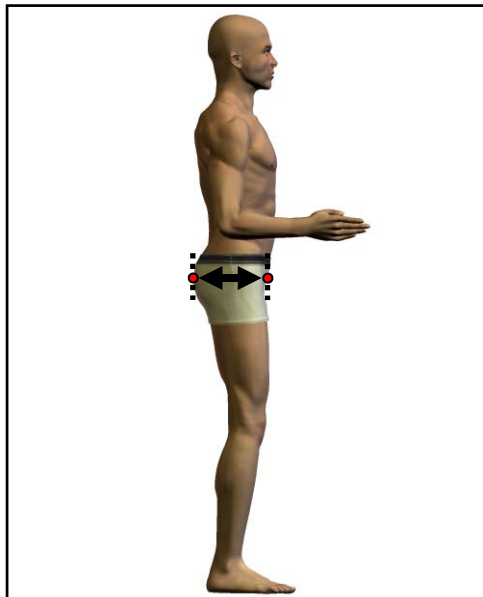
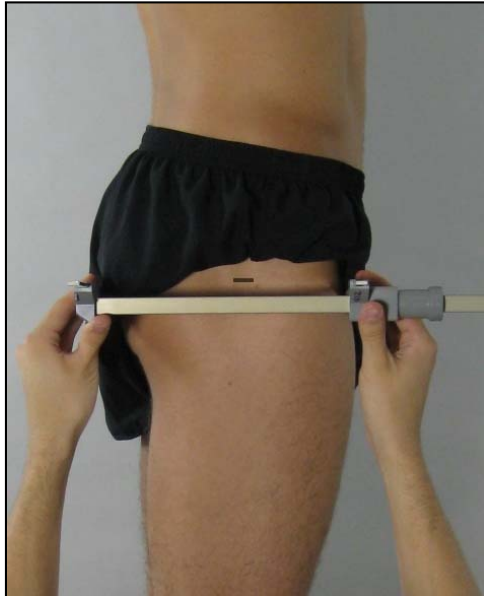
FEMALES		
<u>CM</u>		<u>IN</u>
102.33	MEAN	40.29
0.36	STD ERROR (MEAN)	0.14
7.19	STANDARD DEVIATION	2.83
0.26	STD ERROR (STD DEV)	0.10
84.50	MINIMUM	33.27
126.50	MAXIMUM	49.80
SKEWNESS		0.29
KURTOSIS		2.98
COEFFICIENT OF VARIATION		7.0%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
103.33	MEAN	40.68
0.21	STD ERROR (MEAN)	0.08
6.50	STANDARD DEVIATION	2.56
0.15	STD ERROR (STD DEV)	0.06
84.30	MINIMUM	33.19
128.20	MAXIMUM	50.47
SKEWNESS		0.33
KURTOSIS		3.26
COEFFICIENT OF VARIATION		6.3%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES						MALES					
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct		
1	0.25	1	0.25	83.55	-	84.55	1	0.10	1	0.10	
0	0.00	1	0.25	84.55	-	85.55	0	0.00	1	0.10	
1	0.25	2	0.51	85.55	-	86.55	1	0.10	2	0.20	
2	0.51	4	1.01	86.55	-	87.55	4	0.41	6	0.61	
2	0.51	6	1.52	87.55	-	88.55	4	0.41	10	1.02	
6	1.52	12	3.04	88.55	-	89.55	10	1.02	20	2.05	
4	1.01	16	4.05	89.55	-	90.55	7	0.72	27	2.76	
6	1.52	22	5.57	90.55	-	91.55	14	1.43	41	4.20	
6	1.52	28	7.09	91.55	-	92.55	14	1.43	55	5.63	
11	2.78	39	9.87	92.55	-	93.55	21	2.15	76	7.78	
15	3.80	54	13.67	93.55	-	94.55	32	3.28	108	11.05	
17	4.30	71	17.97	94.55	-	95.55	17	1.74	125	12.79	
17	4.30	88	22.28	95.55	-	96.55	47	4.81	172	17.60	
24	6.08	112	28.35	96.55	-	97.55	51	5.22	223	22.82	
20	5.06	132	33.42	97.55	-	98.55	61	6.24	284	29.07	
25	6.33	157	39.75	98.55	-	99.55	46	4.71	330	33.78	
19	4.81	176	44.56	99.55	-	100.55	57	5.83	387	39.61	
17	4.30	193	48.86	100.55	-	101.55	74	7.57	461	47.19	
18	4.56	211	53.42	101.55	-	102.55	59	6.04	520	53.22	
24	6.08	235	59.49	102.55	-	103.55	54	5.53	574	58.75	
18	4.56	253	64.05	103.55	-	104.55	58	5.94	632	64.69	
17	4.30	270	68.35	104.55	-	105.55	47	4.81	679	69.50	
17	4.30	287	72.66	105.55	-	106.55	60	6.14	739	75.64	
18	4.56	305	77.22	106.55	-	107.55	36	3.68	775	79.32	
19	4.81	324	82.03	107.55	-	108.55	42	4.30	817	83.62	
13	3.29	337	85.32	108.55	-	109.55	30	3.07	847	86.69	
12	3.04	349	88.35	109.55	-	110.55	20	2.05	867	88.74	
9	2.28	358	90.63	110.55	-	111.55	22	2.25	889	90.99	
4	1.01	362	91.65	111.55	-	112.55	19	1.94	908	92.94	
6	1.52	368	93.16	112.55	-	113.55	21	2.15	929	95.09	
6	1.52	374	94.68	113.55	-	114.55	7	0.72	936	95.80	
3	0.76	377	95.44	114.55	-	115.55	11	1.13	947	96.93	
7	1.77	384	97.22	115.55	-	116.55	5	0.51	952	97.44	
3	0.76	387	97.97	116.55	-	117.55	14	1.43	966	98.87	
4	1.01	391	98.99	117.55	-	118.55	4	0.41	970	99.28	
0	0.00	391	98.99	118.55	-	119.55	1	0.10	971	99.39	
2	0.51	393	99.49	119.55	-	120.55	1	0.10	972	99.49	
0	0.00	393	99.49	120.55	-	121.55	0	0.00	972	99.49	
0	0.00	393	99.49	121.55	-	122.55	2	0.20	974	99.69	
0	0.00	393	99.49	122.55	-	123.55	0	0.00	974	99.69	
1	0.25	394	99.75	123.55	-	124.55	0	0.00	974	99.69	
0	0.00	394	99.75	124.55	-	125.55	0	0.00	974	99.69	
1	0.25	395	100.00	125.55	-	126.55	0	0.00	974	99.69	
				126.55	-	127.55	2	0.20	976	99.90	
				127.55	-	128.55	1	0.10	977	100.00	

(17) BUTTOCK DEPTH

The horizontal depth of the torso at the level of the buttock point, posterior and right lateral landmarks, is measured using a beam caliper. The participant stands erect with the heels together and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
18.20	7.17	1ST	19.10	7.52
18.90	7.44	2ND	19.80	7.80
19.00	7.48	3RD	20.30	7.99
19.30	7.60	5TH	20.70	8.15
20.20	7.95	10TH	21.30	8.39
20.50	8.07	15TH	21.70	8.54
20.80	8.19	20TH	22.10	8.70
21.10	8.31	25TH	22.60	8.90
21.30	8.39	30TH	22.90	9.02
21.60	8.50	35TH	23.20	9.13
21.90	8.62	40TH	23.40	9.21
22.10	8.70	45TH	23.70	9.33
22.50	8.86	50TH	24.10	9.49
22.70	8.94	55TH	24.30	9.57
23.20	9.13	60TH	24.70	9.72
23.50	9.25	65TH	24.90	9.80
24.00	9.45	70TH	25.40	10.00
24.30	9.57	75TH	25.80	10.16
24.70	9.72	80TH	26.20	10.31
25.30	9.96	85TH	26.60	10.47
25.90	10.20	90TH	27.20	10.71
27.50	10.83	95TH	28.40	11.18
28.90	11.38	97TH	29.10	11.46
29.90	11.77	98TH	29.50	11.61
30.10	11.85	99TH	29.90	11.77

(17) BUTTOCK DEPTH

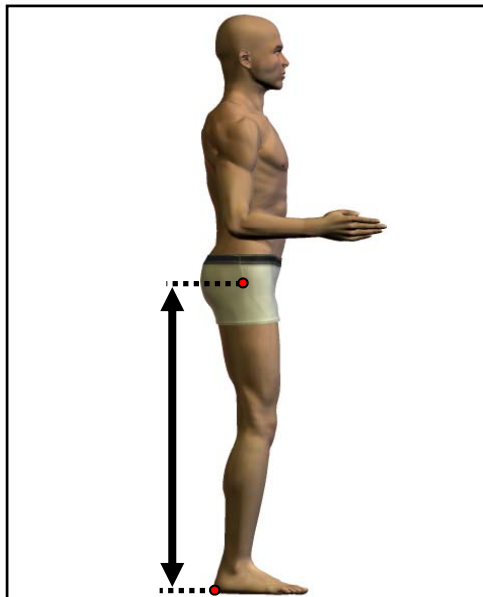
FEMALES		
<u>CM</u>		<u>IN</u>
22.85	MEAN	8.99
0.12	STD ERROR (MEAN)	0.05
2.47	STANDARD DEVIATION	0.97
0.09	STD ERROR (STD DEV)	0.03
17.30	MINIMUM	6.81
34.10	MAXIMUM	13.43
SKEWNESS		0.80
KURTOSIS		3.95
COEFFICIENT OF VARIATION		10.8%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
24.19	MEAN	9.52
0.08	STD ERROR (MEAN)	0.03
2.35	STANDARD DEVIATION	0.92
0.05	STD ERROR (STD DEV)	0.02
17.20	MINIMUM	6.77
32.70	MAXIMUM	12.87
SKEWNESS		0.30
KURTOSIS		3.04
COEFFICIENT OF VARIATION		9.7%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE													
FEMALES											MALES		
F	FPct	CumF	CumFPct	<u>CM</u>			F	FPct	CumF	CumFPct			
1	0.25	1	0.25	16.75	-	17.25	1	0.10	1	0.10			
2	0.51	3	0.76	17.25	-	17.75	0	0.00	1	0.10			
2	0.51	5	1.27	17.75	-	18.25	2	0.20	3	0.31			
10	2.53	15	3.80	18.25	-	18.75	5	0.51	8	0.82			
12	3.04	27	6.84	18.75	-	19.25	9	0.92	17	1.74			
15	3.80	42	10.63	19.25	-	19.75	13	1.33	30	3.07			
24	6.08	66	16.71	19.75	-	20.25	18	1.84	48	4.91			
32	8.10	98	24.81	20.25	-	20.75	35	3.58	83	8.50			
36	9.11	134	33.92	20.75	-	21.25	54	5.53	137	14.02			
38	9.62	172	43.54	21.25	-	21.75	73	7.47	210	21.49			
31	7.85	203	51.39	21.75	-	22.25	68	6.96	278	28.45			
23	5.82	226	57.22	22.25	-	22.75	63	6.45	341	34.90			
29	7.34	255	64.56	22.75	-	23.25	88	9.01	429	43.91			
21	5.32	276	69.87	23.25	-	23.75	87	8.90	516	52.81			
26	6.58	302	76.46	23.75	-	24.25	79	8.09	595	60.90			
19	4.81	321	81.27	24.25	-	24.75	86	8.80	681	69.70			
24	6.08	345	87.34	24.75	-	25.25	51	5.22	732	74.92			
16	4.05	361	91.39	25.25	-	25.75	64	6.55	796	81.47			
9	2.28	370	93.67	25.75	-	26.25	46	4.71	842	86.18			
5	1.27	375	94.94	26.25	-	26.75	43	4.40	885	90.58			
5	1.27	380	96.20	26.75	-	27.25	33	3.38	918	93.96			
4	1.01	384	97.22	27.25	-	27.75	18	1.84	936	95.80			
2	0.51	386	97.72	27.75	-	28.25	14	1.43	950	97.24			
3	0.76	389	98.48	28.25	-	28.75	8	0.82	958	98.06			
0	0.00	389	98.48	28.75	-	29.25	5	0.51	963	98.57			
3	0.76	392	99.24	29.25	-	29.75	4	0.41	967	98.98			
1	0.25	393	99.49	29.75	-	30.25	5	0.51	972	99.49			
0	0.00	393	99.49	30.25	-	30.75	1	0.10	973	99.59			
1	0.25	394	99.75	30.75	-	31.25	2	0.20	975	99.80			
0	0.00	394	99.75	31.25	-	31.75	0	0.00	975	99.80			
0	0.00	394	99.75	31.75	-	32.25	1	0.10	976	99.90			
0	0.00	394	99.75	32.25	-	32.75	1	0.10	977	100.00			
0	0.00	394	99.75	32.75	-	33.25							
0	0.00	394	99.75	33.25	-	33.75							
1	0.25	395	100.00	33.75	-	34.25							

(18) BUTTOCK HEIGHT

The vertical distance between a standing surface and the level of the buttock point, right lateral landmark, is measured with an anthropometer at the right side of the thigh. The participant stands erect with the heels together and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
76.90	30.28	1ST	79.00	31.10
77.30	30.43	2ND	80.20	31.57
77.40	30.47	3RD	80.90	31.85
78.40	30.87	5TH	81.80	32.20
79.10	31.14	10TH	83.40	32.83
80.00	31.50	15TH	85.00	33.46
80.50	31.69	20TH	85.70	33.74
81.20	31.97	25TH	86.60	34.09
81.80	32.20	30TH	87.30	34.37
82.00	32.28	35TH	87.90	34.61
82.70	32.56	40TH	88.40	34.80
83.40	32.83	45TH	88.90	35.00
83.80	32.99	50TH	89.40	35.20
84.30	33.19	55TH	89.90	35.39
84.80	33.39	60TH	90.50	35.63
85.30	33.58	65TH	91.20	35.91
85.90	33.82	70TH	91.90	36.18
86.50	34.06	75TH	92.40	36.38
87.10	34.29	80TH	93.20	36.69
87.80	34.57	85TH	94.10	37.05
89.10	35.08	90TH	95.10	37.44
91.00	35.83	95TH	96.80	38.11
91.90	36.18	97TH	97.90	38.54
92.30	36.34	98TH	98.60	38.82
93.90	36.97	99TH	99.40	39.13

(18) BUTTOCK HEIGHT

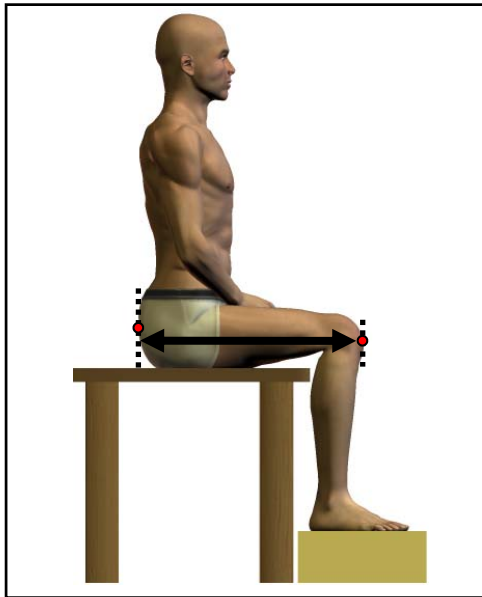
FEMALES		
<u>CM</u>		<u>IN</u>
84.02	MEAN	33.08
0.19	STD ERROR (MEAN)	0.08
3.83	STANDARD DEVIATION	1.51
0.14	STD ERROR (STD DEV)	0.05
76.40	MINIMUM	30.08
96.60	MAXIMUM	38.03
SKEWNESS		0.47
KURTOSIS		3.05
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
89.43	MEAN	35.21
0.15	STD ERROR (MEAN)	0.06
4.54	STANDARD DEVIATION	1.79
0.10	STD ERROR (STD DEV)	0.04
74.20	MINIMUM	29.21
109.50	MAXIMUM	43.11
SKEWNESS		0.05
KURTOSIS		3.46
COEFFICIENT OF VARIATION		5.1%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE										
FEMALES				MALES						
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct	
				73.55	-	74.55	1	0.10	1	0.10
				74.55	-	75.55	0	0.00	1	0.10
1	0.25	1	0.25	75.55	-	76.55	0	0.00	1	0.10
10	2.53	11	2.78	76.55	-	77.55	2	0.20	3	0.31
7	1.77	18	4.56	77.55	-	78.55	2	0.20	5	0.51
21	5.32	39	9.87	78.55	-	79.55	10	1.02	15	1.54
32	8.10	71	17.97	79.55	-	80.55	11	1.13	26	2.66
31	7.85	102	25.82	80.55	-	81.55	18	1.84	44	4.50
34	8.61	136	34.43	81.55	-	82.55	32	3.28	76	7.78
29	7.34	165	41.77	82.55	-	83.55	29	2.97	105	10.75
46	11.65	211	53.42	83.55	-	84.55	47	4.81	152	15.56
35	8.86	246	62.28	84.55	-	85.55	48	4.91	200	20.47
42	10.63	288	72.91	85.55	-	86.55	64	6.55	264	27.02
30	7.59	318	80.51	86.55	-	87.55	84	8.60	348	35.62
21	5.32	339	85.82	87.55	-	88.55	91	9.31	439	44.93
16	4.05	355	89.87	88.55	-	89.55	95	9.72	534	54.66
9	2.28	364	92.15	89.55	-	90.55	83	8.50	617	63.15
10	2.53	374	94.68	90.55	-	91.55	64	6.55	681	69.70
9	2.28	383	96.96	91.55	-	92.55	78	7.98	759	77.69
3	0.76	386	97.72	92.55	-	93.55	54	5.53	813	83.21
4	1.01	390	98.73	93.55	-	94.55	55	5.63	868	88.84
4	1.01	394	99.75	94.55	-	95.55	37	3.79	905	92.63
0	0.00	394	99.75	95.55	-	96.55	22	2.25	927	94.88
1	0.25	395	100.00	96.55	-	97.55	19	1.94	946	96.83
				97.55	-	98.55	11	1.13	957	97.95
				98.55	-	99.55	10	1.02	967	98.98
				99.55	-	100.55	4	0.41	971	99.39
				100.55	-	101.55	3	0.31	974	99.69
				101.55	-	102.55	0	0.00	974	99.69
				102.55	-	103.55	1	0.10	975	99.80
				103.55	-	104.55	0	0.00	975	99.80
				104.55	-	105.55	0	0.00	975	99.80
				105.55	-	106.55	0	0.00	975	99.80
				106.55	-	107.55	0	0.00	975	99.80
				107.55	-	108.55	1	0.10	976	99.90
				108.55	-	109.55	1	0.10	977	100.00

(19) BUTTOCK-KNEE LENGTH

The horizontal distance between a buttock plate placed at the most posterior point on either buttock and the knee point, anterior landmark, is measured with an anthropometer. The participant sits erect. The thighs are parallel and the knees flexed 90° with the feet in line with the thighs.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
53.70	21.14	1ST	55.90	22.01
54.50	21.46	2ND	56.40	22.20
54.80	21.57	3RD	56.90	22.40
55.30	21.77	5TH	57.50	22.64
56.00	22.05	10TH	58.40	22.99
56.40	22.20	15TH	59.20	23.31
56.80	22.36	20TH	59.80	23.54
57.20	22.52	25TH	60.40	23.78
57.50	22.64	30TH	60.90	23.98
57.80	22.76	35TH	61.20	24.09
58.00	22.83	40TH	61.60	24.25
58.30	22.95	45TH	61.90	24.37
58.70	23.11	50TH	62.30	24.53
59.00	23.23	55TH	62.60	24.65
59.50	23.43	60TH	63.00	24.80
59.80	23.54	65TH	63.30	24.92
60.40	23.78	70TH	63.80	25.12
60.70	23.90	75TH	64.20	25.28
61.20	24.09	80TH	64.60	25.43
61.70	24.29	85TH	65.20	25.67
62.50	24.61	90TH	65.70	25.87
64.00	25.20	95TH	66.80	26.30
64.70	25.47	97TH	67.30	26.50
65.10	25.63	98TH	68.30	26.89
66.80	26.30	99TH	69.00	27.17

(19) BUTTOCK-KNEE LENGTH

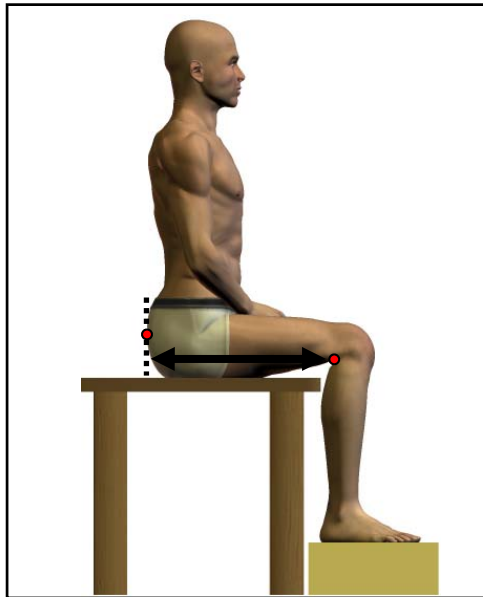
FEMALES		
<u>CM</u>		<u>IN</u>
59.05	MEAN	23.25
0.13	STD ERROR (MEAN)	0.05
2.66	STANDARD DEVIATION	1.05
0.09	STD ERROR (STD DEV)	0.04
53.50	MINIMUM	21.06
70.90	MAXIMUM	27.91
SKEWNESS		0.65
KURTOSIS		3.70
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
62.25	MEAN	24.51
0.09	STD ERROR (MEAN)	0.04
2.85	STANDARD DEVIATION	1.12
0.06	STD ERROR (STD DEV)	0.03
52.30	MINIMUM	20.59
72.70	MAXIMUM	28.62
SKEWNESS		0.03
KURTOSIS		3.20
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE															
FEMALES												MALES			
F	FPct	CumF	CumFPct	<u>CM</u>				F	FPct	CumF	CumFPct				
				52.25	-	52.75		1	0.10	1	0.10				
				52.75	-	53.25		0	0.00	1	0.10				
3	0.76	3	0.76	53.25	-	53.75		2	0.20	3	0.31				
4	1.01	7	1.77	53.75	-	54.25		1	0.10	4	0.41				
3	0.76	10	2.53	54.25	-	54.75		1	0.10	5	0.51				
6	1.52	16	4.05	54.75	-	55.25		0	0.00	5	0.51				
13	3.29	29	7.34	55.25	-	55.75		4	0.41	9	0.92				
13	3.29	42	10.63	55.75	-	56.25		8	0.82	17	1.74				
24	6.08	66	16.71	56.25	-	56.75		10	1.02	27	2.76				
25	6.33	91	23.04	56.75	-	57.25		18	1.84	45	4.61				
36	9.11	127	32.15	57.25	-	57.75		19	1.94	64	6.55				
32	8.10	159	40.25	57.75	-	58.25		26	2.66	90	9.21				
26	6.58	185	46.84	58.25	-	58.75		36	3.68	126	12.90				
22	5.57	207	52.41	58.75	-	59.25		39	3.99	165	16.89				
22	5.57	229	57.97	59.25	-	59.75		44	4.50	209	21.39				
21	5.32	250	63.29	59.75	-	60.25		45	4.61	254	26.00				
24	6.08	274	69.37	60.25	-	60.75		56	5.73	310	31.73				
26	6.58	300	75.95	60.75	-	61.25		61	6.24	371	37.97				
20	5.06	320	81.01	61.25	-	61.75		76	7.78	447	45.75				
12	3.04	332	84.05	61.75	-	62.25		63	6.45	510	52.20				
19	4.81	351	88.86	62.25	-	62.75		65	6.65	575	58.85				
8	2.03	359	90.89	62.75	-	63.25		77	7.88	652	66.73				
7	1.77	366	92.66	63.25	-	63.75		57	5.83	709	72.57				
4	1.01	370	93.67	63.75	-	64.25		52	5.32	761	77.89				
8	2.03	378	95.70	64.25	-	64.75		45	4.61	806	82.50				
5	1.27	383	96.96	64.75	-	65.25		43	4.40	849	86.90				
4	1.01	387	97.97	65.25	-	65.75		43	4.40	892	91.30				
1	0.25	388	98.23	65.75	-	66.25		19	1.94	911	93.24				
1	0.25	389	98.48	66.25	-	66.75		26	2.66	937	95.91				
2	0.51	391	98.99	66.75	-	67.25		15	1.54	952	97.44				
2	0.51	393	99.49	67.25	-	67.75		5	0.51	957	97.95				
1	0.25	394	99.75	67.75	-	68.25		3	0.31	960	98.26				
0	0.00	394	99.75	68.25	-	68.75		6	0.61	966	98.87				
0	0.00	394	99.75	68.75	-	69.25		3	0.31	969	99.18				
0	0.00	394	99.75	69.25	-	69.75		2	0.20	971	99.39				
0	0.00	394	99.75	69.75	-	70.25		2	0.20	973	99.59				
0	0.00	394	99.75	70.25	-	70.75		2	0.20	975	99.80				
1	0.25	395	100.00	70.75	-	71.25		0	0.00	975	99.80				
				71.25	-	71.75		1	0.10	976	99.90				
				71.75	-	72.25		0	0.00	976	99.90				
				72.25	-	72.75		1	0.10	977	100.00				

(20) BUTTOCK-POPLITEAL LENGTH

The horizontal distance between a buttock plate placed at the most posterior point on either buttock and the back of the right knee (the popliteal fossa at the dorsal juncture of the calf and thigh) is measured with an anthropometer. The participant sits erect. The thighs are parallel and the knees flexed 90° with the feet in line with the thighs.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
44.20	17.40	1ST	45.60	17.95
44.50	17.52	2ND	46.20	18.19
44.90	17.68	3RD	46.60	18.35
45.50	17.91	5TH	47.30	18.62
46.00	18.11	10TH	48.00	18.90
46.30	18.23	15TH	48.70	19.17
46.70	18.39	20TH	49.20	19.37
47.00	18.50	25TH	49.70	19.57
47.30	18.62	30TH	50.10	19.72
47.70	18.78	35TH	50.50	19.88
47.80	18.82	40TH	50.70	19.96
48.00	18.90	45TH	51.10	20.12
48.40	19.06	50TH	51.30	20.20
48.70	19.17	55TH	51.60	20.31
49.20	19.37	60TH	52.00	20.47
49.40	19.45	65TH	52.30	20.59
49.80	19.61	70TH	52.70	20.75
50.10	19.72	75TH	53.10	20.91
50.50	19.88	80TH	53.40	21.02
51.00	20.08	85TH	53.60	21.10
51.50	20.28	90TH	54.00	21.26
52.60	20.71	95TH	55.60	21.89
53.00	20.87	97TH	56.30	22.17
53.80	21.18	98TH	56.40	22.20
55.00	21.65	99TH	58.00	22.83

(20) BUTTOCK-POPLITEAL LENGTH

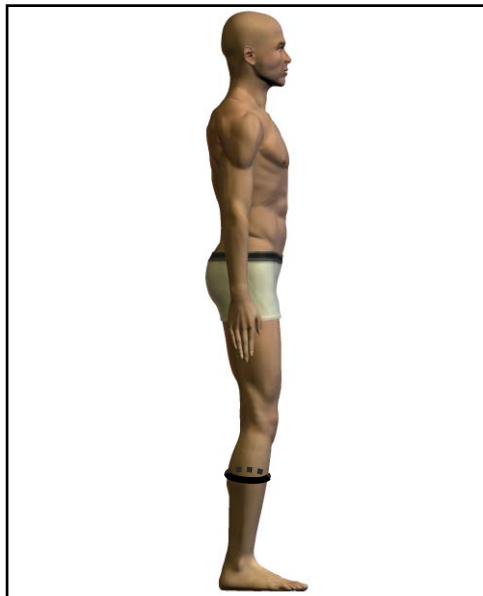
FEMALES		
<u>CM</u>		<u>IN</u>
48.64	MEAN	19.15
0.11	STD ERROR (MEAN)	0.04
2.23	STANDARD DEVIATION	0.88
0.08	STD ERROR (STD DEV)	0.03
43.60	MINIMUM	17.17
55.90	MAXIMUM	22.01
SKEWNESS		0.48
KURTOSIS		3.17
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
51.33	MEAN	20.21
0.08	STD ERROR (MEAN)	0.03
2.52	STANDARD DEVIATION	0.99
0.06	STD ERROR (STD DEV)	0.02
42.90	MINIMUM	16.89
59.80	MAXIMUM	23.54
SKEWNESS		0.14
KURTOSIS		3.50
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE										
FEMALES				<u>CM</u>		MALES				
F	FPct	CumF	CumFPct			F	FPct	CumF	CumFPct	
				42.75	-	43.25	1	0.10	1	0.10
1	0.25	1	0.25	43.25	-	43.75	0	0.00	1	0.10
3	0.76	4	1.01	43.75	-	44.25	1	0.10	2	0.20
8	2.03	12	3.04	44.25	-	44.75	2	0.20	4	0.41
4	1.01	16	4.05	44.75	-	45.25	2	0.20	6	0.61
10	2.53	26	6.58	45.25	-	45.75	5	0.51	11	1.13
20	5.06	46	11.65	45.75	-	46.25	9	0.92	20	2.05
28	7.09	74	18.73	46.25	-	46.75	21	2.15	41	4.20
35	8.86	109	27.59	46.75	-	47.25	10	1.02	51	5.22
34	8.61	143	36.20	47.25	-	47.75	33	3.38	84	8.60
35	8.86	178	45.06	47.75	-	48.25	43	4.40	127	13.00
22	5.57	200	50.63	48.25	-	48.75	40	4.09	167	17.09
29	7.34	229	57.97	48.75	-	49.25	50	5.12	217	22.21
26	6.58	255	64.56	49.25	-	49.75	53	5.42	270	27.64
28	7.09	283	71.65	49.75	-	50.25	61	6.24	331	33.88
24	6.08	307	77.72	50.25	-	50.75	74	7.57	405	41.45
15	3.80	322	81.52	50.75	-	51.25	74	7.57	479	49.03
24	6.08	346	87.59	51.25	-	51.75	82	8.39	561	57.42
12	3.04	358	90.63	51.75	-	52.25	74	7.57	635	64.99
15	3.80	373	94.43	52.25	-	52.75	75	7.68	710	72.67
6	1.52	379	95.95	52.75	-	53.25	60	6.14	770	78.81
3	0.76	382	96.71	53.25	-	53.75	83	8.50	853	87.31
4	1.01	386	97.72	53.75	-	54.25	45	4.61	898	91.91
6	1.52	392	99.24	54.25	-	54.75	20	2.05	918	93.96
1	0.25	393	99.49	54.75	-	55.25	8	0.82	926	94.78
0	0.00	393	99.49	55.25	-	55.75	15	1.54	941	96.32
2	0.51	395	100.00	55.75	-	56.25	12	1.23	953	97.54
				56.25	-	56.75	9	0.92	962	98.46
				56.75	-	57.25	2	0.20	964	98.67
				57.25	-	57.75	5	0.51	969	99.18
				57.75	-	58.25	2	0.20	971	99.39
				58.25	-	58.75	0	0.00	971	99.39
				58.75	-	59.25	3	0.31	974	99.69
				59.25	-	59.75	2	0.20	976	99.90
				59.75	-	60.25	1	0.10	977	100.00

(21) CALF CIRCUMFERENCE

The maximum horizontal circumference of the right calf is measured with a tape. The participant stands erect with the heels approximately 10 cm apart and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
32.30	12.72	1ST	33.80	13.31
32.80	12.91	2ND	34.40	13.54
33.00	12.99	3RD	34.70	13.66
33.30	13.11	5TH	35.00	13.78
34.20	13.46	10TH	36.00	14.17
34.60	13.62	15TH	36.70	14.45
35.00	13.78	20TH	37.30	14.69
35.40	13.94	25TH	37.60	14.80
35.80	14.09	30TH	38.10	15.00
36.00	14.17	35TH	38.50	15.16
36.30	14.29	40TH	38.80	15.28
36.80	14.49	45TH	39.00	15.35
37.10	14.61	50TH	39.40	15.51
37.60	14.80	55TH	39.80	15.67
38.00	14.96	60TH	40.20	15.83
38.40	15.12	65TH	40.50	15.94
38.70	15.24	70TH	40.80	16.06
38.90	15.31	75TH	41.20	16.22
39.40	15.51	80TH	41.80	16.46
40.00	15.75	85TH	42.50	16.73
41.20	16.22	90TH	43.30	17.05
42.30	16.65	95TH	43.90	17.28
42.80	16.85	97TH	45.00	17.72
43.60	17.17	98TH	45.50	17.91
44.40	17.48	99TH	45.80	18.03

(21) CALF CIRCUMFERENCE

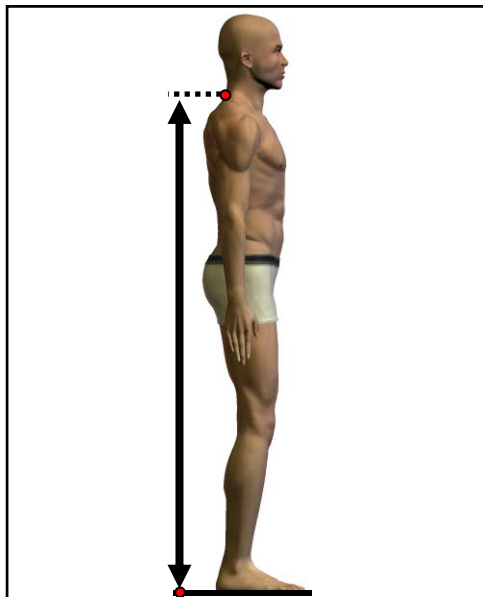
FEMALES		
<u>CM</u>		<u>IN</u>
37.39	MEAN	14.72
0.13	STD ERROR (MEAN)	0.05
2.68	STANDARD DEVIATION	1.06
0.10	STD ERROR (STD DEV)	0.04
31.00	MINIMUM	12.20
48.00	MAXIMUM	18.90
SKEWNESS		0.45
KURTOSIS		3.02
COEFFICIENT OF VARIATION		7.2%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
39.53	MEAN	15.56
0.09	STD ERROR (MEAN)	0.03
2.73	STANDARD DEVIATION	1.08
0.06	STD ERROR (STD DEV)	0.02
32.00	MINIMUM	12.60
47.70	MAXIMUM	18.78
SKEWNESS		0.16
KURTOSIS		2.86
COEFFICIENT OF VARIATION		6.9%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES					<u>CM</u>		MALES				
F	FPct	CumF	CumFPct			F	FPct	CumF	CumFPct		
1	0.25	1	0.25	30.75	-	31.25					
2	0.51	3	0.76	31.25	-	31.75					
1	0.25	4	1.01	31.75	-	32.25	2	0.20	2	0.20	
3	0.76	7	1.77	32.25	-	32.75	2	0.20	4	0.41	
7	1.77	14	3.54	32.75	-	33.25	4	0.41	8	0.82	
12	3.04	26	6.58	33.25	-	33.75	5	0.51	13	1.33	
15	3.80	41	10.38	33.75	-	34.25	10	1.02	23	2.35	
28	7.09	69	17.47	34.25	-	34.75	20	2.05	43	4.40	
25	6.33	94	23.80	34.75	-	35.25	26	2.66	69	7.06	
27	6.84	121	30.63	35.25	-	35.75	38	3.89	107	10.95	
34	8.61	155	39.24	35.75	-	36.25	36	3.68	143	14.64	
24	6.08	179	45.32	36.25	-	36.75	48	4.91	191	19.55	
29	7.34	208	52.66	36.75	-	37.25	41	4.20	232	23.75	
26	6.58	234	59.24	37.25	-	37.75	60	6.14	292	29.89	
19	4.81	253	64.05	37.75	-	38.25	58	5.94	350	35.82	
33	8.35	286	72.41	38.25	-	38.75	78	7.98	428	43.81	
22	5.57	308	77.97	38.75	-	39.25	88	9.01	516	52.81	
19	4.81	327	82.78	39.25	-	39.75	63	6.45	579	59.26	
15	3.80	342	86.58	39.75	-	40.25	64	6.55	643	65.81	
10	2.53	352	89.11	40.25	-	40.75	77	7.88	720	73.69	
9	2.28	361	91.39	40.75	-	41.25	58	5.94	778	79.63	
9	2.28	370	93.67	41.25	-	41.75	34	3.48	812	83.11	
4	1.01	374	94.68	41.75	-	42.25	40	4.09	852	87.21	
6	1.52	380	96.20	42.25	-	42.75	29	2.97	881	90.17	
1	0.25	381	96.46	42.75	-	43.25	25	2.56	906	92.73	
7	1.77	388	98.23	43.25	-	43.75	25	2.56	931	95.29	
1	0.25	389	98.48	43.75	-	44.25	14	1.43	945	96.72	
2	0.51	391	98.99	44.25	-	44.75	11	1.13	956	97.85	
0	0.00	391	98.99	44.75	-	45.25	6	0.61	962	98.46	
3	0.76	394	99.75	45.25	-	45.75	8	0.82	970	99.28	
0	0.00	394	99.75	45.75	-	46.25	3	0.31	973	99.59	
0	0.00	394	99.75	46.25	-	46.75	1	0.10	974	99.69	
0	0.00	394	99.75	46.75	-	47.25	0	0.00	974	99.69	
0	0.00	394	99.75	47.25	-	47.75	3	0.31	977	100.00	
1	0.25	395	100.00	47.75	-	48.25					

(22) CERVICALE HEIGHT*

The vertical distance between a standing surface and the cervicale landmark is measured with an anthropometer. The participant stands erect with the head in the Frankfurt plane. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
131.70	51.85	1ST	139.60	54.96
132.90	52.32	2ND	141.00	55.51
133.00	52.36	3RD	142.10	55.94
133.80	52.68	5TH	143.50	56.50
134.60	52.99	10TH	145.90	57.44
135.70	53.43	15TH	147.70	58.15
136.80	53.86	20TH	148.50	58.46
137.40	54.09	25TH	149.50	58.86
138.10	54.37	30TH	150.50	59.25
139.00	54.72	35TH	151.30	59.57
139.80	55.04	40TH	152.20	59.92
140.30	55.24	45TH	152.90	60.20
141.20	55.59	50TH	153.80	60.55
141.90	55.87	55TH	154.80	60.94
142.60	56.14	60TH	155.50	61.22
143.00	56.30	65TH	156.20	61.50
143.90	56.65	70TH	157.00	61.81
144.60	56.93	75TH	157.70	62.09
146.20	57.56	80TH	158.50	62.40
147.80	58.19	85TH	160.00	62.99
148.50	58.46	90TH	161.20	63.46
151.20	59.53	95TH	164.00	64.57
151.50	59.65	97TH	165.00	64.96
151.80	59.76	98TH	166.00	65.35
155.00	61.02	99TH	167.10	65.79

* In ANSUR cervicale was defined as the highest point on the seventh cervical vertebra. For consistency with international standards, it is now the most prominent point on the seventh cervical vertebra.

(22) CERVICALE HEIGHT

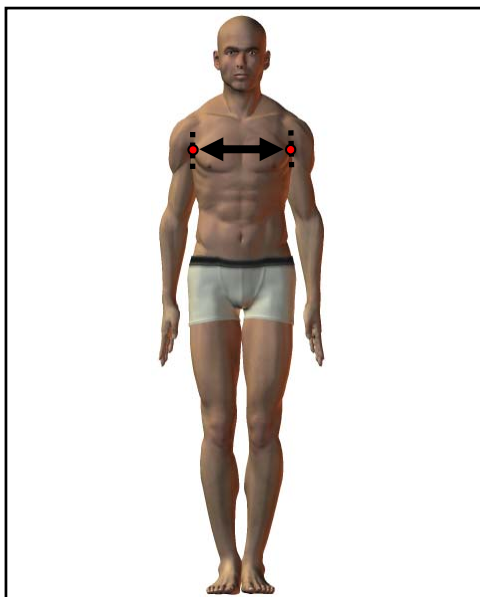
FEMALES		
<u>CM</u>		<u>IN</u>
141.48	MEAN	55.70
0.27	STD ERROR (MEAN)	0.10
5.28	STANDARD DEVIATION	2.08
0.19	STD ERROR (STD DEV)	0.07
128.50	MINIMUM	50.59
158.70	MAXIMUM	62.48
SKEWNESS		0.41
KURTOSIS		2.77
COEFFICIENT OF VARIATION		3.7%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
153.71	MEAN	60.52
0.19	STD ERROR (MEAN)	0.08
6.05	STANDARD DEVIATION	2.38
0.14	STD ERROR (STD DEV)	0.05
131.50	MINIMUM	51.77
176.30	MAXIMUM	69.41
SKEWNESS		-0.03
KURTOSIS		3.04
COEFFICIENT OF VARIATION		3.9%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	128.25 - 129.75							
2	0.51	3	0.76	129.75 - 131.25							
6	1.52	9	2.28	131.25 - 132.75	1	0.10	1	0.10			
19	4.81	28	7.09	132.75 - 134.25	0	0.00	1	0.10			
35	8.86	63	15.95	134.25 - 135.75	0	0.00	1	0.10			
35	8.86	98	24.81	135.75 - 137.25	3	0.31	4	0.41			
42	10.63	140	35.44	137.25 - 138.75	1	0.10	5	0.51			
45	11.39	185	46.84	138.75 - 140.25	7	0.72	12	1.23			
33	8.35	218	55.19	140.25 - 141.75	14	1.43	26	2.66			
42	10.63	260	65.82	141.75 - 143.25	18	1.84	44	4.50			
46	11.65	306	77.47	143.25 - 144.75	28	2.87	72	7.37			
17	4.30	323	81.77	144.75 - 146.25	39	3.99	111	11.36			
15	3.80	338	85.57	146.25 - 147.75	51	5.22	162	16.58			
22	5.57	360	91.14	147.75 - 149.25	78	7.98	240	24.56			
16	4.05	376	95.19	149.25 - 150.75	73	7.47	313	32.04			
12	3.04	388	98.23	150.75 - 152.25	87	8.90	400	40.94			
4	1.01	392	99.24	152.25 - 153.75	94	9.62	494	50.56			
1	0.25	393	99.49	153.75 - 155.25	85	8.70	579	59.26			
1	0.25	394	99.75	155.25 - 156.75	101	10.34	680	69.60			
0	0.00	394	99.75	156.75 - 158.25	83	8.50	763	78.10			
1	0.25	395	100.00	158.25 - 159.75	62	6.35	825	84.44			
				159.75 - 161.25	54	5.53	879	89.97			
				161.25 - 162.75	40	4.09	919	94.06			
				162.75 - 164.25	21	2.15	940	96.21			
				164.25 - 165.75	18	1.84	958	98.06			
				165.75 - 167.25	10	1.02	968	99.08			
				167.25 - 168.75	5	0.51	973	99.59			
				168.75 - 170.25	2	0.20	975	99.80			
				170.25 - 171.75	0	0.00	975	99.80			
				171.75 - 173.25	1	0.10	976	99.90			
				173.25 - 174.75	0	0.00	976	99.90			
				174.75 - 176.25	0	0.00	976	99.90			
				176.25 - 177.75	1	0.10	977	100.00			

(23) CHEST BREADTH*

The maximum horizontal breadth of the chest at the level of the chest point anterior landmark is measured with a beam caliper. The participant stands erect, looking straight ahead with the heels together and the weight distributed evenly on both feet. The participant places both hands on the hips and takes a deep breath and holds it. The tissue is compressed with the beam caliper, and then the participant lowers the arms. The measurement is taken at maximum inspiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
23.90	9.41	1ST	25.70	10.12
24.00	9.45	2ND	25.90	10.20
24.20	9.53	3RD	26.30	10.35
24.60	9.69	5TH	26.70	10.51
24.90	9.80	10TH	27.10	10.67
25.40	10.00	15TH	27.40	10.79
25.60	10.08	20TH	27.80	10.94
25.90	10.20	25TH	28.10	11.06
26.20	10.31	30TH	28.40	11.18
26.40	10.39	35TH	28.70	11.30
26.50	10.43	40TH	29.00	11.42
26.70	10.51	45TH	29.20	11.50
26.90	10.59	50TH	29.40	11.57
27.10	10.67	55TH	29.60	11.65
27.40	10.79	60TH	29.80	11.73
27.70	10.91	65TH	30.00	11.81
28.00	11.02	70TH	30.20	11.89
28.50	11.22	75TH	30.50	12.01
28.80	11.34	80TH	30.80	12.13
29.30	11.54	85TH	31.20	12.28
29.70	11.69	90TH	31.80	12.52
30.40	11.97	95TH	32.40	12.76
31.20	12.28	97TH	33.00	12.99
31.30	12.32	98TH	33.40	13.15
32.40	12.76	99TH	33.90	13.35

* In ANSUR this measurement was taken (in males) at the level of theion (nipple). This change was made in order to capture the breadth of the chest at its maximum. The landmark is unchanged for females. This measurement also differs from ANSUR because the tissue is now compressed and the measurement is taken at maximum inspiration.

(23) CHEST BREADTH

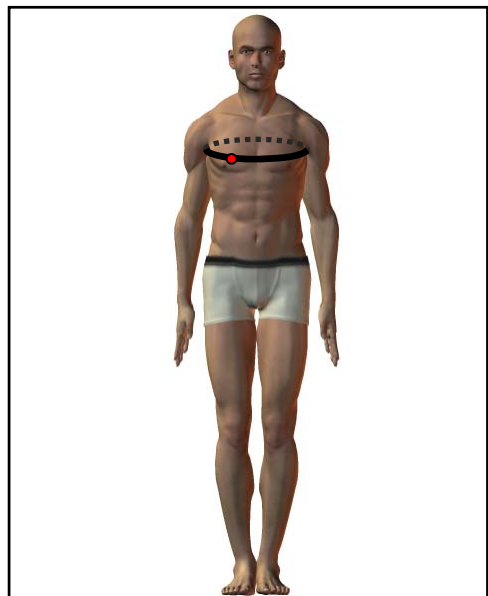
FEMALES		
<u>CM</u>		<u>IN</u>
27.21	MEAN	10.71
0.09	STD ERROR (MEAN)	0.04
1.84	STANDARD DEVIATION	0.72
0.07	STD ERROR (STD DEV)	0.03
23.20	MINIMUM	9.13
33.80	MAXIMUM	13.31
SKEWNESS		0.55
KURTOSIS		3.05
COEFFICIENT OF VARIATION		6.8%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
29.40	MEAN	11.57
0.06	STD ERROR (MEAN)	0.02
1.78	STANDARD DEVIATION	0.70
0.04	STD ERROR (STD DEV)	0.02
24.20	MINIMUM	9.53
35.20	MAXIMUM	13.86
SKEWNESS		0.22
KURTOSIS		3.04
COEFFICIENT OF VARIATION		6.1%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
4	1.01	4	1.01	22.75	-	23.25					
2	0.51	6	1.52	23.25	-	23.75					
11	2.78	17	4.30	23.75	-	24.25	1	0.10			
16	4.05	33	8.35	24.25	-	24.75	2	0.20			
25	6.33	58	14.68	24.75	-	25.25	6	0.61			
42	10.63	100	25.32	25.25	-	25.75	7	0.72			
37	9.37	137	34.68	25.75	-	26.25	19	1.94			
58	14.68	195	49.37	26.25	-	26.75	33	3.38			
44	11.14	239	60.51	26.75	-	27.25	65	6.65			
33	8.35	272	68.86	27.25	-	27.75	80	8.19			
29	7.34	301	76.20	27.75	-	28.25	94	9.62			
29	7.34	330	83.54	28.25	-	28.75	111	11.36			
18	4.56	348	88.10	28.75	-	29.25	102	10.44			
17	4.30	365	92.41	29.25	-	29.75	125	12.79			
9	2.28	374	94.68	29.75	-	30.25	99	10.13			
8	2.03	382	96.71	30.25	-	30.75	70	7.16			
6	1.52	388	98.23	30.75	-	31.25	52	5.32			
2	0.51	390	98.73	31.25	-	31.75	41	4.20			
0	0.00	390	98.73	31.75	-	32.25	24	2.46			
3	0.76	393	99.49	32.25	-	32.75	21	2.15			
1	0.25	394	99.75	32.75	-	33.25	9	0.92			
0	0.00	394	99.75	33.25	-	33.75	9	0.92			
1	0.25	395	100.00	33.75	-	34.25	3	0.31			
				34.25	-	34.75	1	0.10			
				34.75	-	35.25	3	0.31			

(24) CHEST CIRCUMFERENCE*

The maximum horizontal circumference of the chest at the level of chest point, anterior is measured with a tape. The participant stands erect, looking straight ahead. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
79.50	31.30	1ST	91.30	35.94
80.80	31.81	2ND	94.00	37.01
82.00	32.28	3RD	94.70	37.28
83.20	32.76	5TH	96.10	37.83
86.10	33.90	10TH	98.70	38.86
87.20	34.33	15TH	100.30	39.49
88.60	34.88	20TH	101.60	40.00
89.90	35.39	25TH	102.50	40.35
90.60	35.67	30TH	103.40	40.71
91.40	35.98	35TH	104.60	41.18
92.50	36.42	40TH	105.70	41.61
93.70	36.89	45TH	106.80	42.05
94.70	37.28	50TH	108.10	42.56
95.70	37.68	55TH	109.10	42.95
96.70	38.07	60TH	109.70	43.19
97.70	38.46	65TH	111.00	43.70
98.70	38.86	70TH	112.10	44.13
100.10	39.41	75TH	113.40	44.65
101.80	40.08	80TH	115.30	45.39
103.70	40.83	85TH	116.70	45.94
105.70	41.61	90TH	118.70	46.73
109.10	42.95	95TH	121.40	47.80
111.00	43.70	97TH	122.60	48.27
113.80	44.80	98TH	124.60	49.06
117.00	46.06	99TH	126.20	49.69

* In ANSUR this measurement was taken “at the fullest part of the breast”. Although the wording of the definition has changed, the dimensions are equivalent.

(24) CHEST CIRCUMFERENCE

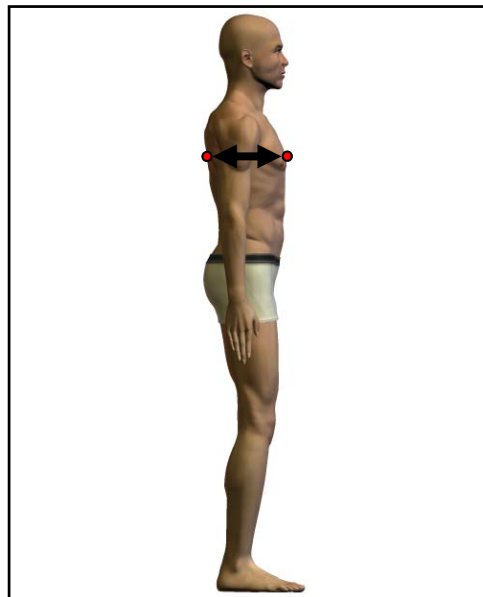
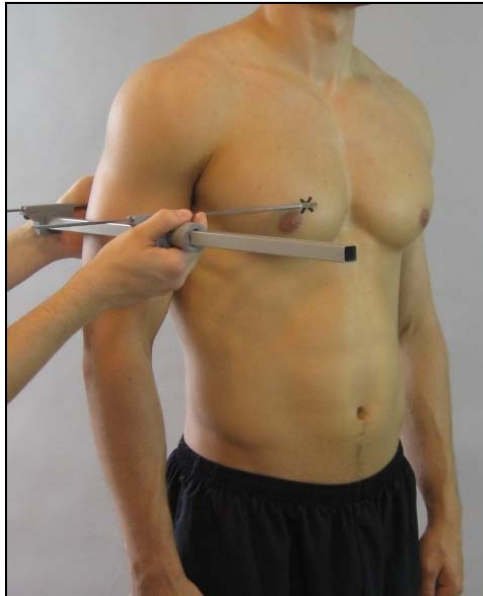
FEMALES		
<u>CM</u>		<u>IN</u>
95.33	MEAN	37.53
0.40	STD ERROR (MEAN)	0.16
7.92	STANDARD DEVIATION	3.12
0.28	STD ERROR (STD DEV)	0.11
77.30	MINIMUM	30.43
122.70	MAXIMUM	48.31
SKEWNESS		0.51
KURTOSIS		3.42
COEFFICIENT OF VARIATION		8.3%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
108.21	MEAN	42.60
0.25	STD ERROR (MEAN)	0.10
7.78	STANDARD DEVIATION	3.06
0.18	STD ERROR (STD DEV)	0.07
86.10	MINIMUM	33.90
133.60	MAXIMUM	52.60
SKEWNESS		0.20
KURTOSIS		2.76
COEFFICIENT OF VARIATION		7.2%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
2	0.51	2	0.51	76.75 - 78.25							
1	0.25	3	0.76	78.25 - 79.75							
4	1.01	7	1.77	79.75 - 81.25							
4	1.01	11	2.78	81.25 - 82.75							
11	2.78	22	5.57	82.75 - 84.25							
16	4.05	38	9.62	84.25 - 85.75							
28	7.09	66	16.71	85.75 - 87.25	2	0.20	2	0.20			
27	6.84	93	23.54	87.25 - 88.75	4	0.41	6	0.61			
26	6.58	119	30.13	88.75 - 90.25	3	0.31	9	0.92			
34	8.61	153	38.73	90.25 - 91.75	8	0.82	17	1.74			
33	8.35	186	47.09	91.75 - 93.25	6	0.61	23	2.35			
28	7.09	214	54.18	93.25 - 94.75	25	2.56	48	4.91			
26	6.58	240	60.76	94.75 - 96.25	26	2.66	74	7.57			
26	6.58	266	67.34	96.25 - 97.75	42	4.30	116	11.87			
24	6.08	290	73.42	97.75 - 99.25	46	4.71	162	16.58			
14	3.54	304	76.96	99.25 - 100.75	63	6.45	225	23.03			
14	3.54	318	80.51	100.75 - 102.25	81	8.29	306	31.32			
19	4.81	337	85.32	102.25 - 103.75	67	6.86	373	38.18			
13	3.29	350	88.61	103.75 - 105.25	88	9.01	461	47.19			
15	3.80	365	92.41	105.25 - 106.75	64	6.55	525	53.74			
9	2.28	374	94.68	106.75 - 108.25	76	7.78	601	61.51			
8	2.03	382	96.71	108.25 - 109.75	89	9.11	690	70.62			
5	1.27	387	97.97	109.75 - 111.25	53	5.42	743	76.05			
1	0.25	388	98.23	111.25 - 112.75	44	4.50	787	80.55			
1	0.25	389	98.48	112.75 - 114.25	34	3.48	821	84.03			
1	0.25	390	98.73	114.25 - 115.75	43	4.40	864	88.43			
1	0.25	391	98.99	115.75 - 117.25	23	2.35	887	90.79			
0	0.00	391	98.99	117.25 - 118.75	26	2.66	913	93.45			
1	0.25	392	99.24	118.75 - 120.25	18	1.84	931	95.29			
2	0.51	394	99.75	120.25 - 121.75	16	1.64	947	96.93			
1	0.25	395	100.00	121.75 - 123.25	11	1.13	958	98.06			
				123.25 - 124.75	6	0.61	964	98.67			
				124.75 - 126.25	5	0.51	969	99.18			
				126.25 - 127.75	2	0.20	971	99.39			
				127.75 - 129.25	2	0.20	973	99.59			
				129.25 - 130.75	2	0.20	975	99.80			
				130.75 - 132.25	0	0.00	975	99.80			
				132.25 - 133.75	2	0.20	977	100.00			

(25) CHEST DEPTH*

The horizontal distance between the chest point anterior landmark and the back at the same level is measured with a beam caliper. The participant stands erect, looking straight ahead. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
19.00	7.48	1ST	20.80	8.19
19.90	7.83	2ND	21.30	8.39
20.20	7.95	3RD	21.60	8.50
20.70	8.15	5TH	21.90	8.62
21.50	8.46	10TH	22.70	8.94
22.10	8.70	15TH	23.20	9.13
22.40	8.82	20TH	23.60	9.29
22.90	9.02	25TH	23.80	9.37
23.20	9.13	30TH	24.20	9.53
23.50	9.25	35TH	24.50	9.65
23.90	9.41	40TH	24.70	9.72
24.20	9.53	45TH	25.10	9.88
24.50	9.65	50TH	25.40	10.00
25.00	9.84	55TH	25.80	10.16
25.30	9.96	60TH	26.10	10.28
25.60	10.08	65TH	26.40	10.39
26.00	10.24	70TH	26.80	10.55
26.60	10.47	75TH	27.10	10.67
27.00	10.63	80TH	27.60	10.87
27.40	10.79	85TH	28.20	11.10
28.20	11.10	90TH	28.60	11.26
29.10	11.46	95TH	29.40	11.57
29.70	11.69	97TH	29.70	11.69
29.80	11.73	98TH	29.90	11.77
31.50	12.40	99TH	30.80	12.13

* In ANSUR this measurement was taken (in males) at the level of thelion (nipple). This change was made in order to capture the depth of the chest at its maximum. The landmark is unchanged for females.

(25) CHEST DEPTH

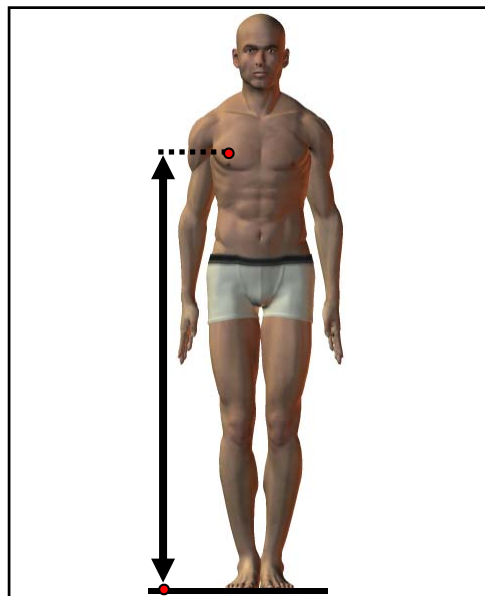
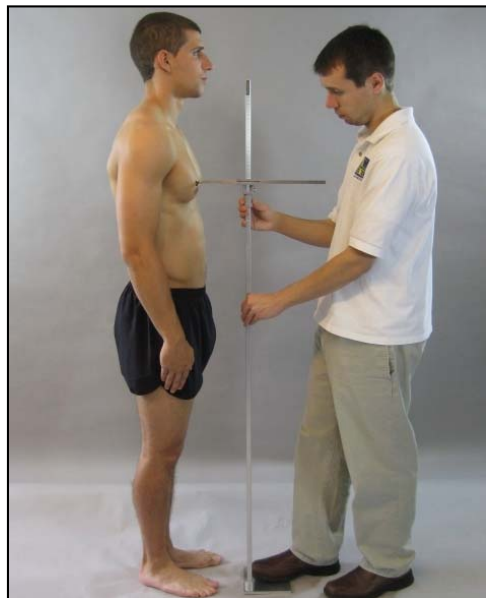
FEMALES		
<u>CM</u>		<u>IN</u>
24.73	MEAN	9.74
0.13	STD ERROR (MEAN)	0.05
2.60	STANDARD DEVIATION	1.02
0.09	STD ERROR (STD DEV)	0.04
18.80	MINIMUM	7.40
33.20	MAXIMUM	13.07
SKEWNESS		0.33
KURTOSIS		3.00
COEFFICIENT OF VARIATION		10.5%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
25.54	MEAN	10.05
0.07	STD ERROR (MEAN)	0.03
2.28	STANDARD DEVIATION	0.90
0.05	STD ERROR (STD DEV)	0.02
19.00	MINIMUM	7.48
32.30	MAXIMUM	12.72
SKEWNESS		0.17
KURTOSIS		2.55
COEFFICIENT OF VARIATION		8.9%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
3	0.76	3	0.76	18.75	-	19.25	2	0.20			
1	0.25	4	1.01	19.25	-	19.75	0	0.20			
7	1.77	11	2.78	19.75	-	20.25	4	0.61			
7	1.77	18	4.56	20.25	-	20.75	9	1.54			
9	2.28	27	6.84	20.75	-	21.25	16	3.17			
23	5.82	50	12.66	21.25	-	21.75	29	6.14			
18	4.56	68	17.22	21.75	-	22.25	43	10.54			
34	8.61	102	25.82	22.25	-	22.75	48	15.46			
27	6.84	129	32.66	22.75	-	23.25	60	21.60			
29	7.34	158	40.00	23.25	-	23.75	84	30.19			
34	8.61	192	48.61	23.75	-	24.25	92	39.61			
31	7.85	223	56.46	24.25	-	24.75	95	49.33			
23	5.82	246	62.28	24.75	-	25.25	79	57.42			
31	7.85	277	70.13	25.25	-	25.75	70	64.59			
11	2.78	288	72.91	25.75	-	26.25	76	72.36			
18	4.56	306	77.47	26.25	-	26.75	63	78.81			
18	4.56	324	82.03	26.75	-	27.25	55	84.44			
17	4.30	341	86.33	27.25	-	27.75	36	88.13			
16	4.05	357	90.38	27.75	-	28.25	26	90.79			
10	2.53	367	92.91	28.25	-	28.75	31	93.96			
7	1.77	374	94.68	28.75	-	29.25	16	95.60			
10	2.53	384	97.22	29.25	-	29.75	21	97.75			
3	0.76	387	97.97	29.75	-	30.25	11	98.87			
3	0.76	390	98.73	30.25	-	30.75	1	98.98			
0	0.00	390	98.73	30.75	-	31.25	4	99.39			
2	0.51	392	99.24	31.25	-	31.75	4	99.80			
1	0.25	393	99.49	31.75	-	32.25	1	99.90			
1	0.25	394	99.75	32.25	-	32.75	1	100.00			
1	0.25	395	100.00	32.75	-	33.25					

(26) CHEST HEIGHT*

The vertical distance between a standing surface and the chest point anterior landmark is measured with an anthropometer. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
109.70	43.19	1ST	119.30	46.97
110.20	43.39	2ND	120.30	47.36
111.00	43.70	3RD	121.00	47.64
111.60	43.94	5TH	122.50	48.23
113.00	44.49	10TH	124.10	48.86
113.50	44.69	15TH	126.00	49.61
114.10	44.92	20TH	126.60	49.84
114.60	45.12	25TH	127.60	50.24
115.30	45.39	30TH	128.50	50.59
115.80	45.59	35TH	129.30	50.91
116.40	45.83	40TH	129.90	51.14
117.30	46.18	45TH	130.60	51.42
117.80	46.38	50TH	131.40	51.73
118.70	46.73	55TH	131.80	51.89
119.30	46.97	60TH	132.80	52.28
120.20	47.32	65TH	133.50	52.56
120.50	47.44	70TH	134.20	52.83
121.50	47.83	75TH	134.90	53.11
122.50	48.23	80TH	135.90	53.50
123.60	48.66	85TH	137.50	54.13
125.70	49.49	90TH	138.50	54.53
127.80	50.31	95TH	140.50	55.31
129.60	51.02	97TH	141.10	55.55
130.20	51.26	98TH	141.90	55.87
130.50	51.38	99TH	143.40	56.46

* In ANSUR this measurement was taken (in males) at the level of the nipple. This change was made in order to capture the height of the chest at its maximum. The landmark is unchanged for females.

(26) CHEST HEIGHT

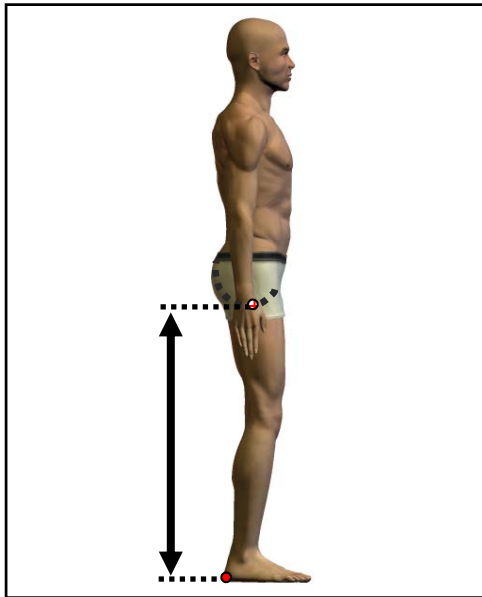
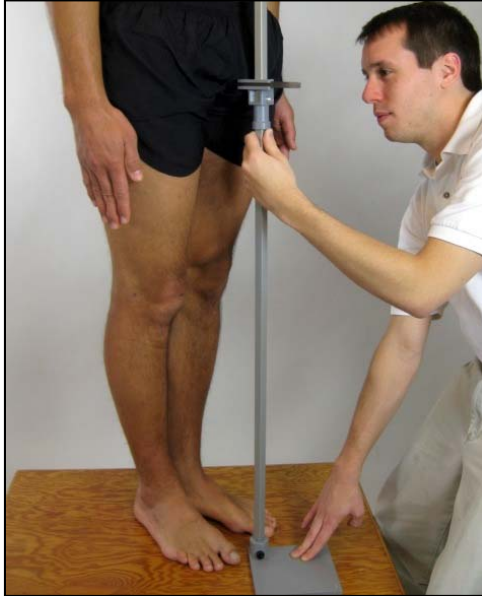
FEMALES		
<u>CM</u>		<u>IN</u>
118.50	MEAN	46.66
0.25	STD ERROR (MEAN)	0.10
4.91	STANDARD DEVIATION	1.93
0.17	STD ERROR (STD DEV)	0.07
107.30	MINIMUM	42.24
133.00	MAXIMUM	52.36
SKEWNESS		0.54
KURTOSIS		2.85
COEFFICIENT OF VARIATION		4.1%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
131.34	MEAN	51.71
0.17	STD ERROR (MEAN)	0.07
5.44	STANDARD DEVIATION	2.14
0.12	STD ERROR (STD DEV)	0.05
112.80	MINIMUM	44.41
150.00	MAXIMUM	59.06
SKEWNESS		0.00
KURTOSIS		2.91
COEFFICIENT OF VARIATION		4.1%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
2	0.51	2	0.51	106.55 - 107.55							
1	0.25	3	0.76	107.55 - 108.55							
4	1.01	7	1.77	108.55 - 109.55							
8	2.03	15	3.80	109.55 - 110.55							
9	2.28	24	6.08	110.55 - 111.55							
18	4.56	42	10.63	111.55 - 112.55							
20	5.06	62	15.70	112.55 - 113.55							
31	7.85	93	23.54	113.55 - 114.55	1	0.10	1	0.10			
34	8.61	127	32.15	114.55 - 115.55	0	0.00	1	0.10			
31	7.85	158	40.00	115.55 - 116.55	1	0.10	2	0.20			
33	8.35	191	48.35	116.55 - 117.55	0	0.00	2	0.20			
29	7.34	220	55.70	117.55 - 118.55	2	0.20	4	0.41			
31	7.85	251	63.54	118.55 - 119.55	3	0.31	7	0.72			
33	8.35	284	71.90	119.55 - 120.55	6	0.61	13	1.33			
19	4.81	303	76.71	120.55 - 121.55	13	1.33	26	2.66			
15	3.80	318	80.51	121.55 - 122.55	11	1.13	37	3.79			
16	4.05	334	84.56	122.55 - 123.55	12	1.23	49	5.02			
13	3.29	347	87.85	123.55 - 124.55	34	3.48	83	8.50			
12	3.04	359	90.89	124.55 - 125.55	23	2.35	106	10.85			
8	2.03	367	92.91	125.55 - 126.55	31	3.17	137	14.02			
10	2.53	377	95.44	126.55 - 127.55	56	5.73	193	19.75			
6	1.52	383	96.96	127.55 - 128.55	43	4.40	236	24.16			
3	0.76	386	97.72	128.55 - 129.55	58	5.94	294	30.09			
6	1.52	392	99.24	129.55 - 130.55	67	6.86	361	36.95			
2	0.51	394	99.75	130.55 - 131.55	75	7.68	436	44.63			
0	0.00	394	99.75	131.55 - 132.55	74	7.57	510	52.20			
1	0.25	395	100.00	132.55 - 133.55	69	7.06	579	59.26			
				133.55 - 134.55	63	6.45	642	65.71			
				134.55 - 135.55	59	6.04	701	71.75			
				135.55 - 136.55	65	6.65	766	78.40			
				136.55 - 137.55	43	4.40	809	82.80			
				137.55 - 138.55	28	2.87	837	85.67			
				138.55 - 139.55	43	4.40	880	90.07			
				139.55 - 140.55	31	3.17	911	93.24			
				140.55 - 141.55	23	2.35	934	95.60			
				141.55 - 142.55	19	1.94	953	97.54			
				142.55 - 143.55	7	0.72	960	98.26			
				143.55 - 144.55	6	0.61	966	98.87			
				144.55 - 145.55	5	0.51	971	99.39			
				145.55 - 146.55	3	0.31	974	99.69			
				146.55 - 147.55	0	0.00	974	99.69			
				147.55 - 148.55	1	0.10	975	99.80			
				148.55 - 149.55	0	0.00	975	99.80			
				149.55 - 150.55	1	0.10	976	99.90			
					1	0.10	977	100.00			

(27) CROTCH HEIGHT

The vertical distance between the standing surface and the crotch is measured with an anthropometer. The participant stands erect, looking straight ahead. The heels are together, and the weight is distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
72.70	28.62	1ST	76.00	29.92
73.10	28.78	2ND	77.60	30.55
73.40	28.90	3RD	78.30	30.83
74.00	29.13	5TH	79.10	31.14
74.60	29.37	10TH	80.80	31.81
75.20	29.61	15TH	81.60	32.13
75.60	29.76	20TH	82.50	32.48
76.40	30.08	25TH	83.30	32.80
76.60	30.16	30TH	83.90	33.03
77.20	30.39	35TH	84.30	33.19
77.50	30.51	40TH	84.90	33.43
78.00	30.71	45TH	85.50	33.66
78.50	30.91	50TH	85.90	33.82
78.90	31.06	55TH	86.50	34.06
79.30	31.22	60TH	87.10	34.29
79.90	31.46	65TH	87.60	34.49
80.40	31.65	70TH	88.10	34.69
81.00	31.89	75TH	88.70	34.92
81.90	32.24	80TH	89.60	35.28
82.80	32.60	85TH	90.50	35.63
84.20	33.15	90TH	91.40	35.98
85.70	33.74	95TH	92.90	36.57
86.20	33.94	97TH	93.70	36.89
87.00	34.25	98TH	94.40	37.17
87.80	34.57	99TH	95.50	37.60

(27) CROTCH HEIGHT

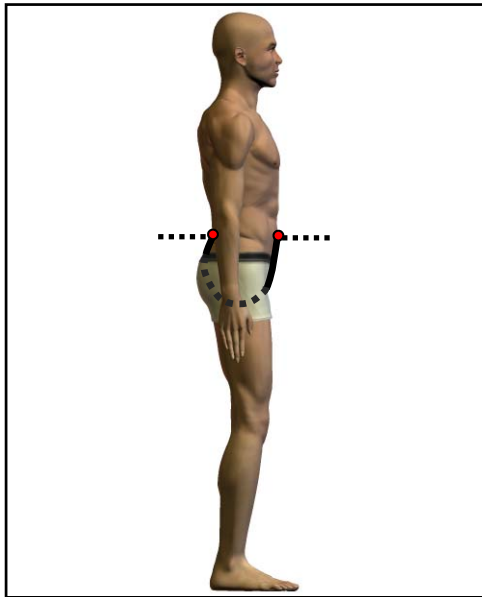
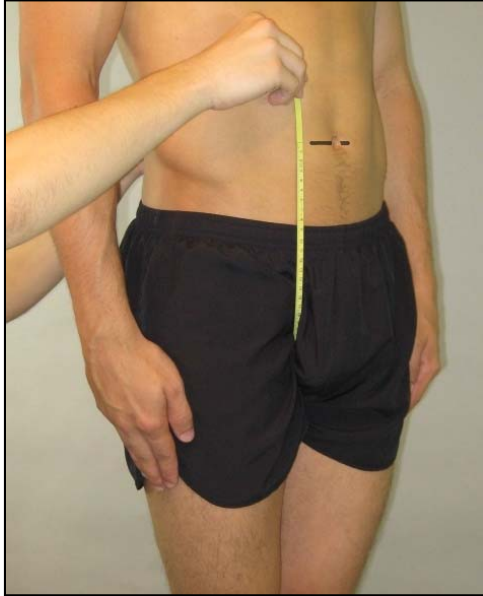
FEMALES		
<u>CM</u>		<u>IN</u>
78.87	MEAN	31.05
0.18	STD ERROR (MEAN)	0.07
3.56	STANDARD DEVIATION	1.40
0.13	STD ERROR (STD DEV)	0.05
72.40	MINIMUM	28.50
91.80	MAXIMUM	36.14
SKEWNESS		0.62
KURTOSIS		3.08
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
86.03	MEAN	33.87
0.13	STD ERROR (MEAN)	0.05
4.19	STANDARD DEVIATION	1.65
0.09	STD ERROR (STD DEV)	0.04
72.80	MINIMUM	28.66
101.10	MAXIMUM	39.80
SKEWNESS		0.05
KURTOSIS		3.19
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE												
FEMALES					MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct				
2	0.51	2	0.51	71.55	-	72.55			2	0.20	2	0.20
11	2.78	13	3.29	72.55	-	73.55			1	0.10	3	0.31
22	5.57	35	8.86	73.55	-	74.55			0	0.00	3	0.31
31	7.85	66	16.71	74.55	-	75.55			5	0.51	8	0.82
35	8.86	101	25.57	75.55	-	76.55			8	0.82	16	1.64
44	11.14	145	36.71	76.55	-	77.55			17	1.74	33	3.38
35	8.86	180	45.57	77.55	-	78.55			24	2.46	57	5.83
46	11.65	226	57.22	78.55	-	79.55			31	3.17	88	9.01
39	9.87	265	67.09	79.55	-	80.55			49	5.02	137	14.02
32	8.10	297	75.19	80.55	-	81.55			59	6.04	196	20.06
25	6.33	322	81.52	81.55	-	82.55			68	6.96	264	27.02
12	3.04	334	84.56	82.55	-	83.55			84	8.60	348	35.62
19	4.81	353	89.37	83.55	-	84.55			91	9.31	439	44.93
15	3.80	368	93.16	84.55	-	85.55			94	9.62	533	54.55
8	2.03	376	95.19	85.55	-	86.55			87	8.90	620	63.46
9	2.28	385	97.47	86.55	-	87.55			89	9.11	709	72.57
8	2.03	393	99.49	87.55	-	88.55			47	4.81	756	77.38
0	0.00	393	99.49	88.55	-	89.55			69	7.06	825	84.44
0	0.00	393	99.49	89.55	-	90.55			56	5.73	881	90.17
1	0.25	394	99.75	90.55	-	91.55			32	3.28	913	93.45
1	0.25	395	100.00	91.55	-	92.55			24	2.46	937	95.91
				92.55	-	93.55			19	1.94	956	97.85
				93.55	-	94.55			10	1.02	966	98.87
				94.55	-	95.55			4	0.41	970	99.28
				95.55	-	96.55			2	0.20	972	99.49
				96.55	-	97.55			2	0.20	974	99.69
				97.55	-	98.55			0	0.00	974	99.69
				98.55	-	99.55			2	0.20	976	99.90
				99.55	-	100.55			1	0.10	977	100.00
				100.55	-	101.55						

(28) CROTCH LENGTH (OMPHALION)

The distance between the abdomen at the level of the omphalion landmark to the same level on the back is measured with a tape passing through the crotch to the right of the genitalia. The tape is held vertically both in front and in back. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
53.40	21.02	1ST	53.80	21.18
54.80	21.57	2ND	54.70	21.54
55.20	21.73	3RD	55.70	21.93
56.20	22.13	5TH	56.20	22.13
57.20	22.52	10TH	57.60	22.68
58.30	22.95	15TH	58.70	23.11
59.00	23.23	20TH	59.30	23.35
59.90	23.58	25TH	59.80	23.54
60.80	23.94	30TH	60.40	23.78
61.30	24.13	35TH	61.10	24.06
61.80	24.33	40TH	61.60	24.25
62.10	24.45	45TH	62.30	24.53
62.40	24.57	50TH	62.80	24.72
63.00	24.80	55TH	63.40	24.96
63.40	24.96	60TH	63.90	25.16
64.10	25.24	65TH	64.40	25.35
64.50	25.39	70TH	65.10	25.63
65.50	25.79	75TH	65.70	25.87
66.30	26.10	80TH	66.40	26.14
67.30	26.50	85TH	67.40	26.54
68.30	26.89	90TH	68.60	27.01
70.60	27.80	95TH	69.90	27.52
71.20	28.03	97TH	71.20	28.03
71.40	28.11	98TH	71.60	28.19
72.70	28.62	99TH	73.40	28.90

(28) CROTCH LENGTH (OMPHALION)

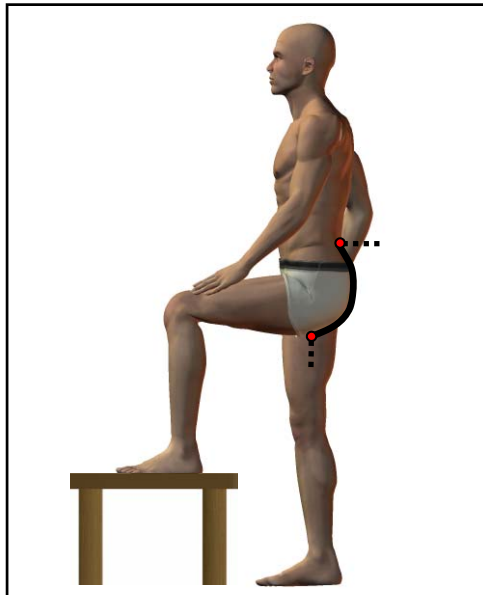
FEMALES		
CM		IN
62.76	MEAN	24.71
0.21	STD ERROR (MEAN)	0.08
4.23	STANDARD DEVIATION	1.67
0.15	STD ERROR (STD DEV)	0.06
52.10	MINIMUM	20.51
74.80	MAXIMUM	29.45
SKEWNESS		0.21
KURTOSIS		2.94
COEFFICIENT OF VARIATION		6.7%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
62.91	MEAN	24.77
0.14	STD ERROR (MEAN)	0.05
4.24	STANDARD DEVIATION	1.67
0.10	STD ERROR (STD DEV)	0.04
50.50	MINIMUM	19.88
77.80	MAXIMUM	30.63
SKEWNESS		0.22
KURTOSIS		2.92
COEFFICIENT OF VARIATION		6.7%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	CM	F	FPct	CumF	CumFPct			
				49.55	1	0.10	1	0.10			
				50.55	2	0.20	3	0.31			
1	0.25	1	0.25	51.55	2	0.20	5	0.51			
5	1.27	6	1.52	52.55	4	0.41	9	0.92			
3	0.76	9	2.28	53.55	13	1.33	22	2.25			
10	2.53	19	4.81	54.55	14	1.43	36	3.68			
17	4.30	36	9.11	55.55	35	3.58	71	7.27			
21	5.32	57	14.43	56.55	42	4.30	113	11.57			
26	6.58	83	21.01	57.55	65	6.65	178	18.22			
20	5.06	103	26.08	58.55	72	7.37	250	25.59			
24	6.08	127	32.15	59.55	75	7.68	325	33.27			
37	9.37	164	41.52	60.55	92	9.42	417	42.68			
52	13.16	216	54.68	61.55	91	9.31	508	52.00			
44	11.14	260	65.82	62.55	82	8.39	590	60.39			
27	6.84	287	72.66	63.55	84	8.60	674	68.99			
24	6.08	311	78.73	64.55	72	7.37	746	76.36			
19	4.81	330	83.54	65.55	68	6.96	814	83.32			
20	5.06	350	88.61	66.55	48	4.91	862	88.23			
15	3.80	365	92.41	67.55	38	3.89	900	92.12			
11	2.78	376	95.19	68.55	27	2.76	927	94.88			
6	1.52	382	96.71	69.55	22	2.25	949	97.13			
7	1.77	389	98.48	70.55	9	0.92	958	98.06			
2	0.51	391	98.99	71.55	6	0.61	964	98.67			
1	0.25	392	99.24	72.55	5	0.51	969	99.18			
1	0.25	393	99.49	73.55	2	0.20	971	99.39			
2	0.51	395	100.00	74.55	3	0.31	974	99.69			
				75.55	2	0.20	976	99.90			
				76.55	0	0.00	976	99.90			
				77.55	1	0.10	977	100.00			

(29) CROTCH LENGTH, POSTERIOR (OMPHALION)

The surface distance from the crotch at the inner thigh landmark to the omphalion posterior landmark is measured with a tape. The tape passes between the buttocks to the back of the waist. The participant stands with the left foot on a platform so that the knee is flexed.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
27.60	10.87	1ST	30.60	12.05
28.90	11.38	2ND	31.00	12.20
29.30	11.54	3RD	31.20	12.28
29.90	11.77	5TH	31.70	12.48
30.90	12.17	10TH	32.40	12.76
31.30	12.32	15TH	33.00	12.99
32.00	12.60	20TH	33.40	13.15
32.50	12.80	25TH	33.70	13.27
32.80	12.91	30TH	34.00	13.39
33.20	13.07	35TH	34.30	13.50
33.50	13.19	40TH	34.70	13.66
33.70	13.27	45TH	34.80	13.70
34.00	13.39	50TH	35.20	13.86
34.30	13.50	55TH	35.40	13.94
34.60	13.62	60TH	35.80	14.09
35.50	13.98	65TH	36.10	14.21
35.80	14.09	70TH	36.40	14.33
36.20	14.25	75TH	36.80	14.49
36.50	14.37	80TH	37.00	14.57
37.10	14.61	85TH	37.40	14.72
37.80	14.88	90TH	37.90	14.92
38.80	15.28	95TH	39.00	15.35
39.40	15.51	97TH	39.70	15.63
40.20	15.83	98TH	39.90	15.71
41.90	16.50	99TH	40.40	15.91

(29) CROTCH LENGTH, POSTERIOR (OMPHALION)

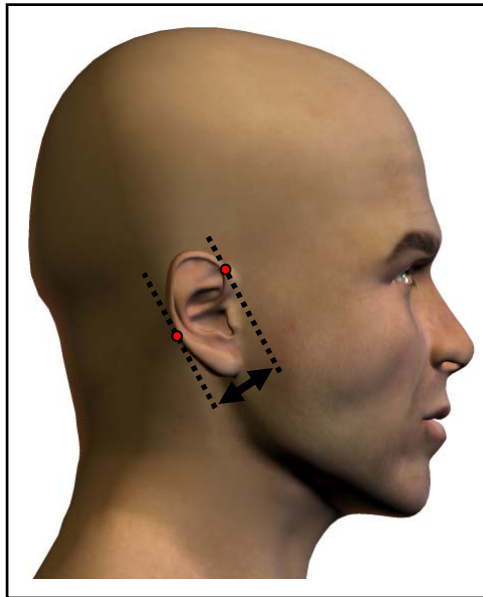
FEMALES		
<u>CM</u>		<u>IN</u>
34.28	MEAN	13.50
0.14	STD ERROR (MEAN)	0.06
2.79	STANDARD DEVIATION	1.10
0.10	STD ERROR (STD DEV)	0.04
27.00	MINIMUM	10.63
45.10	MAXIMUM	17.76
SKEWNESS		0.32
KURTOSIS		3.55
COEFFICIENT OF VARIATION		8.1%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
35.24	MEAN	13.88
0.07	STD ERROR (MEAN)	0.03
2.20	STANDARD DEVIATION	0.87
0.05	STD ERROR (STD DEV)	0.02
29.10	MINIMUM	11.46
43.90	MAXIMUM	17.28
SKEWNESS		0.21
KURTOSIS		3.06
COEFFICIENT OF VARIATION		6.2%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	26.75 - 27.25							
3	0.76	4	1.01	27.25 - 27.75							
1	0.25	5	1.27	27.75 - 28.25							
3	0.76	8	2.03	28.25 - 28.75							
6	1.52	14	3.54	28.75 - 29.25	1	0.10	1	0.10			
11	2.78	25	6.33	29.25 - 29.75	1	0.10	2	0.20			
10	2.53	35	8.86	29.75 - 30.25	3	0.31	5	0.51			
14	3.54	49	12.41	30.25 - 30.75	6	0.61	11	1.13			
20	5.06	69	17.47	30.75 - 31.25	14	1.43	25	2.56			
17	4.30	86	21.77	31.25 - 31.75	18	1.84	43	4.40			
23	5.82	109	27.59	31.75 - 32.25	28	2.87	71	7.27			
22	5.57	131	33.16	32.25 - 32.75	36	3.68	107	10.95			
29	7.34	160	40.51	32.75 - 33.25	50	5.12	157	16.07			
29	7.34	189	47.85	33.25 - 33.75	73	7.47	230	23.54			
36	9.11	225	56.96	33.75 - 34.25	86	8.80	316	32.34			
22	5.57	247	62.53	34.25 - 34.75	69	7.06	385	39.41			
13	3.29	260	65.82	34.75 - 35.25	93	9.52	478	48.93			
25	6.33	285	72.15	35.25 - 35.75	67	6.86	545	55.78			
26	6.58	311	78.73	35.75 - 36.25	94	9.62	639	65.40			
17	4.30	328	83.04	36.25 - 36.75	83	8.50	722	73.90			
13	3.29	341	86.33	36.75 - 37.25	78	7.98	800	81.88			
16	4.05	357	90.38	37.25 - 37.75	50	5.12	850	87.00			
12	3.04	369	93.42	37.75 - 38.25	31	3.17	881	90.17			
3	0.76	372	94.18	38.25 - 38.75	27	2.76	908	92.94			
9	2.28	381	96.46	38.75 - 39.25	26	2.66	934	95.60			
2	0.51	383	96.96	39.25 - 39.75	13	1.33	947	96.93			
4	1.01	387	97.97	39.75 - 40.25	12	1.23	959	98.16			
3	0.76	390	98.73	40.25 - 40.75	6	0.61	965	98.77			
2	0.51	392	99.24	40.75 - 41.25	5	0.51	970	99.28			
0	0.00	392	99.24	41.25 - 41.75	4	0.41	974	99.69			
1	0.25	393	99.49	41.75 - 42.25	1	0.10	975	99.80			
1	0.25	394	99.75	42.25 - 42.75	0	0.00	975	99.80			
0	0.00	394	99.75	42.75 - 43.25	1	0.10	976	99.90			
0	0.00	394	99.75	43.25 - 43.75	0	0.00	976	99.90			
0	0.00	394	99.75	43.75 - 44.25	1	0.10	977	100.00			
0	0.00	394	99.75	44.25 - 44.75							
1	0.25	395	100.00	44.75 - 45.25							

(30) EAR BREADTH

The maximum breadth of the right ear perpendicular to its long axis is measured with a sliding caliper.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
2.80	1.10	1ST	2.90	1.14
2.80	1.10	2ND	3.00	1.18
2.80	1.10	3RD	3.00	1.18
2.90	1.14	5TH	3.10	1.22
3.00	1.18	10TH	3.20	1.26
3.00	1.18	15TH	3.30	1.30
3.10	1.22	20TH	3.30	1.30
3.20	1.26	25TH	3.30	1.30
3.20	1.26	30TH	3.40	1.34
3.20	1.26	35TH	3.40	1.34
3.30	1.30	40TH	3.40	1.34
3.30	1.30	45TH	3.50	1.38
3.30	1.30	50TH	3.50	1.38
3.40	1.34	55TH	3.50	1.38
3.40	1.34	60TH	3.60	1.42
3.40	1.34	65TH	3.60	1.42
3.50	1.38	70TH	3.70	1.46
3.50	1.38	75TH	3.70	1.46
3.50	1.38	80TH	3.80	1.50
3.60	1.42	85TH	3.80	1.50
3.60	1.42	90TH	3.90	1.54
3.70	1.46	95TH	4.00	1.57
3.70	1.46	97TH	4.00	1.57
3.80	1.50	98TH	4.10	1.61
3.90	1.54	99TH	4.20	1.65

(30) EAR BREADTH

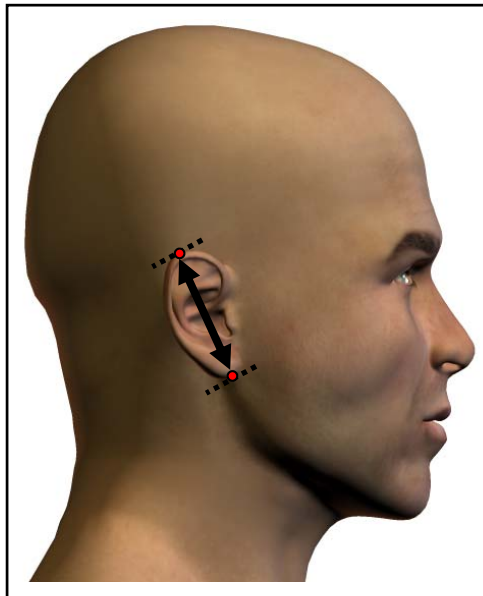
FEMALES		
<u>CM</u>		<u>IN</u>
3.32	MEAN	1.31
0.01	STD ERROR (MEAN)	0.01
0.25	STANDARD DEVIATION	0.10
0.01	STD ERROR (STD DEV)	0.00
2.50	MINIMUM	0.98
4.10	MAXIMUM	1.61
SKEWNESS		-0.11
KURTOSIS		2.69
COEFFICIENT OF VARIATION		7.6%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
3.53	MEAN	1.39
0.01	STD ERROR (MEAN)	0.00
0.27	STANDARD DEVIATION	0.11
0.01	STD ERROR (STD DEV)	0.00
2.70	MINIMUM	1.06
4.40	MAXIMUM	1.73
SKEWNESS		0.17
KURTOSIS		3.23
COEFFICIENT OF VARIATION		7.7%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE										
FEMALES							MALES			
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct	
1	0.25	1	0.25	2.45	-	2.55				
0	0.00	1	0.25	2.55	-	2.65				
3	0.76	4	1.01	2.65	-	2.75	1	0.10	1	0.10
10	2.53	14	3.54	2.75	-	2.85	2	0.20	3	0.31
18	4.56	32	8.10	2.85	-	2.95	10	1.02	13	1.33
35	8.86	67	16.96	2.95	-	3.05	37	3.79	50	5.12
27	6.84	94	23.80	3.05	-	3.15	38	3.89	88	9.01
46	11.65	140	35.44	3.15	-	3.25	70	7.16	158	16.17
62	15.70	202	51.14	3.25	-	3.35	111	11.36	269	27.53
56	14.18	258	65.32	3.35	-	3.45	159	16.27	428	43.81
54	13.67	312	78.99	3.45	-	3.55	152	15.56	580	59.37
43	10.89	355	89.87	3.55	-	3.65	107	10.95	687	70.32
25	6.33	380	96.20	3.65	-	3.75	122	12.49	809	82.80
6	1.52	386	97.72	3.75	-	3.85	81	8.29	890	91.10
5	1.27	391	98.99	3.85	-	3.95	49	5.02	939	96.11
2	0.51	393	99.49	3.95	-	4.05	22	2.25	961	98.36
2	0.51	395	100.00	4.05	-	4.15	8	0.82	969	99.18
				4.15	-	4.25	4	0.41	973	99.59
				4.25	-	4.35	1	0.10	974	99.69
				4.35	-	4.45	3	0.31	977	100.00

(31) EAR LENGTH

The length of the right ear, from its highest to lowest points on a line parallel to the long axis of the ear, is measured with a sliding caliper.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
5.20	2.05	1ST	5.50	2.17
5.20	2.05	2ND	5.70	2.24
5.30	2.09	3RD	5.80	2.28
5.50	2.17	5TH	5.90	2.32
5.50	2.17	10TH	6.00	2.36
5.60	2.20	15TH	6.10	2.40
5.70	2.24	20TH	6.20	2.44
5.70	2.24	25TH	6.20	2.44
5.80	2.28	30TH	6.30	2.48
5.80	2.28	35TH	6.30	2.48
5.80	2.28	40TH	6.40	2.52
5.90	2.32	45TH	6.40	2.52
6.00	2.36	50TH	6.50	2.56
6.00	2.36	55TH	6.60	2.60
6.00	2.36	60TH	6.60	2.60
6.10	2.40	65TH	6.70	2.64
6.20	2.44	70TH	6.70	2.64
6.20	2.44	75TH	6.80	2.68
6.40	2.52	80TH	6.90	2.72
6.40	2.52	85TH	7.00	2.76
6.50	2.56	90TH	7.10	2.80
6.60	2.60	95TH	7.30	2.87
6.70	2.64	97TH	7.40	2.91
6.80	2.68	98TH	7.50	2.95
6.80	2.68	99TH	7.70	3.03

(31) EAR LENGTH

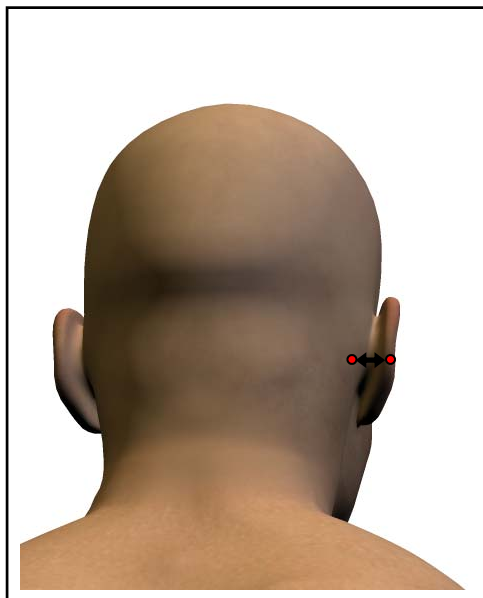
FEMALES		
<u>CM</u>		<u>IN</u>
5.99	MEAN	2.36
0.02	STD ERROR (MEAN)	0.01
0.37	STANDARD DEVIATION	0.15
0.01	STD ERROR (STD DEV)	0.01
4.70	MINIMUM	1.85
7.10	MAXIMUM	2.80
SKEWNESS		0.19
KURTOSIS		2.79
COEFFICIENT OF VARIATION		6.3%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
6.53	MEAN	2.57
0.01	STD ERROR (MEAN)	0.01
0.44	STANDARD DEVIATION	0.17
0.01	STD ERROR (STD DEV)	0.00
5.00	MINIMUM	1.97
7.90	MAXIMUM	3.11
SKEWNESS		0.26
KURTOSIS		3.14
COEFFICIENT OF VARIATION		6.8%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	4.65 - 4.75							
0	0.00	1	0.25	4.75 - 4.85							
0	0.00	1	0.25	4.85 - 4.95							
2	0.51	3	0.76	4.95 - 5.05	1	0.10	1	0.10			
2	0.51	5	1.27	5.05 - 5.15	0	0.00	1	0.10			
6	1.52	11	2.78	5.15 - 5.25	1	0.10	2	0.20			
2	0.51	13	3.29	5.25 - 5.35	0	0.00	2	0.20			
8	2.03	21	5.32	5.35 - 5.45	2	0.20	4	0.41			
31	7.85	52	13.16	5.45 - 5.55	10	1.02	14	1.43			
24	6.08	76	19.24	5.55 - 5.65	9	0.92	23	2.35			
38	9.62	114	28.86	5.65 - 5.75	20	2.05	43	4.40			
44	11.14	158	40.00	5.75 - 5.85	19	1.94	62	6.35			
26	6.58	184	46.58	5.85 - 5.95	32	3.28	94	9.62			
63	15.95	247	62.53	5.95 - 6.05	78	7.98	172	17.60			
30	7.59	277	70.13	6.05 - 6.15	77	7.88	249	25.49			
22	5.57	299	75.70	6.15 - 6.25	105	10.75	354	36.23			
18	4.56	317	80.25	6.25 - 6.35	81	8.29	435	44.52			
30	7.59	347	87.85	6.35 - 6.45	111	11.36	546	55.89			
21	5.32	368	93.16	6.45 - 6.55	73	7.47	619	63.36			
9	2.28	377	95.44	6.55 - 6.65	78	7.98	697	71.34			
8	2.03	385	97.47	6.65 - 6.75	81	8.29	778	79.63			
8	2.03	393	99.49	6.75 - 6.85	52	5.32	830	84.95			
1	0.25	394	99.75	6.85 - 6.95	45	4.61	875	89.56			
0	0.00	394	99.75	6.95 - 7.05	46	4.71	921	94.27			
1	0.25	395	100.00	7.05 - 7.15	21	2.15	942	96.42			
				7.15 - 7.25	12	1.23	954	97.65			
				7.25 - 7.35	8	0.82	962	98.46			
				7.35 - 7.45	7	0.72	969	99.18			
				7.45 - 7.55	3	0.31	972	99.49			
				7.55 - 7.65	1	0.10	973	99.59			
				7.65 - 7.75	2	0.20	975	99.80			
				7.75 - 7.85	0	0.00	975	99.80			
				7.85 - 7.95	2	0.20	977	100.00			

(32) EAR PROTRUSION

The horizontal distance between the mastoid process and the outside edge of the right ear at its most lateral point is measured using a sliding caliper with its slide reversed.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
1.60	0.63	1ST	1.70	0.67
1.60	0.63	2ND	1.70	0.67
1.60	0.63	3RD	1.70	0.67
1.70	0.67	5TH	1.80	0.71
1.70	0.67	10TH	1.90	0.75
1.80	0.71	15TH	1.90	0.75
1.80	0.71	20TH	2.00	0.79
1.90	0.75	25TH	2.00	0.79
1.90	0.75	30TH	2.10	0.83
2.00	0.79	35TH	2.10	0.83
2.00	0.79	40TH	2.20	0.87
2.00	0.79	45TH	2.20	0.87
2.10	0.83	50TH	2.20	0.87
2.10	0.83	55TH	2.30	0.91
2.10	0.83	60TH	2.30	0.91
2.20	0.87	65TH	2.40	0.94
2.20	0.87	70TH	2.40	0.94
2.20	0.87	75TH	2.40	0.94
2.30	0.91	80TH	2.50	0.98
2.30	0.91	85TH	2.50	0.98
2.40	0.94	90TH	2.60	1.02
2.50	0.98	95TH	2.70	1.06
2.60	1.02	97TH	2.90	1.14
2.70	1.06	98TH	2.90	1.14
2.70	1.06	99TH	2.90	1.14

(32) EAR PROTRUSION

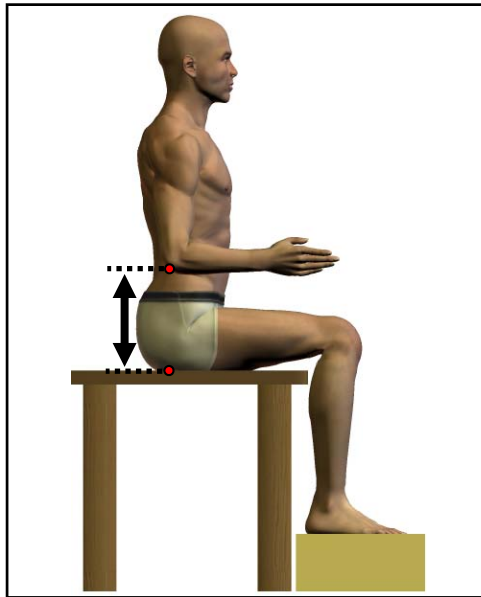
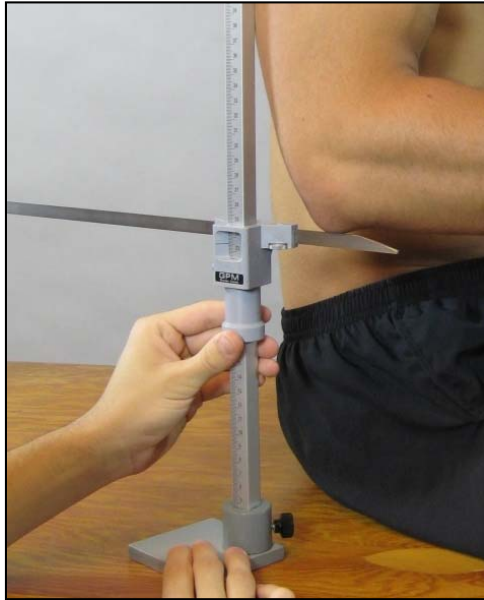
FEMALES		
<u>CM</u>		<u>IN</u>
2.07	MEAN	0.81
0.01	STD ERROR (MEAN)	0.01
0.26	STANDARD DEVIATION	0.10
0.01	STD ERROR (STD DEV)	0.00
1.30	MINIMUM	0.51
3.00	MAXIMUM	1.18
SKEWNESS		0.39
KURTOSIS		3.62
COEFFICIENT OF VARIATION		12.7%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
2.25	MEAN	0.88
0.01	STD ERROR (MEAN)	0.00
0.29	STANDARD DEVIATION	0.11
0.01	STD ERROR (STD DEV)	0.00
1.60	MINIMUM	0.63
3.30	MAXIMUM	1.30
SKEWNESS		0.32
KURTOSIS		2.86
COEFFICIENT OF VARIATION		13.0%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	1.25 - 1.35							
2	0.51	3	0.76	1.35 - 1.45							
3	0.76	6	1.52	1.45 - 1.55							
18	4.56	24	6.08	1.55 - 1.65	3	0.31	3	0.31			
31	7.85	55	13.92	1.65 - 1.75	23	2.35	26	2.66			
36	9.11	91	23.04	1.75 - 1.85	40	4.09	66	6.76			
56	14.18	147	37.22	1.85 - 1.95	81	8.29	147	15.05			
69	17.47	216	54.68	1.95 - 2.05	122	12.49	269	27.53			
47	11.90	263	66.58	2.05 - 2.15	104	10.64	373	38.18			
49	12.41	312	78.99	2.15 - 2.25	133	13.61	506	51.79			
38	9.62	350	88.61	2.25 - 2.35	108	11.05	614	62.85			
20	5.06	370	93.67	2.35 - 2.45	128	13.10	742	75.95			
9	2.28	379	95.95	2.45 - 2.55	99	10.13	841	86.08			
7	1.77	386	97.72	2.55 - 2.65	51	5.22	892	91.30			
7	1.77	393	99.49	2.65 - 2.75	42	4.30	934	95.60			
0	0.00	393	99.49	2.75 - 2.85	19	1.94	953	97.54			
0	0.00	393	99.49	2.85 - 2.95	15	1.54	968	99.08			
2	0.51	395	100.00	2.95 - 3.05	4	0.41	972	99.49			
				3.05 - 3.15	2	0.20	974	99.69			
				3.15 - 3.25	1	0.10	975	99.80			
				3.25 - 3.35	2	0.20	977	100.00			

(33) ELBOW REST HEIGHT

The vertical distance between a sitting surface and the olecranon, bottom landmark on the flexed right elbow, is measured with an anthropometer. The participant sits erect, looking straight ahead. The shoulders and upper arms are relaxed, and the forearms and hands are extended forward horizontally with the palms facing each other. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
18.20	7.17	1ST	19.00	7.48
18.70	7.36	2ND	19.50	7.68
19.20	7.56	3RD	20.30	7.99
20.10	7.91	5TH	21.20	8.35
20.70	8.15	10TH	22.00	8.66
21.60	8.50	15TH	22.50	8.86
22.00	8.66	20TH	23.00	9.06
22.30	8.78	25TH	23.40	9.21
22.60	8.90	30TH	23.60	9.29
23.00	9.06	35TH	24.00	9.45
23.20	9.13	40TH	24.30	9.57
23.30	9.17	45TH	24.60	9.69
23.70	9.33	50TH	24.90	9.80
24.00	9.45	55TH	25.30	9.96
24.30	9.57	60TH	25.70	10.12
24.70	9.72	65TH	26.10	10.28
25.20	9.92	70TH	26.60	10.47
25.60	10.08	75TH	27.00	10.63
25.90	10.20	80TH	27.40	10.79
26.30	10.35	85TH	28.00	11.02
26.80	10.55	90TH	28.40	11.18
28.50	11.22	95TH	29.50	11.61
29.00	11.42	97TH	29.90	11.77
29.40	11.57	98TH	30.40	11.97
30.50	12.01	99TH	30.90	12.17

(33) ELBOW REST HEIGHT

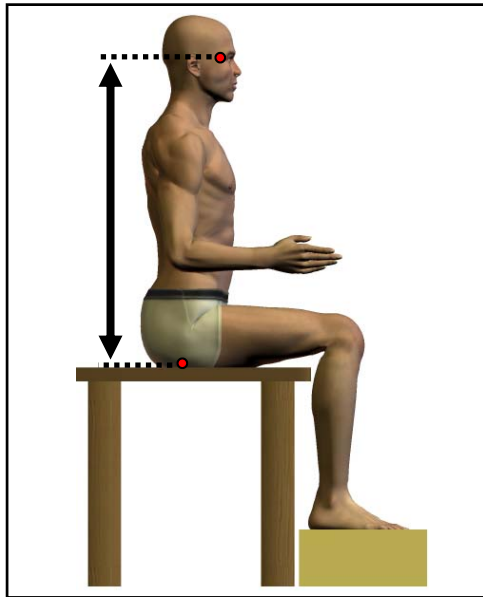
FEMALES		
CM		IN
23.89	MEAN	9.40
0.12	STD ERROR (MEAN)	0.05
2.47	STANDARD DEVIATION	0.97
0.09	STD ERROR (STD DEV)	0.03
15.70	MINIMUM	6.18
31.20	MAXIMUM	12.28
SKEWNESS		0.21
KURTOSIS		3.26
COEFFICIENT OF VARIATION		10.4%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
25.10	MEAN	9.88
0.08	STD ERROR (MEAN)	0.03
2.60	STANDARD DEVIATION	1.02
0.06	STD ERROR (STD DEV)	0.02
15.50	MINIMUM	6.10
32.20	MAXIMUM	12.68
SKEWNESS		-0.07
KURTOSIS		3.18
COEFFICIENT OF VARIATION		10.3%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE										
FEMALES							MALES			
F	FPct	CumF	CumFPct	CM		F	FPct	CumF	CumFPct	
1	0.25	1	0.25	15.25	-	15.75	1	0.10	1	0.10
1	0.25	2	0.51	15.75	-	16.25	1	0.10	2	0.20
2	0.51	4	1.01	16.25	-	16.75	0	0.00	2	0.20
0	0.00	4	1.01	16.75	-	17.25	1	0.10	3	0.31
8	2.03	12	3.04	17.25	-	17.75	1	0.10	4	0.41
10	2.53	22	5.57	17.75	-	18.25	1	0.10	5	0.51
6	1.52	28	7.09	18.25	-	18.75	3	0.31	8	0.82
3	0.76	31	7.85	18.75	-	19.25	8	0.82	16	1.64
11	2.78	42	10.63	19.25	-	19.75	5	0.51	21	2.15
12	3.04	54	13.67	19.75	-	20.25	8	0.82	29	2.97
25	6.33	79	20.00	20.25	-	20.75	15	1.54	44	4.50
12	3.04	91	23.04	20.75	-	21.25	15	1.54	59	6.04
24	6.08	115	29.11	21.25	-	21.75	35	3.58	94	9.62
31	7.85	146	36.96	21.75	-	22.25	33	3.38	127	13.00
33	8.35	179	45.32	22.25	-	22.75	54	5.53	181	18.53
30	7.59	209	52.91	22.75	-	23.25	50	5.12	231	23.64
35	8.86	244	61.77	23.25	-	23.75	71	7.27	302	30.91
25	6.33	269	68.10	23.75	-	24.25	69	7.06	371	37.97
25	6.33	294	74.43	24.25	-	24.75	88	9.01	459	46.98
22	5.57	316	80.00	24.75	-	25.25	69	7.06	528	54.04
21	5.32	337	85.32	25.25	-	25.75	67	6.86	595	60.90
15	3.80	352	89.11	25.75	-	26.25	67	6.86	662	67.76
16	4.05	368	93.16	26.25	-	26.75	65	6.65	727	74.41
4	1.01	372	94.18	26.75	-	27.25	60	6.14	787	80.55
4	1.01	376	95.19	27.25	-	27.75	43	4.40	830	84.95
5	1.27	381	96.46	27.75	-	28.25	44	4.50	874	89.46
4	1.01	385	97.47	28.25	-	28.75	27	2.76	901	92.22
4	1.01	389	98.48	28.75	-	29.25	21	2.15	922	94.37
2	0.51	391	98.99	29.25	-	29.75	18	1.84	940	96.21
1	0.25	392	99.24	29.75	-	30.25	12	1.23	952	97.44
2	0.51	394	99.75	30.25	-	30.75	9	0.92	961	98.36
1	0.25	395	100.00	30.75	-	31.25	11	1.13	972	99.49
				31.25	-	31.75	2	0.20	974	99.69
				31.75	-	32.25	3	0.31	977	100.00

(34) EYE HEIGHT, SITTING

The vertical distance between a sitting surface and the ectocanthus landmark is measured with an anthropometer. The participant sits erect with the head in the Frankfurt plane. The shoulders and upper arms are relaxed, and the forearms and hands are extended forward horizontally with the palms facing each other. The thighs are parallel, and the knees are flexed 90° with the feet in line with the thighs. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
70.00	27.56	1ST	75.30	29.65
70.50	27.76	2ND	76.00	29.92
70.90	27.91	3RD	76.20	30.00
71.40	28.11	5TH	76.60	30.16
72.80	28.66	10TH	77.50	30.51
73.50	28.94	15TH	78.00	30.71
74.00	29.13	20TH	78.50	30.91
74.40	29.29	25TH	79.10	31.14
75.00	29.53	30TH	79.50	31.30
75.30	29.65	35TH	80.00	31.50
75.80	29.84	40TH	80.30	31.61
76.00	29.92	45TH	80.70	31.77
76.30	30.04	50TH	81.10	31.93
76.60	30.16	55TH	81.40	32.05
76.80	30.24	60TH	81.80	32.20
77.30	30.43	65TH	82.20	32.36
77.80	30.63	70TH	82.60	32.52
78.10	30.75	75TH	83.10	32.72
78.80	31.02	80TH	83.50	32.87
79.30	31.22	85TH	84.10	33.11
80.10	31.54	90TH	85.00	33.46
81.00	31.89	95TH	86.10	33.90
81.50	32.09	97TH	87.00	34.25
81.80	32.20	98TH	87.40	34.41
83.70	32.95	99TH	88.60	34.88

(34) EYE HEIGHT, SITTING

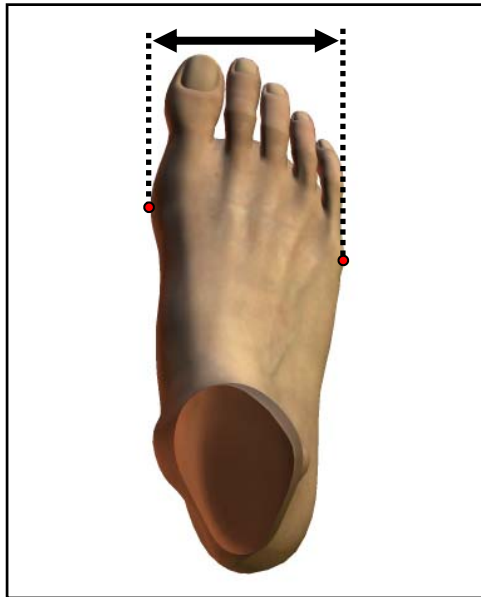
FEMALES		
CM		IN
76.32	MEAN	30.05
0.14	STD ERROR (MEAN)	0.06
2.81	STANDARD DEVIATION	1.11
0.10	STD ERROR (STD DEV)	0.04
66.80	MINIMUM	26.30
84.20	MAXIMUM	33.15
SKEWNESS		0.07
KURTOSIS		2.99
COEFFICIENT OF VARIATION		3.7%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
81.15	MEAN	31.95
0.09	STD ERROR (MEAN)	0.04
2.88	STANDARD DEVIATION	1.14
0.07	STD ERROR (STD DEV)	0.03
73.00	MINIMUM	28.74
90.70	MAXIMUM	35.71
SKEWNESS		0.24
KURTOSIS		2.92
COEFFICIENT OF VARIATION		3.6%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	CM	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	66.75 - 67.25							
1	0.25	2	0.51	67.25 - 67.75							
0	0.00	2	0.51	67.75 - 68.25							
3	0.76	5	1.27	68.25 - 68.75							
0	0.00	5	1.27	68.75 - 69.25							
6	1.52	11	2.78	69.25 - 69.75							
4	1.01	15	3.80	69.75 - 70.25							
10	2.53	25	6.33	70.25 - 70.75							
6	1.52	31	7.85	70.75 - 71.25							
19	4.81	50	12.66	71.25 - 71.75							
14	3.54	64	16.20	71.75 - 72.25							
14	3.54	78	19.75	72.25 - 72.75							
15	3.80	93	23.54	72.75 - 73.25	2	0.20	2	0.20			
22	5.57	115	29.11	73.25 - 73.75	1	0.10	3	0.31			
18	4.56	133	33.67	73.75 - 74.25	4	0.41	7	0.72			
26	6.58	159	40.25	74.25 - 74.75	1	0.10	8	0.82			
18	4.56	177	44.81	74.75 - 75.25	4	0.41	12	1.23			
25	6.33	202	51.14	75.25 - 75.75	9	0.92	21	2.15			
30	7.59	232	58.73	75.75 - 76.25	12	1.23	33	3.38			
30	7.59	262	66.33	76.25 - 76.75	22	2.25	55	5.63			
20	5.06	282	71.39	76.75 - 77.25	19	1.94	74	7.57			
17	4.30	299	75.70	77.25 - 77.75	38	3.89	112	11.46			
25	6.33	324	82.03	77.75 - 78.25	47	4.81	159	16.27			
11	2.78	335	84.81	78.25 - 78.75	41	4.20	200	20.47			
14	3.54	349	88.35	78.75 - 79.25	49	5.02	249	25.49			
13	3.29	362	91.65	79.25 - 79.75	55	5.63	304	31.12			
7	1.77	369	93.42	79.75 - 80.25	61	6.24	365	37.36			
12	3.04	381	96.46	80.25 - 80.75	78	7.98	443	45.34			
3	0.76	384	97.22	80.75 - 81.25	48	4.91	491	50.26			
4	1.01	388	98.23	81.25 - 81.75	87	8.90	578	59.16			
4	1.01	392	99.24	81.75 - 82.25	54	5.53	632	64.69			
0	0.00	392	99.24	82.25 - 82.75	61	6.24	693	70.93			
0	0.00	392	99.24	82.75 - 83.25	56	5.73	749	76.66			
1	0.25	393	99.49	83.25 - 83.75	44	4.50	793	81.17			
2	0.51	395	100.00	83.75 - 84.25	39	3.99	832	85.16			
				84.25 - 84.75	39	3.99	871	89.15			
				84.75 - 85.25	29	2.97	900	92.12			
				85.25 - 85.75	20	2.05	920	94.17			
				85.75 - 86.25	12	1.23	932	95.39			
				86.25 - 86.75	14	1.43	946	96.83			
				86.75 - 87.25	9	0.92	955	97.75			
				87.25 - 87.75	5	0.51	960	98.26			
				87.75 - 88.25	6	0.61	966	98.87			
				88.25 - 88.75	5	0.51	971	99.39			
				88.75 - 89.25	2	0.20	973	99.59			
				89.25 - 89.75	1	0.10	974	99.69			
				89.75 - 90.25	1	0.10	975	99.80			
				90.25 - 90.75	2	0.20	977	100.00			

(35) FOOT BREADTH, HORIZONTAL

The maximum breadth of the right foot is measured with a Brannock Device®. The participant stands with the right foot on the device and the left foot on a board of equal height with the weight distributed equally on both feet. The heel of the right foot lightly touches the back of the device, and the medial side of the right foot is parallel with the long axis of the device. The vertical slide of the device is moved until it lightly touches the fifth metatarsophalangeal protrusion landmark.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
8.20	3.23	1ST	9.20	3.62
8.30	3.27	2ND	9.30	3.66
8.40	3.31	3RD	9.30	3.66
8.40	3.31	5TH	9.40	3.70
8.60	3.39	10TH	9.60	3.78
8.80	3.46	15TH	9.70	3.82
8.80	3.46	20TH	9.80	3.86
8.90	3.50	25TH	9.90	3.90
9.00	3.54	30TH	9.90	3.90
9.00	3.54	35TH	9.90	3.90
9.10	3.58	40TH	10.00	3.94
9.20	3.62	45TH	10.10	3.98
9.20	3.62	50TH	10.20	4.02
9.30	3.66	55TH	10.30	4.06
9.40	3.70	60TH	10.30	4.06
9.40	3.70	65TH	10.40	4.09
9.50	3.74	70TH	10.40	4.09
9.60	3.78	75TH	10.50	4.13
9.70	3.82	80TH	10.60	4.17
9.80	3.86	85TH	10.70	4.21
9.90	3.90	90TH	10.80	4.25
10.00	3.94	95TH	11.00	4.33
10.10	3.98	97TH	11.10	4.37
10.20	4.02	98TH	11.20	4.41
10.30	4.06	99TH	11.40	4.49

(35) FOOT BREADTH, HORIZONTAL

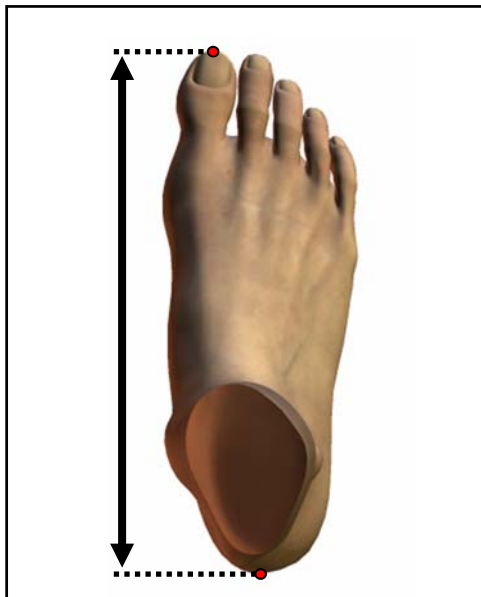
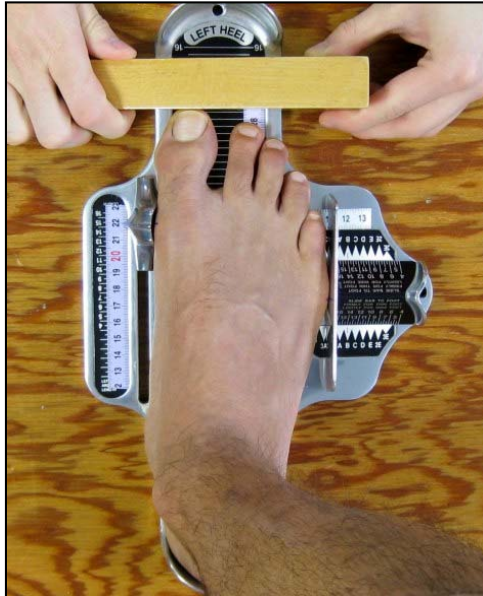
FEMALES		
<u>CM</u>		<u>IN</u>
9.25	MEAN	3.64
0.02	STD ERROR (MEAN)	0.01
0.48	STANDARD DEVIATION	0.19
0.02	STD ERROR (STD DEV)	0.01
8.10	MINIMUM	3.19
10.80	MAXIMUM	4.25
SKEWNESS		0.07
KURTOSIS		2.55
COEFFICIENT OF VARIATION		5.2%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
10.18	MEAN	4.01
0.02	STD ERROR (MEAN)	0.01
0.49	STANDARD DEVIATION	0.19
0.01	STD ERROR (STD DEV)	0.00
8.60	MINIMUM	3.39
12.00	MAXIMUM	4.72
SKEWNESS		0.23
KURTOSIS		3.20
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
				8.05	-	8.15					
2	0.51	2	0.51	8.15	-	8.25					
3	0.76	5	1.27	8.25	-	8.35					
2	0.51	7	1.77	8.35	-	8.45					
12	3.04	19	4.81	8.45	-	8.55					
3	0.76	22	5.57	8.55	-	8.65	1	0.10			
9	2.28	31	7.85	8.65	-	8.75	1	0.20			
19	4.81	50	12.66	8.75	-	8.85	1	0.31			
21	5.32	71	17.97	8.85	-	8.95	3	0.61			
25	6.33	96	24.30	8.95	-	9.05	3	0.92			
31	7.85	127	32.15	9.05	-	9.15	3	1.23			
37	9.37	164	41.52	9.15	-	9.25	11	2.35			
29	7.34	193	48.86	9.25	-	9.35	15	3.89			
33	8.35	226	57.22	9.35	-	9.45	32	7.16			
30	7.59	256	64.81	9.45	-	9.55	27	9.93			
28	7.09	284	71.90	9.55	-	9.65	32	13.20			
25	6.33	309	78.23	9.65	-	9.75	64	19.75			
17	4.30	326	82.53	9.75	-	9.85	47	24.56			
16	4.05	342	86.58	9.85	-	9.95	108	35.62			
23	5.82	365	92.41	9.95	-	10.05	78	43.60			
13	3.29	378	95.70	10.05	-	10.15	53	49.03			
3	0.76	381	96.46	10.15	-	10.25	70	56.19			
5	1.27	386	97.72	10.25	-	10.35	59	62.23			
5	1.27	391	98.99	10.35	-	10.45	110	73.49			
3	0.76	394	99.75	10.45	-	10.55	62	79.84			
0	0.00	394	99.75	10.55	-	10.65	39	83.83			
0	0.00	394	99.75	10.65	-	10.75	52	89.15			
0	0.00	394	99.75	10.75	-	10.85	34	92.63			
1	0.25	395	100.00	10.85	-	10.95	23	94.98			
				10.95	-	11.05	15	96.52			
				11.05	-	11.15	12	97.75			
				11.15	-	11.25	3	98.06			
				11.25	-	11.35	4	98.46			
				11.35	-	11.45	6	99.08			
				11.45	-	11.55	3	99.39			
				11.55	-	11.65	1	99.49			
				11.65	-	11.75	0	99.49			
				11.75	-	11.85	3	99.80			
				11.85	-	11.95	1	99.90			
				11.95	-	12.05	1	100.00			

(36) FOOT LENGTH

The maximum length of the right foot is measured with a Brannock Device®. The participant stands with the right foot on the device and the left foot on a board of equal height with the weight distributed equally on both feet. The heel of the right foot lightly touches the back of the device, and the medial side of the right foot is parallel with the long axis of the device. A block is placed against the tip of the longest toe to establish the measurement on the scale of the device.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
22.30	8.78	1ST	24.50	9.65
22.30	8.78	2ND	24.80	9.76
22.60	8.90	3RD	25.10	9.88
22.90	9.02	5TH	25.30	9.96
23.30	9.17	10TH	25.70	10.12
23.50	9.25	15TH	26.00	10.24
23.60	9.29	20TH	26.20	10.31
23.80	9.37	25TH	26.30	10.35
24.00	9.45	30TH	26.50	10.43
24.20	9.53	35TH	26.70	10.51
24.30	9.57	40TH	26.80	10.55
24.40	9.61	45TH	27.00	10.63
24.60	9.69	50TH	27.20	10.71
24.70	9.72	55TH	27.30	10.75
24.90	9.80	60TH	27.50	10.83
25.10	9.88	65TH	27.60	10.87
25.20	9.92	70TH	27.80	10.94
25.40	10.00	75TH	28.00	11.02
25.70	10.12	80TH	28.30	11.14
25.90	10.20	85TH	28.50	11.22
26.00	10.24	90TH	28.80	11.34
26.50	10.43	95TH	29.20	11.50
26.80	10.55	97TH	29.40	11.57
27.10	10.67	98TH	29.60	11.65
27.20	10.71	99TH	29.90	11.77

(36) FOOT LENGTH

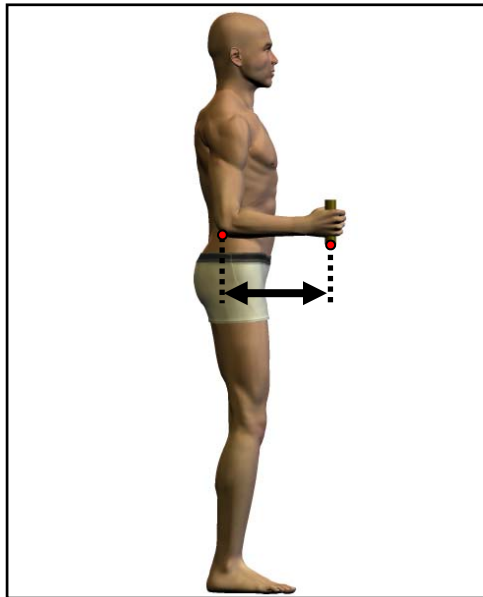
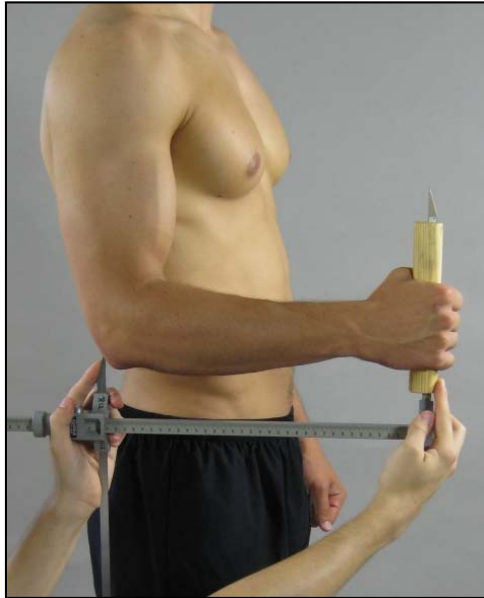
FEMALES		
<u>CM</u>		<u>IN</u>
24.63	MEAN	9.70
0.06	STD ERROR (MEAN)	0.02
1.13	STANDARD DEVIATION	0.44
0.04	STD ERROR (STD DEV)	0.02
21.30	MINIMUM	8.39
27.80	MAXIMUM	10.94
SKEWNESS		0.09
KURTOSIS		2.68
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
27.19	MEAN	10.71
0.04	STD ERROR (MEAN)	0.02
1.19	STANDARD DEVIATION	0.47
0.03	STD ERROR (STD DEV)	0.01
23.50	MINIMUM	9.25
31.30	MAXIMUM	12.32
SKEWNESS		0.06
KURTOSIS		2.85
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES								MALES			
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct		
1	0.25	1	0.25	21.10	-	21.35					
0	0.00	1	0.25	21.35	-	21.60					
0	0.00	1	0.25	21.60	-	21.85					
0	0.00	1	0.25	21.85	-	22.10					
4	1.01	5	1.27	22.10	-	22.35					
1	0.25	6	1.52	22.35	-	22.60					
4	1.01	10	2.53	22.60	-	22.85					
10	2.53	20	5.06	22.85	-	23.10					
12	3.04	32	8.10	23.10	-	23.35					
19	4.81	51	12.91	23.35	-	23.60	1	0.10	1	0.10	
34	8.61	85	21.52	23.60	-	23.85	4	0.41	5	0.51	
17	4.30	102	25.82	23.85	-	24.10	0	0.00	5	0.51	
38	9.62	140	35.44	24.10	-	24.35	6	0.61	11	1.13	
23	5.82	163	41.27	24.35	-	24.60	2	0.20	13	1.33	
42	10.63	205	51.90	24.60	-	24.85	9	0.92	22	2.25	
16	4.05	221	55.95	24.85	-	25.10	7	0.72	29	2.97	
43	10.89	264	66.84	25.10	-	25.35	25	2.56	54	5.53	
23	5.82	287	72.66	25.35	-	25.60	23	2.35	77	7.88	
31	7.85	318	80.51	25.60	-	25.85	54	5.53	131	13.41	
22	5.57	340	86.08	25.85	-	26.10	37	3.79	168	17.20	
16	4.05	356	90.13	26.10	-	26.35	75	7.68	243	24.87	
9	2.28	365	92.41	26.35	-	26.60	56	5.73	299	30.60	
15	3.80	380	96.20	26.60	-	26.85	91	9.31	390	39.92	
0	0.00	380	96.20	26.85	-	27.10	59	6.04	449	45.96	
8	2.03	388	98.23	27.10	-	27.35	92	9.42	541	55.37	
6	1.52	394	99.75	27.35	-	27.60	61	6.24	602	61.62	
1	0.25	395	100.00	27.60	-	27.85	103	10.54	705	72.16	
				27.85	-	28.10	45	4.61	750	76.77	
				28.10	-	28.35	54	5.53	804	82.29	
				28.35	-	28.60	40	4.09	844	86.39	
				28.60	-	28.85	43	4.40	887	90.79	
				28.85	-	29.10	24	2.46	911	93.24	
				29.10	-	29.35	31	3.17	942	96.42	
				29.35	-	29.60	9	0.92	951	97.34	
				29.60	-	29.85	8	0.82	959	98.16	
				29.85	-	30.10	9	0.92	968	99.08	
				30.10	-	30.35	7	0.72	975	99.80	
				30.35	-	30.60	1	0.10	976	99.90	
				30.60	-	30.85	0	0.00	976	99.90	
				30.85	-	31.10	0	0.00	976	99.90	
				31.10	-	31.35	1	0.10	977	100.00	

(37) FOREARM-CENTER OF GRIP LENGTH

The horizontal distance between the olecranon rear landmark and the center of a 1-1/4"-diameter dowel gripped in the right hand is measured with a beam caliper. The participant stands erect with the upper arms hanging at the side and the right elbow flexed 90°. The hand grips a 1-1/4"-diameter dowel placed on the fixed blade of a beam caliper. The hand gripping the dowel should be in line with the long axis of the arm.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
28.70	11.30	1ST	31.80	12.52
29.00	11.42	2ND	32.10	12.64
29.20	11.50	3RD	32.40	12.76
29.30	11.54	5TH	32.80	12.91
29.80	11.73	10TH	33.10	13.03
30.10	11.85	15TH	33.50	13.19
30.30	11.93	20TH	33.80	13.31
30.50	12.01	25TH	34.00	13.39
30.80	12.13	30TH	34.30	13.50
31.00	12.20	35TH	34.50	13.58
31.10	12.24	40TH	34.80	13.70
31.30	12.32	45TH	35.00	13.78
31.50	12.40	50TH	35.20	13.86
31.80	12.52	55TH	35.40	13.94
32.00	12.60	60TH	35.50	13.98
32.20	12.68	65TH	35.70	14.06
32.30	12.72	70TH	36.00	14.17
32.60	12.83	75TH	36.20	14.25
32.90	12.95	80TH	36.60	14.41
33.30	13.11	85TH	37.00	14.57
33.60	13.23	90TH	37.30	14.69
34.10	13.43	95TH	37.70	14.84
34.70	13.66	97TH	38.00	14.96
34.90	13.74	98TH	38.20	15.04
35.50	13.98	99TH	38.80	15.28

(37) FOREARM-CENTER OF GRIP LENGTH

FEMALES		
<u>CM</u>		<u>IN</u>
31.64	MEAN	12.46
0.08	STD ERROR (MEAN)	0.03
1.50	STANDARD DEVIATION	0.59
0.05	STD ERROR (STD DEV)	0.02
28.20	MINIMUM	11.10
36.80	MAXIMUM	14.49
SKEWNESS		0.36
KURTOSIS		2.90
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
35.17	MEAN	13.85
0.05	STD ERROR (MEAN)	0.02
1.56	STANDARD DEVIATION	0.62
0.04	STD ERROR (STD DEV)	0.01
30.20	MINIMUM	11.89
39.20	MAXIMUM	15.43
SKEWNESS		0.02
KURTOSIS		2.68
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	27.75	-	28.25					
3	0.76	4	1.01	28.25	-	28.75					
6	1.52	10	2.53	28.75	-	29.25					
13	3.29	23	5.82	29.25	-	29.75					
29	7.34	52	13.16	29.75	-	30.25	1	0.10			
37	9.37	89	22.53	30.25	-	30.75	3	0.31			
49	12.41	138	34.94	30.75	-	31.25	2	0.20			
48	12.15	186	47.09	31.25	-	31.75	7	0.72			
50	12.66	236	59.75	31.75	-	32.25	22	2.25			
45	11.39	281	71.14	32.25	-	32.75	25	2.56			
28	7.09	309	78.23	32.75	-	33.25	59	6.04			
31	7.85	340	86.08	33.25	-	33.75	80	8.19			
21	5.32	361	91.39	33.75	-	34.25	94	9.62			
15	3.80	376	95.19	34.25	-	34.75	110	11.26			
6	1.52	382	96.71	34.75	-	35.25	110	11.26			
5	1.27	387	97.97	35.25	-	35.75	132	13.51			
2	0.51	389	98.48	35.75	-	36.25	96	9.83			
5	1.27	394	99.75	36.25	-	36.75	72	7.37			
1	0.25	395	100.00	36.75	-	37.25	67	6.86			
				37.25	-	37.75	48	4.91			
				37.75	-	38.25	27	2.76			
				38.25	-	38.75	12	1.23			
				38.75	-	39.25	10	1.02			
							977	100.00			

(38) FOREARM CIRCUMFERENCE, FLEXED

The circumference of the flexed right forearm is measured with a tape passing across the crease at the juncture between the upper arm and the forearm. The measurement is taken in a plane perpendicular to the long axis of the forearm. The participant stands with the upper arm extended forward horizontally, the elbow flexed 90°, and the fist tightly clenched with palm facing the head.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
22.90	9.02	1ST	27.60	10.87
23.10	9.09	2ND	27.80	10.94
23.50	9.25	3RD	28.20	11.10
23.70	9.33	5TH	28.60	11.26
24.00	9.45	10TH	29.20	11.50
24.40	9.61	15TH	29.60	11.65
24.80	9.76	20TH	29.80	11.73
25.10	9.88	25TH	30.20	11.89
25.40	10.00	30TH	30.50	12.01
25.60	10.08	35TH	30.70	12.09
25.70	10.12	40TH	31.00	12.20
26.00	10.24	45TH	31.10	12.24
26.10	10.28	50TH	31.40	12.36
26.20	10.31	55TH	31.50	12.40
26.50	10.43	60TH	31.90	12.56
26.80	10.55	65TH	32.20	12.68
27.10	10.67	70TH	32.40	12.76
27.30	10.75	75TH	32.70	12.87
27.50	10.83	80TH	33.10	13.03
27.80	10.94	85TH	33.60	13.23
28.30	11.14	90TH	34.20	13.46
28.90	11.38	95TH	34.80	13.70
29.90	11.77	97TH	35.60	14.02
30.30	11.93	98TH	36.00	14.17
30.80	12.13	99TH	36.80	14.49

(38) FOREARM CIRCUMFERENCE, FLEXED

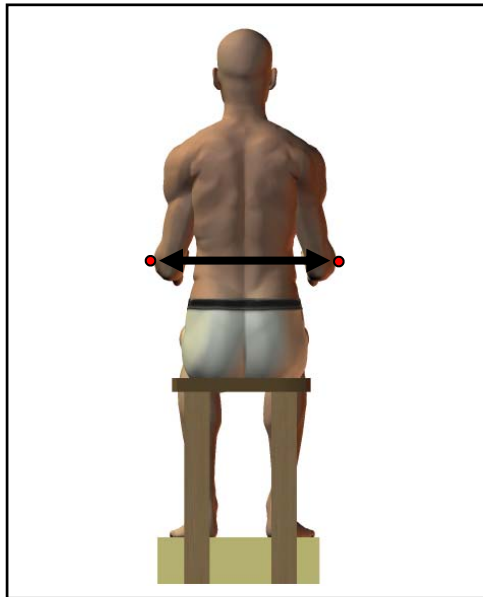
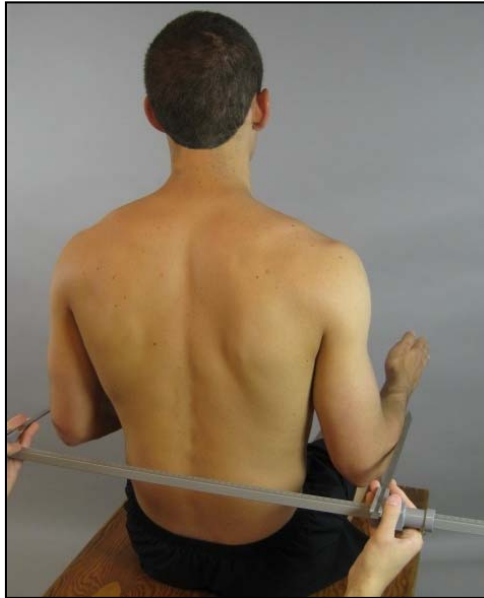
FEMALES		
CM		IN
26.22	MEAN	10.32
0.08	STD ERROR (MEAN)	0.03
1.66	STANDARD DEVIATION	0.65
0.06	STD ERROR (STD DEV)	0.02
22.10	MINIMUM	8.70
32.60	MAXIMUM	12.83
SKEWNESS		0.44
KURTOSIS		3.56
COEFFICIENT OF VARIATION		6.3%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
31.53	MEAN	12.41
0.06	STD ERROR (MEAN)	0.02
1.94	STANDARD DEVIATION	0.76
0.04	STD ERROR (STD DEV)	0.02
26.10	MINIMUM	10.28
37.80	MAXIMUM	14.88
SKEWNESS		0.38
KURTOSIS		3.10
COEFFICIENT OF VARIATION		6.2%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	CM	F	FPct	CumF	CumFPct			
2	0.51	2	0.51	21.75	-						
0	0.00	2	0.51	22.25	-						
7	1.77	9	2.28	22.75	-						
14	3.54	23	5.82	23.25	-						
21	5.32	44	11.14	23.75	-						
28	7.09	72	18.23	24.25	-						
33	8.35	105	26.58	24.75	-						
46	11.65	151	38.23	25.25	-						
63	15.95	214	54.18	25.75	-						
44	11.14	258	65.32	26.25	-	1	0.10	1	0.10		
39	9.87	297	75.19	26.75	-	2	0.20	3	0.31		
32	8.10	329	83.29	27.25	-	7	0.72	10	1.02		
18	4.56	347	87.85	27.75	-	13	1.33	23	2.35		
20	5.06	367	92.91	28.25	-	17	1.74	40	4.09		
8	2.03	375	94.94	28.75	-	40	4.09	80	8.19		
4	1.01	379	95.95	29.25	-	55	5.63	135	13.82		
4	1.01	383	96.96	29.75	-	67	6.86	202	20.68		
4	1.01	387	97.97	30.25	-	94	9.62	296	30.30		
1	0.25	388	98.23	30.75	-	93	9.52	389	39.82		
1	0.25	389	98.48	31.25	-	118	12.08	507	51.89		
5	1.27	394	99.75	31.75	-	108	11.05	615	62.95		
1	0.25	395	100.00	32.25	-	91	9.31	706	72.26		
				32.75	-	70	7.16	776	79.43		
				33.25	-	46	4.71	822	84.14		
				33.75	-	45	4.61	867	88.74		
				34.25	-	31	3.17	898	91.91		
				34.75	-	29	2.97	927	94.88		
				35.25	-	17	1.74	944	96.62		
				35.75	-	9	0.92	953	97.54		
				36.25	-	9	0.92	962	98.46		
				36.75	-	7	0.72	969	99.18		
				37.25	-	6	0.61	975	99.80		
				37.75	-	0	0.00	975	99.80		
				37.75	-	2	0.20	977	100.00		

(39) FOREARM-FOREARM BREADTH

The maximum horizontal distance across the upper body between the outer sides of the forearms is measured with a beam caliper. The participant sits erect, looking straight ahead. The shoulders and upper arms are relaxed, and the forearms and hands are extended forward horizontally with the palms facing each other. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
41.10	16.18	1ST	48.90	19.25
42.20	16.61	2ND	50.20	19.76
42.30	16.65	3RD	50.70	19.96
43.50	17.13	5TH	51.50	20.28
44.50	17.52	10TH	53.50	21.06
45.40	17.87	15TH	54.30	21.38
45.80	18.03	20TH	55.20	21.73
46.40	18.27	25TH	55.80	21.97
46.90	18.46	30TH	56.60	22.28
47.70	18.78	35TH	57.20	22.52
48.20	18.98	40TH	57.80	22.76
48.70	19.17	45TH	58.30	22.95
49.20	19.37	50TH	58.90	23.19
49.70	19.57	55TH	59.50	23.43
50.20	19.76	60TH	60.10	23.66
50.60	19.92	65TH	60.90	23.98
51.60	20.31	70TH	61.40	24.17
52.10	20.51	75TH	62.10	24.45
52.60	20.71	80TH	63.00	24.80
53.90	21.22	85TH	63.60	25.04
55.40	21.81	90TH	64.50	25.39
56.30	22.17	95TH	66.40	26.14
57.50	22.64	97TH	67.70	26.65
58.30	22.95	98TH	68.90	27.13
59.80	23.54	99TH	71.00	27.95

(39) FOREARM-FOREARM BREADTH

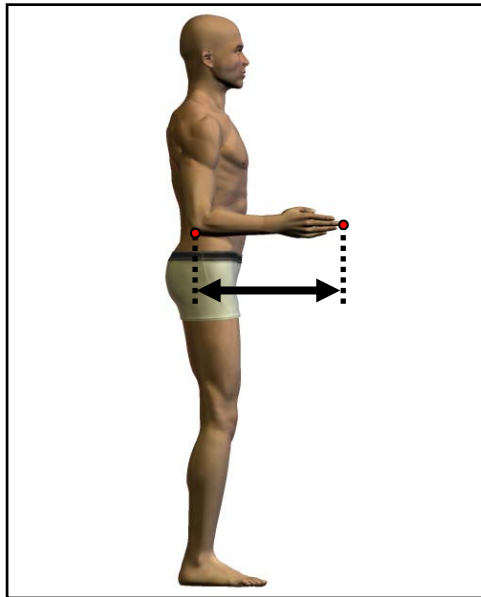
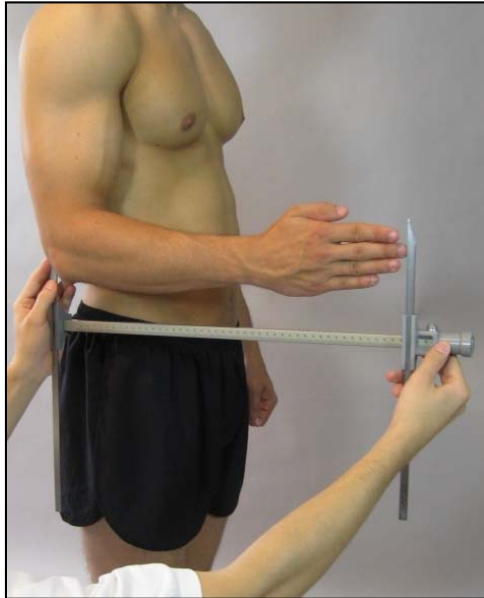
FEMALES		
<u>CM</u>		<u>IN</u>
49.48	MEAN	19.48
0.21	STD ERROR (MEAN)	0.08
4.20	STANDARD DEVIATION	1.65
0.15	STD ERROR (STD DEV)	0.06
38.60	MINIMUM	15.20
65.80	MAXIMUM	25.91
SKEWNESS		0.52
KURTOSIS		3.75
COEFFICIENT OF VARIATION		8.5%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
59.06	MEAN	23.25
0.15	STD ERROR (MEAN)	0.06
4.59	STANDARD DEVIATION	1.81
0.10	STD ERROR (STD DEV)	0.04
44.00	MINIMUM	17.32
78.80	MAXIMUM	31.02
SKEWNESS		0.22
KURTOSIS		3.46
COEFFICIENT OF VARIATION		7.8%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCY TABLE				MALES			
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct		
1	0.25	1	0.25	38.55	-	39.55					
3	0.76	4	1.01	39.55	-	40.55					
4	1.01	8	2.03	40.55	-	41.55					
9	2.28	17	4.30	41.55	-	42.55					
9	2.28	26	6.58	42.55	-	43.55					
20	5.06	46	11.65	43.55	-	44.55	2	0.20	2	0.20	
27	6.84	73	18.48	44.55	-	45.55	1	0.10	3	0.31	
34	8.61	107	27.09	45.55	-	46.55	0	0.00	3	0.31	
31	7.85	138	34.94	46.55	-	47.55	2	0.20	5	0.51	
44	11.14	182	46.08	47.55	-	48.55	9	0.92	14	1.43	
39	9.87	221	55.95	48.55	-	49.55	5	0.51	19	1.94	
40	10.13	261	66.08	49.55	-	50.55	21	2.15	40	4.09	
21	5.32	282	71.39	50.55	-	51.55	26	2.66	66	6.76	
33	8.35	315	79.75	51.55	-	52.55	34	3.48	100	10.24	
22	5.57	337	85.32	52.55	-	53.55	47	4.81	147	15.05	
9	2.28	346	87.59	53.55	-	54.55	73	7.47	220	22.52	
18	4.56	364	92.15	54.55	-	55.55	78	7.98	298	30.50	
17	4.30	381	96.46	55.55	-	56.55	73	7.47	371	37.97	
5	1.27	386	97.72	56.55	-	57.55	93	9.52	464	47.49	
3	0.76	389	98.48	57.55	-	58.55	82	8.39	546	55.89	
2	0.51	391	98.99	58.55	-	59.55	69	7.06	615	62.95	
1	0.25	392	99.24	59.55	-	60.55	73	7.47	688	70.42	
0	0.00	392	99.24	60.55	-	61.55	61	6.24	749	76.66	
0	0.00	392	99.24	61.55	-	62.55	52	5.32	801	81.99	
2	0.51	394	99.75	62.55	-	63.55	44	4.50	845	86.49	
0	0.00	394	99.75	63.55	-	64.55	44	4.50	889	90.99	
0	0.00	394	99.75	64.55	-	65.55	19	1.94	908	92.94	
1	0.25	395	100.00	65.55	-	66.55	25	2.56	933	95.50	
				66.55	-	67.55	15	1.54	948	97.03	
				67.55	-	68.55	8	0.82	956	97.85	
				68.55	-	69.55	8	0.82	964	98.67	
				69.55	-	70.55	2	0.20	966	98.87	
				70.55	-	71.55	5	0.51	971	99.39	
				71.55	-	72.55	1	0.10	972	99.49	
				72.55	-	73.55	2	0.20	974	99.69	
				73.55	-	74.55	0	0.00	974	99.69	
				74.55	-	75.55	2	0.20	976	99.90	
				75.55	-	76.55	0	0.00	976	99.90	
				76.55	-	77.55	0	0.00	976	99.90	
				77.55	-	78.55	0	0.00	976	99.90	
				78.55	-	79.55	1	0.10	977	100.00	

(40) FOREARM-HAND LENGTH

The horizontal distance between the olecranon rear landmark and the dactylion III landmark is measured with a beam caliper. The participant stands erect with the upper arms hanging at the sides and the right elbow flexed 90°. The hand is held out straight with the palm facing inward.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
40.40	15.91	1ST	44.00	17.32
40.60	15.98	2ND	44.50	17.52
40.80	16.06	3RD	44.60	17.56
41.10	16.18	5TH	45.00	17.72
41.60	16.38	10TH	45.60	17.95
42.00	16.54	15TH	46.10	18.15
42.30	16.65	20TH	46.50	18.31
42.60	16.77	25TH	46.90	18.46
42.70	16.81	30TH	47.20	18.58
43.00	16.93	35TH	47.50	18.70
43.30	17.05	40TH	47.80	18.82
43.50	17.13	45TH	48.00	18.90
43.80	17.24	50TH	48.30	19.02
43.90	17.28	55TH	48.50	19.09
44.10	17.36	60TH	48.80	19.21
44.40	17.48	65TH	49.10	19.33
44.80	17.64	70TH	49.50	19.49
45.10	17.76	75TH	49.80	19.61
45.50	17.91	80TH	50.00	19.69
45.90	18.07	85TH	50.50	19.88
46.50	18.31	90TH	50.90	20.04
47.30	18.62	95TH	51.50	20.28
47.80	18.82	97TH	52.00	20.47
48.00	18.90	98TH	52.40	20.63
48.70	19.17	99TH	53.00	20.87

(40) FOREARM-HAND LENGTH

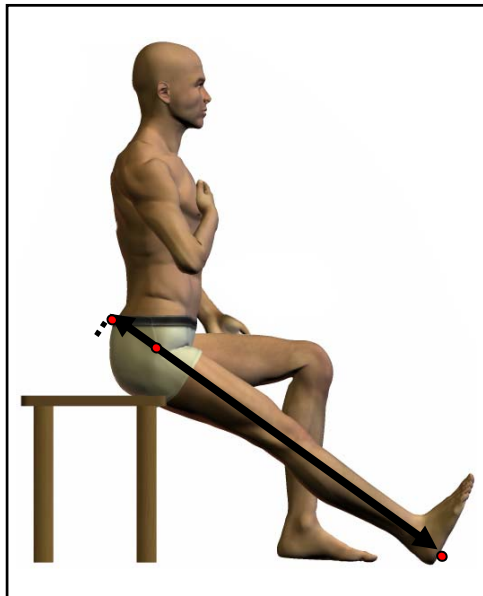
FEMALES		
<u>CM</u>		<u>IN</u>
43.89	MEAN	17.28
0.09	STD ERROR (MEAN)	0.04
1.85	STANDARD DEVIATION	0.73
0.07	STD ERROR (STD DEV)	0.03
39.90	MINIMUM	15.71
51.10	MAXIMUM	20.12
SKEWNESS		0.39
KURTOSIS		2.72
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
48.30	MEAN	19.01
0.06	STD ERROR (MEAN)	0.03
2.01	STANDARD DEVIATION	0.79
0.05	STD ERROR (STD DEV)	0.02
41.50	MINIMUM	16.34
54.50	MAXIMUM	21.46
SKEWNESS		-0.01
KURTOSIS		2.78
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
2	0.51	2	0.51	39.75 - 40.25							
6	1.52	8	2.03	40.25 - 40.75							
8	2.03	16	4.05	40.75 - 41.25							
14	3.54	30	7.59	41.25 - 41.75	1	0.10	1	0.10			
26	6.58	56	14.18	41.75 - 42.25	2	0.20	3	0.31			
34	8.61	90	22.78	42.25 - 42.75	1	0.10	4	0.41			
33	8.35	123	31.14	42.75 - 43.25	1	0.10	5	0.51			
40	10.13	163	41.27	43.25 - 43.75	4	0.41	9	0.92			
45	11.39	208	52.66	43.75 - 44.25	11	1.13	20	2.05			
33	8.35	241	61.01	44.25 - 44.75	22	2.25	42	4.30			
31	7.85	272	68.86	44.75 - 45.25	24	2.46	66	6.76			
32	8.10	304	76.96	45.25 - 45.75	54	5.53	120	12.28			
21	5.32	325	82.28	45.75 - 46.25	44	4.50	164	16.79			
15	3.80	340	86.08	46.25 - 46.75	62	6.35	226	23.13			
17	4.30	357	90.38	46.75 - 47.25	76	7.78	302	30.91			
12	3.04	369	93.42	47.25 - 47.75	88	9.01	390	39.92			
13	3.29	382	96.71	47.75 - 48.25	91	9.31	481	49.23			
5	1.27	387	97.97	48.25 - 48.75	90	9.21	571	58.44			
6	1.52	393	99.49	48.75 - 49.25	94	9.62	665	68.07			
0	0.00	393	99.49	49.25 - 49.75	60	6.14	725	74.21			
0	0.00	393	99.49	49.75 - 50.25	79	8.09	804	82.29			
1	0.25	394	99.75	50.25 - 50.75	51	5.22	855	87.51			
1	0.25	395	100.00	50.75 - 51.25	51	5.22	906	92.73			
				51.25 - 51.75	29	2.97	935	95.70			
				51.75 - 52.25	16	1.64	951	97.34			
				52.25 - 52.75	15	1.54	966	98.87			
				52.75 - 53.25	8	0.82	974	99.69			
				53.25 - 53.75	2	0.20	976	99.90			
				53.75 - 54.25	0	0.00	976	99.90			
				54.25 - 54.75	1	0.10	977	100.00			

(41) FUNCTIONAL LEG LENGTH

The straight-line distance between the plane of the bottom of the right foot with the leg extended and the back of the body of a seated participant is measured with an anthropometer passing over the trochanter landmark. The participant sits erect on a stool 45.8¹ cm high. The right leg is extended, and the foot is on the base plate of the anthropometer, which rests on the floor. The measurement is taken from the footrest surface of the base plate.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
96.20	37.87	1ST	102.90	40.51
96.30	37.91	2ND	105.10	41.38
97.00	38.19	3RD	105.80	41.65
97.40	38.35	5TH	106.70	42.01
99.30	39.09	10TH	108.30	42.64
100.20	39.45	15TH	109.50	43.11
101.00	39.76	20TH	110.60	43.54
102.00	40.16	25TH	111.40	43.86
102.40	40.31	30TH	112.30	44.21
102.80	40.47	35TH	112.90	44.45
103.90	40.91	40TH	113.50	44.69
104.90	41.30	45TH	114.30	45.00
105.30	41.46	50TH	114.60	45.12
105.80	41.65	55TH	115.30	45.39
106.40	41.89	60TH	115.80	45.59
107.10	42.17	65TH	116.50	45.87
107.70	42.40	70TH	117.20	46.14
108.60	42.76	75TH	118.00	46.46
109.40	43.07	80TH	119.00	46.85
110.40	43.46	85TH	120.10	47.28
112.10	44.13	90TH	121.60	47.87
113.50	44.69	95TH	123.50	48.62
114.30	45.00	97TH	124.70	49.09
115.20	45.35	98TH	125.40	49.37
116.00	45.67	99TH	126.80	49.92

¹ The stool height in ANSUR was 40.8 cm.

(41) FUNCTIONAL LEG LENGTH

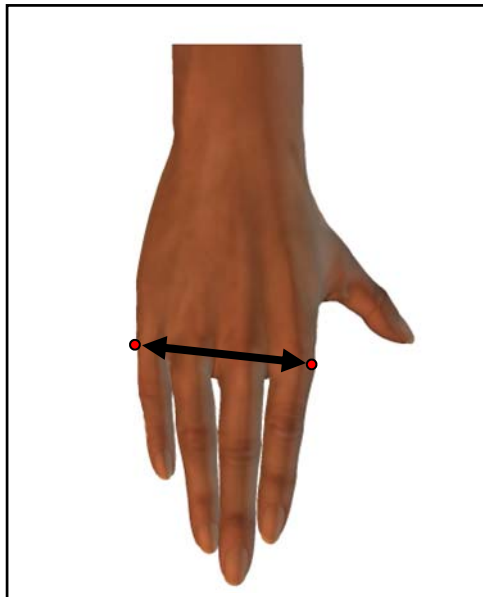
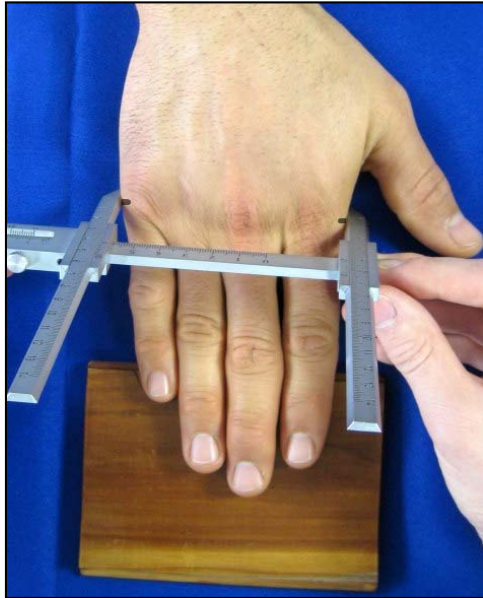
FEMALES		
CM		IN
105.31	MEAN	41.46
0.24	STD ERROR (MEAN)	0.09
4.76	STANDARD DEVIATION	1.87
0.17	STD ERROR (STD DEV)	0.07
94.30	MINIMUM	37.13
122.50	MAXIMUM	48.23
SKEWNESS		0.22
KURTOSIS		2.75
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
114.81	MEAN	45.20
0.16	STD ERROR (MEAN)	0.06
5.06	STANDARD DEVIATION	1.99
0.11	STD ERROR (STD DEV)	0.05
97.40	MINIMUM	38.35
130.30	MAXIMUM	51.30
SKEWNESS		0.07
KURTOSIS		3.07
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCY TABLE				MALES			
F	FPct	CumF	CumFPct	CM		F	FPct	CumF	CumFPct		
1	0.25	1	0.25	93.55	-	94.55					
0	0.00	1	0.25	94.55	-	95.55					
7	1.77	8	2.03	95.55	-	96.55					
8	2.03	16	4.05	96.55	-	97.55	1	0.10	0.10		
4	1.01	20	5.06	97.55	-	98.55	1	0.10	0.20		
15	3.80	35	8.86	98.55	-	99.55	2	0.20	0.41		
25	6.33	60	15.19	99.55	-	100.55	0	0.00	0.41		
28	7.09	88	22.28	100.55	-	101.55	2	0.20	0.61		
27	6.84	115	29.11	101.55	-	102.55	6	0.61	1.23		
27	6.84	142	35.95	102.55	-	103.55	5	0.51	1.74		
23	5.82	165	41.77	103.55	-	104.55	4	0.41	2.15		
30	7.59	195	49.37	104.55	-	105.55	12	1.23	3.38		
36	9.11	231	58.48	105.55	-	106.55	22	2.25	5.63		
37	9.37	268	67.85	106.55	-	107.55	31	3.17	8.80		
21	5.32	289	73.16	107.55	-	108.55	33	3.38	12.18		
21	5.32	310	78.48	108.55	-	109.55	45	4.61	16.79		
20	5.06	330	83.54	109.55	-	110.55	49	5.02	21.80		
13	3.29	343	86.84	110.55	-	111.55	68	6.96	28.76		
7	1.77	350	88.61	111.55	-	112.55	65	6.65	35.41		
17	4.30	367	92.91	112.55	-	113.55	88	9.01	44.42		
14	3.54	381	96.46	113.55	-	114.55	76	7.78	52.20		
5	1.27	386	97.72	114.55	-	115.55	76	7.78	59.98		
4	1.01	390	98.73	115.55	-	116.55	69	7.06	67.04		
2	0.51	392	99.24	116.55	-	117.55	62	6.35	73.39		
1	0.25	393	99.49	117.55	-	118.55	56	5.73	79.12		
1	0.25	394	99.75	118.55	-	119.55	47	4.81	83.93		
0	0.00	394	99.75	119.55	-	120.55	38	3.89	87.82		
0	0.00	394	99.75	120.55	-	121.55	28	2.87	90.69		
1	0.25	395	100.00	121.55	-	122.55	35	3.58	94.27		
				122.55	-	123.55	12	1.23	95.50		
				123.55	-	124.55	16	1.64	97.13		
				124.55	-	125.55	11	1.13	98.26		
				125.55	-	126.55	5	0.51	98.77		
				126.55	-	127.55	5	0.51	99.28		
				127.55	-	128.55	2	0.20	99.49		
				128.55	-	129.55	3	0.31	99.80		
				129.55	-	130.55	2	0.20	100.00		

(42) HAND BREADTH

The breadth of the right hand between the landmarks at metacarpale II and metacarpale V is measured with a sliding caliper. The participant places the palm on a table with the fingers together and the thumb abducted. The middle finger is parallel to the long axis of the forearm. The two distal phalanges of the fingers lie on a flat surface 8 mm higher than the table.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
7.00	2.76	1ST	8.00	3.15
7.00	2.76	2ND	8.10	3.19
7.10	2.80	3RD	8.10	3.19
7.20	2.83	5TH	8.20	3.23
7.40	2.91	10TH	8.30	3.27
7.40	2.91	15TH	8.40	3.31
7.50	2.95	20TH	8.50	3.35
7.50	2.95	25TH	8.60	3.39
7.60	2.99	30TH	8.60	3.39
7.70	3.03	35TH	8.70	3.43
7.70	3.03	40TH	8.70	3.43
7.80	3.07	45TH	8.80	3.46
7.90	3.11	50TH	8.80	3.46
7.90	3.11	55TH	8.90	3.50
7.90	3.11	60TH	8.90	3.50
8.00	3.15	65TH	9.00	3.54
8.00	3.15	70TH	9.10	3.58
8.10	3.19	75TH	9.10	3.58
8.10	3.19	80TH	9.20	3.62
8.20	3.23	85TH	9.30	3.66
8.30	3.27	90TH	9.40	3.70
8.50	3.35	95TH	9.50	3.74
8.60	3.39	97TH	9.70	3.82
8.70	3.43	98TH	9.80	3.86
8.80	3.46	99TH	9.90	3.90

(42) HAND BREADTH

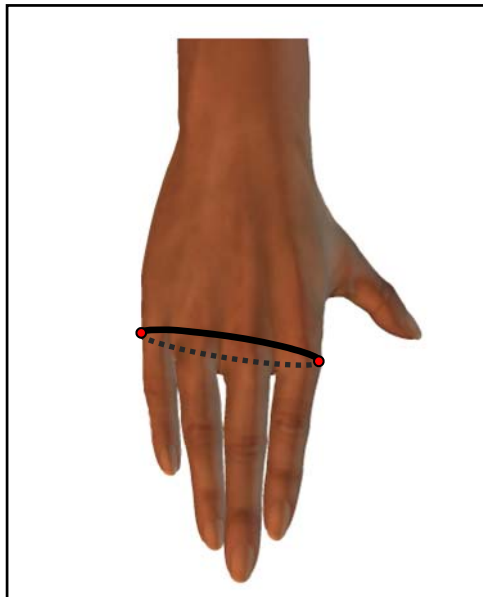
FEMALES		
<u>CM</u>		<u>IN</u>
7.83	MEAN	3.08
0.02	STD ERROR (MEAN)	0.01
0.39	STANDARD DEVIATION	0.16
0.01	STD ERROR (STD DEV)	0.01
6.70	MINIMUM	2.64
8.90	MAXIMUM	3.50
SKEWNESS		0.05
KURTOSIS		3.07
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
8.85	MEAN	3.48
0.01	STD ERROR (MEAN)	0.01
0.42	STANDARD DEVIATION	0.16
0.01	STD ERROR (STD DEV)	0.00
7.50	MINIMUM	2.95
10.60	MAXIMUM	4.17
SKEWNESS		0.20
KURTOSIS		3.10
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE										
FEMALES				<u>CM</u>			MALES			
F	FPct	CumF	CumFPct				F	FPct	CumF	CumFPct
1	0.25	1	0.25	6.65	-	6.75				
1	0.25	2	0.51	6.75	-	6.85				
0	0.00	2	0.51	6.85	-	6.95				
6	1.52	8	2.03	6.95	-	7.05				
4	1.01	12	3.04	7.05	-	7.15				
12	3.04	24	6.08	7.15	-	7.25				
4	1.01	28	7.09	7.25	-	7.35				
39	9.87	67	16.96	7.35	-	7.45				
32	8.10	99	25.06	7.45	-	7.55	1	0.10	1	0.10
28	7.09	127	32.15	7.55	-	7.65	0	0.00	1	0.10
42	10.63	169	42.78	7.65	-	7.75	4	0.41	5	0.51
44	11.14	213	53.92	7.75	-	7.85	7	0.72	12	1.23
44	11.14	257	65.06	7.85	-	7.95	4	0.41	16	1.64
35	8.86	292	73.92	7.95	-	8.05	12	1.23	28	2.87
27	6.84	319	80.76	8.05	-	8.15	25	2.56	53	5.42
26	6.58	345	87.34	8.15	-	8.25	30	3.07	83	8.50
15	3.80	360	91.14	8.25	-	8.35	32	3.28	115	11.77
14	3.54	374	94.68	8.35	-	8.45	91	9.31	206	21.08
7	1.77	381	96.46	8.45	-	8.55	76	7.78	282	28.86
5	1.27	386	97.72	8.55	-	8.65	67	6.86	349	35.72
4	1.01	390	98.73	8.65	-	8.75	97	9.93	446	45.65
3	0.76	393	99.49	8.75	-	8.85	123	12.59	569	58.24
2	0.51	395	100.00	8.85	-	8.95	64	6.55	633	64.79
				8.95	-	9.05	87	8.90	720	73.69
				9.05	-	9.15	57	5.83	777	79.53
				9.15	-	9.25	58	5.94	835	85.47
				9.25	-	9.35	36	3.68	871	89.15
				9.35	-	9.45	42	4.30	913	93.45
				9.45	-	9.55	21	2.15	934	95.60
				9.55	-	9.65	14	1.43	948	97.03
				9.65	-	9.75	13	1.33	961	98.36
				9.75	-	9.85	8	0.82	969	99.18
				9.85	-	9.95	3	0.31	972	99.49
				9.95	-	10.05	4	0.41	976	99.90
				10.05	-	10.15	0	0.00	976	99.90
				10.15	-	10.25	0	0.00	976	99.90
				10.25	-	10.35	0	0.00	976	99.90
				10.35	-	10.45	0	0.00	976	99.90
				10.45	-	10.55	0	0.00	976	99.90
				10.55	-	10.65	1	0.10	977	100.00

(43) HAND CIRCUMFERENCE

The circumference of the right hand is measured with a tape passing over the landmarks at metacarpale II and metacarpale V. The participant places the palm on a table with the fingers together and the thumb abducted. The middle finger is parallel to the long axis of the forearm. The two distal phalanges of the fingers lie on a flat surface 8 mm higher than the table.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
16.50	6.50	1ST	19.10	7.52
16.80	6.61	2ND	19.50	7.68
16.80	6.61	3RD	19.60	7.72
17.20	6.77	5TH	19.70	7.76
17.50	6.89	10TH	20.10	7.91
17.70	6.97	15TH	20.30	7.99
17.80	7.01	20TH	20.50	8.07
18.00	7.09	25TH	20.70	8.15
18.00	7.09	30TH	20.70	8.15
18.20	7.17	35TH	21.00	8.27
18.40	7.24	40TH	21.10	8.31
18.50	7.28	45TH	21.20	8.35
18.70	7.36	50TH	21.30	8.39
18.80	7.40	55TH	21.40	8.43
18.90	7.44	60TH	21.50	8.46
19.00	7.48	65TH	21.70	8.54
19.10	7.52	70TH	21.70	8.54
19.20	7.56	75TH	22.00	8.66
19.30	7.60	80TH	22.20	8.74
19.40	7.64	85TH	22.40	8.82
19.70	7.76	90TH	22.50	8.86
20.20	7.95	95TH	22.80	8.98
20.40	8.03	97TH	23.20	9.13
20.50	8.07	98TH	23.50	9.25
20.90	8.23	99TH	23.50	9.25

(43) HAND CIRCUMFERENCE

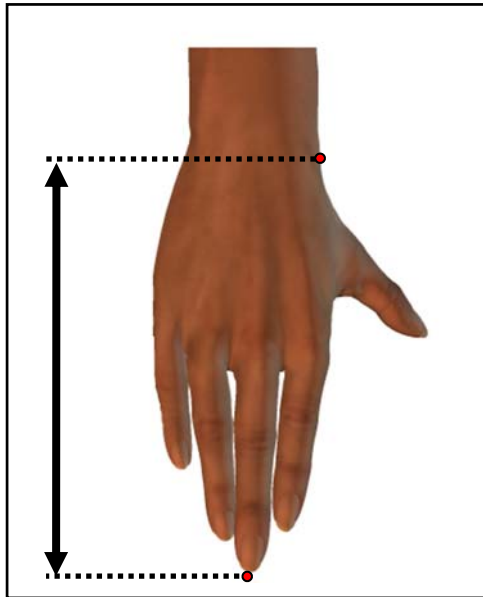
FEMALES		
CM		IN
18.61	MEAN	7.33
0.05	STD ERROR (MEAN)	0.02
0.90	STANDARD DEVIATION	0.36
0.03	STD ERROR (STD DEV)	0.01
16.20	MINIMUM	6.38
21.40	MAXIMUM	8.43
SKEWNESS		0.10
KURTOSIS		3.09
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
21.32	MEAN	8.39
0.03	STD ERROR (MEAN)	0.01
0.96	STANDARD DEVIATION	0.38
0.02	STD ERROR (STD DEV)	0.01
18.50	MINIMUM	7.28
24.80	MAXIMUM	9.76
SKEWNESS		0.11
KURTOSIS		3.07
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	CM	F	FPct	CumF	CumFPct			
2	0.51	2	0.51	16.15 - 16.35							
1	0.25	3	0.76	16.35 - 16.55							
2	0.51	5	1.27	16.55 - 16.75							
8	2.03	13	3.29	16.75 - 16.95							
0	0.00	13	3.29	16.95 - 17.15							
10	2.53	23	5.82	17.15 - 17.35							
14	3.54	37	9.37	17.35 - 17.55							
30	7.59	67	16.96	17.55 - 17.75							
24	6.08	91	23.04	17.75 - 17.95							
27	6.84	118	29.87	17.95 - 18.15							
33	8.35	151	38.23	18.15 - 18.35							
33	8.35	184	46.58	18.35 - 18.55	1	0.10	1	0.10			
41	10.38	225	56.96	18.55 - 18.75	3	0.31	4	0.41			
29	7.34	254	64.30	18.75 - 18.95	5	0.51	9	0.92			
40	10.13	294	74.43	18.95 - 19.15	4	0.41	13	1.33			
29	7.34	323	81.77	19.15 - 19.35	4	0.41	17	1.74			
21	5.32	344	87.09	19.35 - 19.55	13	1.33	30	3.07			
14	3.54	358	90.63	19.55 - 19.75	30	3.07	60	6.14			
11	2.78	369	93.42	19.75 - 19.95	24	2.46	84	8.60			
7	1.77	376	95.19	19.95 - 20.15	37	3.79	121	12.38			
5	1.27	381	96.46	20.15 - 20.35	61	6.24	182	18.63			
4	1.01	385	97.47	20.35 - 20.55	61	6.24	243	24.87			
4	1.01	389	98.48	20.55 - 20.75	84	8.60	327	33.47			
3	0.76	392	99.24	20.75 - 20.95	50	5.12	377	38.59			
1	0.25	393	99.49	20.95 - 21.15	72	7.37	449	45.96			
1	0.25	394	99.75	21.15 - 21.35	84	8.60	533	54.55			
1	0.25	395	100.00	21.35 - 21.55	87	8.90	620	63.46			
				21.55 - 21.75	95	9.72	715	73.18			
				21.75 - 21.95	48	4.91	763	78.10			
				21.95 - 22.15	39	3.99	802	82.09			
				22.15 - 22.35	54	5.53	856	87.62			
				22.35 - 22.55	40	4.09	896	91.71			
				22.55 - 22.75	37	3.79	933	95.50			
				22.75 - 22.95	11	1.13	944	96.62			
				22.95 - 23.15	7	0.72	951	97.34			
				23.15 - 23.35	12	1.23	963	98.57			
				23.35 - 23.55	6	0.61	969	99.18			
				23.55 - 23.75	3	0.31	972	99.49			
				23.75 - 23.95	1	0.10	973	99.59			
				23.95 - 24.15	0	0.00	973	99.59			
				24.15 - 24.35	2	0.20	975	99.80			
				24.35 - 24.55	0	0.00	975	99.80			
				24.55 - 24.75	1	0.10	976	99.90			
				24.75 - 24.95	1	0.10	977	100.00			

(44) HAND LENGTH

The length of the right hand between the stylium landmark on the wrist and the tip of the middle finger is measured with a Poech sliding caliper. The participant places the palm on a table with the fingers together and the thumb abducted. The middle finger is parallel to the long axis of the forearm. The two distal phalanges of the fingers lie on a flat surface 8 mm higher than the table.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
16.10	6.34	1ST	17.00	6.69
16.20	6.38	2ND	17.30	6.81
16.40	6.46	3RD	17.50	6.89
16.60	6.54	5TH	17.80	7.01
16.90	6.65	10TH	18.10	7.13
17.20	6.77	15TH	18.30	7.20
17.40	6.85	20TH	18.40	7.24
17.50	6.89	25TH	18.50	7.28
17.60	6.93	30TH	18.70	7.36
17.70	6.97	35TH	18.80	7.40
17.80	7.01	40TH	18.90	7.44
18.00	7.09	45TH	19.00	7.48
18.10	7.13	50TH	19.20	7.56
18.20	7.17	55TH	19.30	7.60
18.30	7.20	60TH	19.40	7.64
18.40	7.24	65TH	19.50	7.68
18.40	7.24	70TH	19.60	7.72
18.60	7.32	75TH	19.70	7.76
18.70	7.36	80TH	20.00	7.87
18.90	7.44	85TH	20.10	7.91
19.30	7.60	90TH	20.40	8.03
19.60	7.72	95TH	20.60	8.11
19.70	7.76	97TH	20.80	8.19
19.80	7.80	98TH	21.00	8.27
20.00	7.87	99TH	21.10	8.31

(44) HAND LENGTH

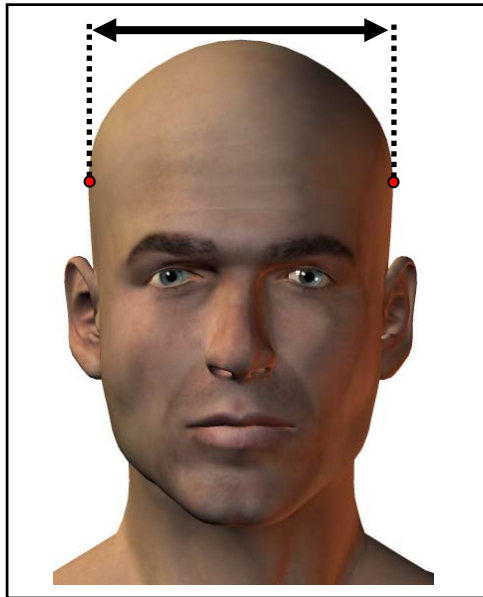
FEMALES		
<u>CM</u>		<u>IN</u>
18.06	MEAN	7.11
0.04	STD ERROR (MEAN)	0.02
0.88	STANDARD DEVIATION	0.35
0.03	STD ERROR (STD DEV)	0.01
15.60	MINIMUM	6.14
21.30	MAXIMUM	8.39
SKEWNESS		0.08
KURTOSIS		3.04
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
19.17	MEAN	7.55
0.03	STD ERROR (MEAN)	0.01
0.89	STANDARD DEVIATION	0.35
0.02	STD ERROR (STD DEV)	0.01
15.90	MINIMUM	6.26
22.00	MAXIMUM	8.66
SKEWNESS		0.03
KURTOSIS		2.87
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	15.55 - 15.75							
0	0.00	1	0.25	15.75 - 15.95	1	0.10	1	0.10			
2	0.51	3	0.76	15.95 - 16.15	0	0.00	1	0.10			
5	1.27	8	2.03	16.15 - 16.35	0	0.00	1	0.10			
6	1.52	14	3.54	16.35 - 16.55	0	0.00	1	0.10			
8	2.03	22	5.57	16.55 - 16.75	3	0.31	4	0.41			
8	2.03	30	7.59	16.75 - 16.95	1	0.10	5	0.51			
12	3.04	42	10.63	16.95 - 17.15	11	1.13	16	1.64			
13	3.29	55	13.92	17.15 - 17.35	10	1.02	26	2.66			
34	8.61	89	22.53	17.35 - 17.55	12	1.23	38	3.89			
36	9.11	125	31.65	17.55 - 17.75	16	1.64	54	5.53			
26	6.58	151	38.23	17.75 - 17.95	34	3.48	88	9.01			
40	10.13	191	48.35	17.95 - 18.15	47	4.81	135	13.82			
39	9.87	230	58.23	18.15 - 18.35	53	5.42	188	19.24			
41	10.38	271	68.61	18.35 - 18.55	80	8.19	268	27.43			
30	7.59	301	76.20	18.55 - 18.75	85	8.70	353	36.13			
12	3.04	313	79.24	18.75 - 18.95	69	7.06	422	43.19			
14	3.54	327	82.78	18.95 - 19.15	75	7.68	497	50.87			
11	2.78	338	85.57	19.15 - 19.35	76	7.78	573	58.65			
18	4.56	356	90.13	19.35 - 19.55	98	10.03	671	68.68			
16	4.05	372	94.18	19.55 - 19.75	82	8.39	753	77.07			
7	1.77	379	95.95	19.75 - 19.95	41	4.20	794	81.27			
9	2.28	388	98.23	19.95 - 20.15	56	5.73	850	87.00			
0	0.00	388	98.23	20.15 - 20.35	25	2.56	875	89.56			
3	0.76	391	98.99	20.35 - 20.55	41	4.20	916	93.76			
3	0.76	394	99.75	20.55 - 20.75	31	3.17	947	96.93			
0	0.00	394	99.75	20.75 - 20.95	12	1.23	959	98.16			
0	0.00	394	99.75	20.95 - 21.15	10	1.02	969	99.18			
1	0.25	395	100.00	21.15 - 21.35	3	0.31	972	99.49			
				21.35 - 21.55	4	0.41	976	99.90			
				21.55 - 21.75	0	0.00	976	99.90			
				21.75 - 21.95	0	0.00	976	99.90			
				21.95 - 22.15	1	0.10	977	100.00			

(45) HEAD BREADTH*

The maximum horizontal breadth of the head above the plane of attachment of the ears is measured with a spreading caliper. For female participants with braids or cornrows, the measurement includes the styled hair.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
13.70	5.39	1ST	14.20	5.59
13.80	5.43	2ND	14.40	5.67
13.80	5.43	3RD	14.50	5.71
13.90	5.47	5TH	14.70	5.79
14.10	5.55	10TH	14.80	5.83
14.20	5.59	15TH	14.90	5.87
14.30	5.63	20TH	15.00	5.91
14.40	5.67	25TH	15.00	5.91
14.50	5.71	30TH	15.10	5.94
14.50	5.71	35TH	15.20	5.98
14.60	5.75	40TH	15.30	6.02
14.60	5.75	45TH	15.30	6.02
14.70	5.79	50TH	15.40	6.06
14.80	5.83	55TH	15.40	6.06
14.80	5.83	60TH	15.50	6.10
14.90	5.87	65TH	15.60	6.14
15.00	5.91	70TH	15.60	6.14
15.00	5.91	75TH	15.70	6.18
15.10	5.94	80TH	15.80	6.22
15.20	5.98	85TH	15.90	6.26
15.30	6.02	90TH	16.00	6.30
15.50	6.10	95TH	16.20	6.38
15.70	6.18	97TH	16.40	6.46
15.70	6.18	98TH	16.40	6.46
15.90	6.26	99TH	16.70	6.57

(45) HEAD BREADTH

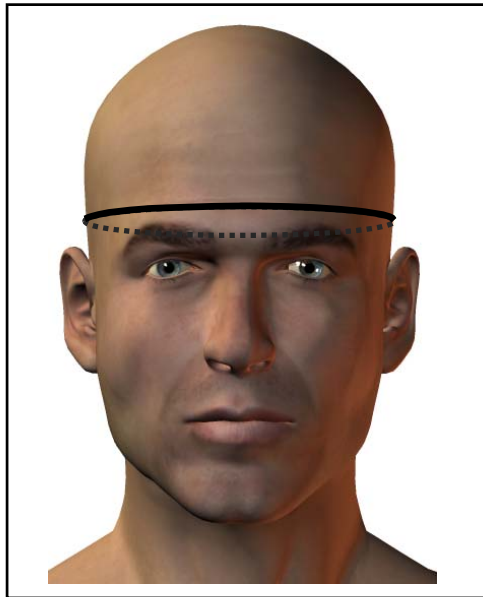
FEMALES		
<u>CM</u>		<u>IN</u>
14.71	MEAN	5.79
0.02	STD ERROR (MEAN)	0.01
0.49	STANDARD DEVIATION	0.19
0.02	STD ERROR (STD DEV)	0.01
13.20	MINIMUM	5.20
16.40	MAXIMUM	6.46
SKEWNESS		0.12
KURTOSIS		3.16
COEFFICIENT OF VARIATION		3.3%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
15.39	MEAN	6.06
0.02	STD ERROR (MEAN)	0.01
0.50	STANDARD DEVIATION	0.19
0.01	STD ERROR (STD DEV)	0.00
14.00	MINIMUM	5.51
17.10	MAXIMUM	6.73
SKEWNESS		0.19
KURTOSIS		3.06
COEFFICIENT OF VARIATION		3.2%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES								MALES			
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct		
2	0.51	2	0.51	13.15	-	13.25					
0	0.00	2	0.51	13.25	-	13.35					
0	0.00	2	0.51	13.35	-	13.45					
1	0.25	3	0.76	13.45	-	13.55					
0	0.00	3	0.76	13.55	-	13.65					
4	1.01	7	1.77	13.65	-	13.75					
6	1.52	13	3.29	13.75	-	13.85					
3	0.76	16	4.05	13.85	-	13.95					
13	3.29	29	7.34	13.95	-	14.05	1	0.10	1	0.10	
14	3.54	43	10.89	14.05	-	14.15	0	0.00	1	0.10	
16	4.05	59	14.94	14.15	-	14.25	4	0.41	5	0.51	
23	5.82	82	20.76	14.25	-	14.35	6	0.61	11	1.13	
21	5.32	103	26.08	14.35	-	14.45	15	1.54	26	2.66	
33	8.35	136	34.43	14.45	-	14.55	9	0.92	35	3.58	
33	8.35	169	42.78	14.55	-	14.65	13	1.33	48	4.91	
31	7.85	200	50.63	14.65	-	14.75	36	3.68	84	8.60	
26	6.58	226	57.22	14.75	-	14.85	58	5.94	142	14.53	
23	5.82	249	63.04	14.85	-	14.95	55	5.63	197	20.16	
42	10.63	291	73.67	14.95	-	15.05	67	6.86	264	27.02	
16	4.05	307	77.72	15.05	-	15.15	41	4.20	305	31.22	
19	4.81	326	82.53	15.15	-	15.25	70	7.16	375	38.38	
15	3.80	341	86.33	15.25	-	15.35	77	7.88	452	46.26	
15	3.80	356	90.13	15.35	-	15.45	113	11.57	565	57.83	
11	2.78	367	92.91	15.45	-	15.55	66	6.76	631	64.59	
7	1.77	374	94.68	15.55	-	15.65	67	6.86	698	71.44	
7	1.77	381	96.46	15.65	-	15.75	45	4.61	743	76.05	
4	1.01	385	97.47	15.75	-	15.85	69	7.06	812	83.11	
3	0.76	388	98.23	15.85	-	15.95	30	3.07	842	86.18	
2	0.51	390	98.73	15.95	-	16.05	49	5.02	891	91.20	
3	0.76	393	99.49	16.05	-	16.15	19	1.94	910	93.14	
1	0.25	394	99.75	16.15	-	16.25	19	1.94	929	95.09	
0	0.00	394	99.75	16.25	-	16.35	13	1.33	942	96.42	
1	0.25	395	100.00	16.35	-	16.45	14	1.43	956	97.85	
				16.45	-	16.55	3	0.31	959	98.16	
				16.55	-	16.65	5	0.51	964	98.67	
				16.65	-	16.75	7	0.72	971	99.39	
				16.75	-	16.85	3	0.31	974	99.69	
				16.85	-	16.95	1	0.10	975	99.80	
				16.95	-	17.05	1	0.10	976	99.90	
				17.05	-	17.15	1	0.10	977	100.00	

(46) HEAD CIRCUMFERENCE*

The maximum circumference of the head above the attachment of the ears is measured with a tape passing just above the ridges of the eyebrows and around the back of the head. For female participants with braids or cornrows, the measurement includes the styled hair.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
52.30	20.59	1ST	54.50	21.46
52.60	20.71	2ND	54.90	21.61
52.70	20.75	3RD	55.20	21.73
53.30	20.98	5TH	55.50	21.85
53.80	21.18	10TH	56.10	22.09
54.30	21.38	15TH	56.40	22.20
54.50	21.46	20TH	56.70	22.32
54.80	21.57	25TH	56.80	22.36
55.00	21.65	30TH	57.10	22.48
55.20	21.73	35TH	57.30	22.56
55.40	21.81	40TH	57.40	22.60
55.50	21.85	45TH	57.60	22.68
55.60	21.89	50TH	57.70	22.72
55.70	21.93	55TH	57.90	22.80
55.80	21.97	60TH	58.20	22.91
56.20	22.13	65TH	58.40	22.99
56.40	22.20	70TH	58.50	23.03
56.60	22.28	75TH	58.80	23.15
56.90	22.40	80TH	59.00	23.23
57.20	22.52	85TH	59.30	23.35
57.70	22.72	90TH	59.70	23.50
58.20	22.91	95TH	60.40	23.78
58.80	23.15	97TH	60.70	23.90
58.90	23.19	98TH	61.30	24.13
59.40	23.39	99TH	61.70	24.29

* This measurement is not equivalent to ANSUR for females. See text on page 47 for details.

(46) HEAD CIRCUMFERENCE

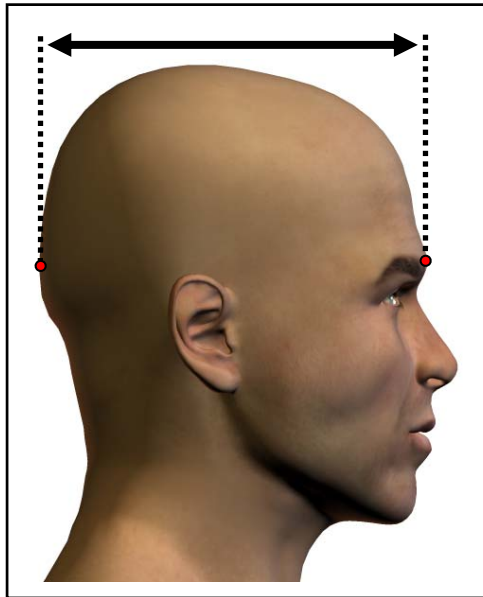
FEMALES		
<u>CM</u>		<u>IN</u>
55.69	MEAN	21.93
0.08	STD ERROR (MEAN)	0.03
1.49	STANDARD DEVIATION	0.59
0.05	STD ERROR (STD DEV)	0.02
50.70	MINIMUM	19.96
61.70	MAXIMUM	24.29
SKEWNESS		0.06
KURTOSIS		3.48
COEFFICIENT OF VARIATION		2.7%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
57.85	MEAN	22.77
0.05	STD ERROR (MEAN)	0.02
1.47	STANDARD DEVIATION	0.58
0.03	STD ERROR (STD DEV)	0.01
54.00	MINIMUM	21.26
63.00	MAXIMUM	24.80
SKEWNESS		0.29
KURTOSIS		3.30
COEFFICIENT OF VARIATION		2.5%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	50.60	-	50.85					
0	0.00	1	0.25	50.85	-	51.10					
0	0.00	1	0.25	51.10	-	51.35					
0	0.00	1	0.25	51.35	-	51.60					
1	0.25	2	0.51	51.60	-	51.85					
0	0.00	2	0.51	51.85	-	52.10					
1	0.25	3	0.76	52.10	-	52.35					
2	0.51	5	1.27	52.35	-	52.60					
4	1.01	9	2.28	52.60	-	52.85					
1	0.25	10	2.53	52.85	-	53.10					
6	1.52	16	4.05	53.10	-	53.35					
6	1.52	22	5.57	53.35	-	53.60					
11	2.78	33	8.35	53.60	-	53.85					
3	0.76	36	9.11	53.85	-	54.10					
15	3.80	51	12.91	54.10	-	54.35	1	0.10			
15	3.80	66	16.71	54.35	-	54.60	3	0.31			
27	6.84	93	23.54	54.60	-	54.85	4	0.41			
11	2.78	104	26.33	54.85	-	55.10	8	0.82			
27	6.84	131	33.16	55.10	-	55.35	15	1.54			
26	6.58	157	39.75	55.35	-	55.60	25	2.56			
39	9.87	196	49.62	55.60	-	55.85	38	3.89			
8	2.03	204	51.65	55.85	-	56.10	53	5.42			
19	4.81	223	56.46	56.10	-	56.35	84	8.60			
25	6.33	248	62.78	56.35	-	56.60	99	10.13			
25	6.33	273	69.11	56.60	-	56.85	137	14.02			
18	4.56	291	73.67	56.85	-	57.10	185	18.94			
17	4.30	308	77.97	57.10	-	57.35	268	27.43			
11	2.78	319	80.76	57.35	-	57.60	306	31.32			
16	4.05	335	84.81	57.60	-	57.85	373	38.18			
10	2.53	345	87.34	57.85	-	58.10	449	45.96			
7	1.77	352	89.11	58.10	-	58.35	533	54.55			
5	1.27	357	90.38	58.35	-	58.60	564	57.73			
8	2.03	365	92.41	58.60	-	58.85	631	64.59			
7	1.77	372	94.18	58.85	-	59.10	691	70.73			
4	1.01	376	95.19	59.10	-	59.35	771	78.92			
5	1.27	381	96.46	59.35	-	59.60	805	82.40			
2	0.51	383	96.96	59.60	-	59.85	842	86.18			
4	1.01	387	97.97	59.85	-	60.10	870	89.05			
2	0.51	389	98.48	60.10	-	60.35	905	92.63			
1	0.25	390	98.73	60.35	-	60.60	914	93.55			
1	0.25	391	98.99	60.60	-	60.85	929	95.09			
2	0.51	393	99.49	60.85	-	61.10	943	96.52			
1	0.25	394	99.75	61.10	-	61.35	956	97.85			
0	0.00	394	99.75	61.35	-	61.60	958	98.06			
1	0.25	395	100.00	61.60	-	61.85	965	98.77			
				61.85	-	62.10	967	98.98			
				62.10	-	62.35	974	99.69			
				62.35	-	62.60	975	99.80			
				62.60	-	62.85	975	99.80			
				62.85	-	63.10	976	99.90			
							976	99.90			
							977	100.00			
							977	100.00			

(47) HEAD LENGTH*

The distance from the glabella landmark to the opisthocranium landmark is measured with a spreading caliper. For female participants with braids or cornrows, the measurement includes the styled hair.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
17.40	6.85	1ST	18.50	7.28
17.70	6.97	2ND	18.60	7.32
17.80	7.01	3RD	18.70	7.36
17.90	7.05	5TH	19.10	7.52
18.10	7.13	10TH	19.40	7.64
18.30	7.20	15TH	19.50	7.68
18.40	7.24	20TH	19.70	7.76
18.50	7.28	25TH	19.80	7.80
18.60	7.32	30TH	19.90	7.83
18.70	7.36	35TH	19.90	7.83
18.80	7.40	40TH	20.00	7.87
18.80	7.40	45TH	20.10	7.91
19.00	7.48	50TH	20.20	7.95
19.10	7.52	55TH	20.20	7.95
19.20	7.56	60TH	20.30	7.99
19.20	7.56	65TH	20.40	8.03
19.30	7.60	70TH	20.50	8.07
19.40	7.64	75TH	20.60	8.11
19.50	7.68	80TH	20.60	8.11
19.70	7.76	85TH	20.80	8.19
19.90	7.83	90TH	20.90	8.23
20.10	7.91	95TH	21.10	8.31
20.30	7.99	97TH	21.30	8.39
20.50	8.07	98TH	21.50	8.46
20.60	8.11	99TH	21.70	8.54

* This measurement is not equivalent to ANSUR for females. See text on page 47 for details.

(47) HEAD LENGTH

FEMALES		
<u>CM</u>		<u>IN</u>
18.98	MEAN	7.47
0.03	STD ERROR (MEAN)	0.01
0.67	STANDARD DEVIATION	0.26
0.02	STD ERROR (STD DEV)	0.01
17.10	MINIMUM	6.73
21.30	MAXIMUM	8.39
SKEWNESS		0.11
KURTOSIS		3.03
COEFFICIENT OF VARIATION		3.5%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
20.15	MEAN	7.93
0.02	STD ERROR (MEAN)	0.01
0.64	STANDARD DEVIATION	0.25
0.01	STD ERROR (STD DEV)	0.01
18.30	MINIMUM	7.20
22.70	MAXIMUM	8.94
SKEWNESS		0.00
KURTOSIS		3.91
COEFFICIENT OF VARIATION		3.2%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct		
1	0.25	1	0.25	16.95	-	17.15					
1	0.25	2	0.51	17.15	-	17.35					
3	0.76	5	1.27	17.35	-	17.55					
5	1.27	10	2.53	17.55	-	17.75					
8	2.03	18	4.56	17.75	-	17.95					
17	4.30	35	8.86	17.95	-	18.15					
22	5.57	57	14.43	18.15	-	18.35	4	0.41	4	0.41	
30	7.59	87	22.03	18.35	-	18.55	7	0.72	11	1.13	
43	10.89	130	32.91	18.55	-	18.75	13	1.33	24	2.46	
43	10.89	173	43.80	18.75	-	18.95	13	1.33	37	3.79	
37	9.37	210	53.16	18.95	-	19.15	23	2.35	60	6.14	
52	13.16	262	66.33	19.15	-	19.35	36	3.68	96	9.83	
39	9.87	301	76.20	19.35	-	19.55	80	8.19	176	18.01	
34	8.61	335	84.81	19.55	-	19.75	86	8.80	262	26.82	
24	6.08	359	90.89	19.75	-	19.95	115	11.77	377	38.59	
11	2.78	370	93.67	19.95	-	20.15	128	13.10	505	51.69	
9	2.28	379	95.95	20.15	-	20.35	108	11.05	613	62.74	
6	1.52	385	97.47	20.35	-	20.55	107	10.95	720	73.69	
6	1.52	391	98.99	20.55	-	20.75	117	11.98	837	85.67	
3	0.76	394	99.75	20.75	-	20.95	56	5.73	893	91.40	
0	0.00	394	99.75	20.95	-	21.15	42	4.30	935	95.70	
1	0.25	395	100.00	21.15	-	21.35	21	2.15	956	97.85	
				21.35	-	21.55	5	0.51	961	98.36	
				21.55	-	21.75	8	0.82	969	99.18	
				21.75	-	21.95	6	0.61	975	99.80	
				21.95	-	22.15	0	0.00	975	99.80	
				22.15	-	22.35	0	0.00	975	99.80	
				22.35	-	22.55	1	0.10	976	99.90	
				22.55	-	22.75	1	0.10	977	100.00	

(48) HEEL-ANKLE CIRCUMFERENCE

The circumference of the right foot is measured with a tape passing over the point at which the heel first contacts the table and over the dorsal juncture of the foot and leg landmark at the front of the ankle. The participant stands with the feet about 10 cm apart and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
27.90	10.98	1ST	31.00	12.20
28.30	11.14	2ND	31.20	12.28
28.40	11.18	3RD	31.50	12.40
28.70	11.30	5TH	31.80	12.52
29.00	11.42	10TH	32.30	12.72
29.40	11.57	15TH	32.70	12.87
29.50	11.61	20TH	33.00	12.99
29.80	11.73	25TH	33.20	13.07
30.00	11.81	30TH	33.40	13.15
30.20	11.89	35TH	33.70	13.27
30.40	11.97	40TH	33.70	13.27
30.60	12.05	45TH	34.00	13.39
30.70	12.09	50TH	34.20	13.46
30.90	12.17	55TH	34.40	13.54
31.20	12.28	60TH	34.60	13.62
31.40	12.36	65TH	34.70	13.66
31.60	12.44	70TH	35.00	13.78
31.80	12.52	75TH	35.30	13.90
32.00	12.60	80TH	35.50	13.98
32.30	12.72	85TH	35.80	14.09
32.60	12.83	90TH	36.30	14.29
33.00	12.99	95TH	36.90	14.53
33.60	13.23	97TH	37.40	14.72
34.00	13.39	98TH	37.70	14.84
34.30	13.50	99TH	38.30	15.08

(48) HEEL-ANKLE CIRCUMFERENCE

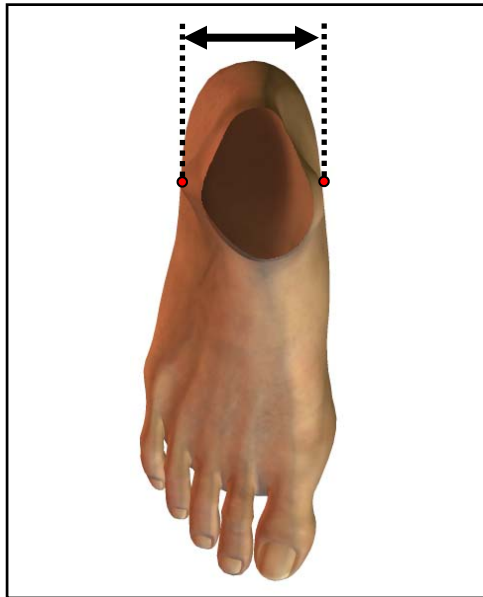
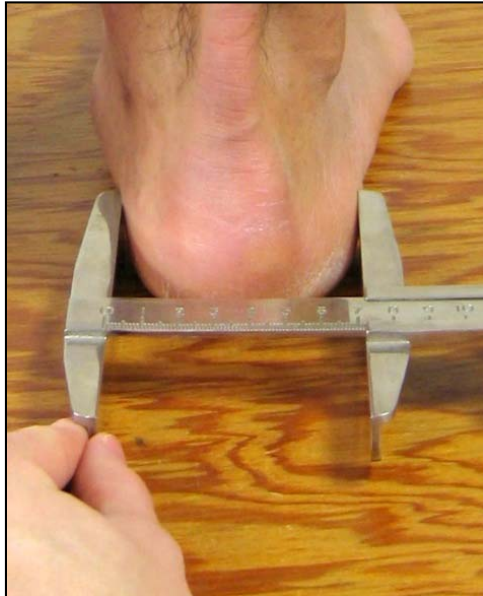
FEMALES		
CM		IN
30.82	MEAN	12.13
0.07	STD ERROR (MEAN)	0.03
1.39	STANDARD DEVIATION	0.55
0.05	STD ERROR (STD DEV)	0.02
27.20	MINIMUM	10.71
36.00	MAXIMUM	14.17
SKEWNESS		0.23
KURTOSIS		2.83
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
34.27	MEAN	13.49
0.05	STD ERROR (MEAN)	0.02
1.54	STANDARD DEVIATION	0.61
0.03	STD ERROR (STD DEV)	0.01
29.20	MINIMUM	11.50
39.40	MAXIMUM	15.51
SKEWNESS		0.23
KURTOSIS		3.15
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	CM	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	26.75 - 27.25							
0	0.00	1	0.25	27.25 - 27.75							
4	1.01	5	1.27	27.75 - 28.25							
13	3.29	18	4.56	28.25 - 28.75							
19	4.81	37	9.37	28.75 - 29.25	1	0.10	1	0.10			
39	9.87	76	19.24	29.25 - 29.75	1	0.10	2	0.20			
45	11.39	121	30.63	29.75 - 30.25	1	0.10	3	0.31			
61	15.44	182	46.08	30.25 - 30.75	7	0.72	10	1.02			
39	9.87	221	55.95	30.75 - 31.25	17	1.74	27	2.76			
54	13.67	275	69.62	31.25 - 31.75	29	2.97	56	5.73			
42	10.63	317	80.25	31.75 - 32.25	31	3.17	87	8.90			
35	8.86	352	89.11	32.25 - 32.75	81	8.29	168	17.20			
13	3.29	365	92.41	32.75 - 33.25	80	8.19	248	25.38			
12	3.04	377	95.44	33.25 - 33.75	149	15.25	397	40.63			
7	1.77	384	97.22	33.75 - 34.25	109	11.16	506	51.79			
8	2.03	392	99.24	34.25 - 34.75	154	15.76	660	67.55			
2	0.51	394	99.75	34.75 - 35.25	81	8.29	741	75.84			
0	0.00	394	99.75	35.25 - 35.75	99	10.13	840	85.98			
1	0.25	395	100.00	35.75 - 36.25	48	4.91	888	90.89			
				36.25 - 36.75	46	4.71	934	95.60			
				36.75 - 37.25	16	1.64	950	97.24			
				37.25 - 37.75	18	1.84	968	99.08			
				37.75 - 38.25	4	0.41	972	99.49			
				38.25 - 38.75	3	0.31	975	99.80			
				38.75 - 39.25	1	0.10	976	99.90			
				39.25 - 39.75	1	0.10	977	100.00			

(49) HEEL BREADTH

The maximum horizontal distance between the medial and lateral points of the right heel, at or posterior to the lateral malleolus landmark, is measured with a Holtain caliper. The measurement is taken just above the level of the standing surface at the most protruding points of the curvature of the heel. The participant stands with the feet about 10 cm apart and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
5.60	2.20	1ST	6.40	2.52
5.70	2.24	2ND	6.50	2.56
5.80	2.28	3RD	6.50	2.56
5.80	2.28	5TH	6.60	2.60
6.00	2.36	10TH	6.70	2.64
6.10	2.40	15TH	6.80	2.68
6.20	2.44	20TH	6.90	2.72
6.20	2.44	25TH	7.00	2.76
6.30	2.48	30TH	7.10	2.80
6.40	2.52	35TH	7.10	2.80
6.40	2.52	40TH	7.20	2.83
6.40	2.52	45TH	7.20	2.83
6.50	2.56	50TH	7.30	2.87
6.50	2.56	55TH	7.40	2.91
6.60	2.60	60TH	7.50	2.95
6.70	2.64	65TH	7.50	2.95
6.70	2.64	70TH	7.60	2.99
6.80	2.68	75TH	7.70	3.03
6.90	2.72	80TH	7.70	3.03
7.00	2.76	85TH	7.80	3.07
7.10	2.80	90TH	7.90	3.11
7.30	2.87	95TH	8.10	3.19
7.40	2.91	97TH	8.20	3.23
7.40	2.91	98TH	8.40	3.31
7.80	3.07	99TH	8.50	3.35

(49) HEEL BREADTH

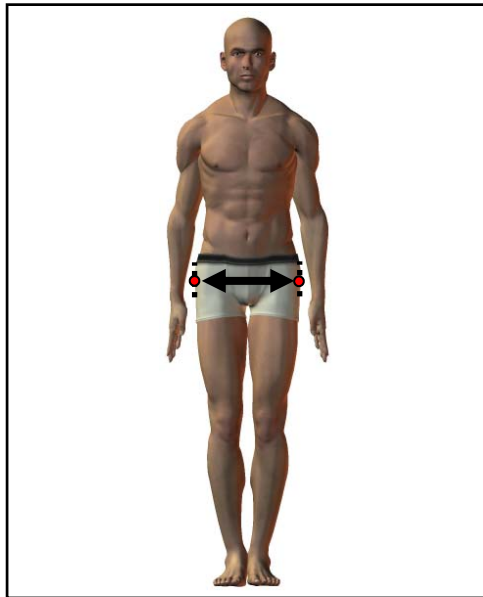
FEMALES		
<u>CM</u>		<u>IN</u>
6.53	MEAN	2.57
0.02	STD ERROR (MEAN)	0.01
0.45	STANDARD DEVIATION	0.18
0.02	STD ERROR (STD DEV)	0.01
5.20	MINIMUM	2.05
8.40	MAXIMUM	3.31
SKEWNESS		0.36
KURTOSIS		3.37
COEFFICIENT OF VARIATION		6.9%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
7.34	MEAN	2.89
0.02	STD ERROR (MEAN)	0.01
0.48	STANDARD DEVIATION	0.19
0.01	STD ERROR (STD DEV)	0.00
5.90	MINIMUM	2.32
8.90	MAXIMUM	3.50
SKEWNESS		0.22
KURTOSIS		2.83
COEFFICIENT OF VARIATION		6.5%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	5.15 - 5.25							
0	0.00	1	0.25	5.25 - 5.35							
0	0.00	1	0.25	5.35 - 5.45							
1	0.25	2	0.51	5.45 - 5.55							
4	1.01	6	1.52	5.55 - 5.65							
4	1.01	10	2.53	5.65 - 5.75							
8	2.03	18	4.56	5.75 - 5.85							
7	1.77	25	6.33	5.85 - 5.95	2	0.20	2	0.20			
11	2.78	36	9.11	5.95 - 6.05	0	0.00	2	0.20			
19	4.81	55	13.92	6.05 - 6.15	1	0.10	3	0.31			
27	6.84	82	20.76	6.15 - 6.25	2	0.20	5	0.51			
17	4.30	99	25.06	6.25 - 6.35	7	0.72	12	1.23			
41	10.38	140	35.44	6.35 - 6.45	12	1.23	24	2.46			
36	9.11	176	44.56	6.45 - 6.55	13	1.33	37	3.79			
20	5.06	196	49.62	6.55 - 6.65	23	2.35	60	6.14			
40	10.13	236	59.75	6.65 - 6.75	64	6.55	124	12.69			
23	5.82	259	65.57	6.75 - 6.85	53	5.42	177	18.12			
18	4.56	277	70.13	6.85 - 6.95	58	5.94	235	24.05			
29	7.34	306	77.47	6.95 - 7.05	68	6.96	303	31.01			
27	6.84	333	84.30	7.05 - 7.15	93	9.52	396	40.53			
15	3.80	348	88.10	7.15 - 7.25	67	6.86	463	47.39			
9	2.28	357	90.38	7.25 - 7.35	62	6.35	525	53.74			
13	3.29	370	93.67	7.35 - 7.45	77	7.88	602	61.62			
4	1.01	374	94.68	7.45 - 7.55	60	6.14	662	67.76			
8	2.03	382	96.71	7.55 - 7.65	65	6.65	727	74.41			
0	0.00	382	96.71	7.65 - 7.75	77	7.88	804	82.29			
4	1.01	386	97.72	7.75 - 7.85	56	5.73	860	88.02			
3	0.76	389	98.48	7.85 - 7.95	33	3.38	893	91.40			
2	0.51	391	98.99	7.95 - 8.05	26	2.66	919	94.06			
1	0.25	392	99.24	8.05 - 8.15	22	2.25	941	96.32			
1	0.25	393	99.49	8.15 - 8.25	14	1.43	955	97.75			
0	0.00	393	99.49	8.25 - 8.35	2	0.20	957	97.95			
2	0.51	395	100.00	8.35 - 8.45	10	1.02	967	98.98			
				8.45 - 8.55	2	0.20	969	99.18			
				8.55 - 8.65	0	0.00	969	99.18			
				8.65 - 8.75	4	0.41	973	99.59			
				8.75 - 8.85	3	0.31	976	99.90			
				8.85 - 8.95	1	0.10	977	100.00			

(50) HIP BREADTH

The horizontal distance between the lateral buttock landmarks is measured with a beam caliper. The participant stands erect with the heels together and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
30.80	12.13	1ST	30.40	11.97
31.10	12.24	2ND	30.80	12.13
31.30	12.32	3RD	31.30	12.32
32.10	12.64	5TH	31.70	12.48
32.70	12.87	10TH	32.30	12.72
33.30	13.11	15TH	32.70	12.87
33.70	13.27	20TH	33.20	13.07
34.00	13.39	25TH	33.50	13.19
34.60	13.62	30TH	33.70	13.27
34.90	13.74	35TH	34.00	13.39
35.20	13.86	40TH	34.20	13.46
35.60	14.02	45TH	34.40	13.54
35.90	14.13	50TH	34.60	13.62
36.20	14.25	55TH	34.80	13.70
36.40	14.33	60TH	35.10	13.82
36.80	14.49	65TH	35.40	13.94
37.00	14.57	70TH	35.70	14.06
37.30	14.69	75TH	36.20	14.25
37.90	14.92	80TH	36.60	14.41
38.40	15.12	85TH	37.10	14.61
39.00	15.35	90TH	37.50	14.76
40.00	15.75	95TH	38.30	15.08
40.10	15.79	97TH	38.70	15.24
40.50	15.94	98TH	39.40	15.51
41.90	16.50	99TH	40.00	15.75

(50) HIP BREADTH

FEMALES		
CM		IN
35.86	MEAN	14.12
0.12	STD ERROR (MEAN)	0.05
2.41	STANDARD DEVIATION	0.95
0.09	STD ERROR (STD DEV)	0.03
29.10	MINIMUM	11.46
44.50	MAXIMUM	17.52
SKEWNESS		0.21
KURTOSIS		3.17
COEFFICIENT OF VARIATION		6.7%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
34.81	MEAN	13.71
0.07	STD ERROR (MEAN)	0.03
2.05	STANDARD DEVIATION	0.81
0.05	STD ERROR (STD DEV)	0.02
28.40	MINIMUM	11.18
42.90	MAXIMUM	16.89
SKEWNESS		0.30
KURTOSIS		3.16
COEFFICIENT OF VARIATION		5.9%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE										
FEMALES				CENTIMETERS		MALES				
F	FPct	CumF	CumFPct			F	FPct	CumF	CumFPct	
				28.25	-	28.75	1	0.10	1	0.10
1	0.25	1	0.25	28.75	-	29.25	1	0.10	2	0.20
1	0.25	2	0.51	29.25	-	29.75	4	0.41	6	0.61
2	0.51	4	1.01	29.75	-	30.25	5	0.51	11	1.13
2	0.51	6	1.52	30.25	-	30.75	17	1.74	28	2.87
7	1.77	13	3.29	30.75	-	31.25	15	1.54	43	4.40
6	1.52	19	4.81	31.25	-	31.75	35	3.58	78	7.98
10	2.53	29	7.34	31.75	-	32.25	41	4.20	119	12.18
21	5.32	50	12.66	32.25	-	32.75	67	6.86	186	19.04
22	5.57	72	18.23	32.75	-	33.25	68	6.96	254	26.00
24	6.08	96	24.30	33.25	-	33.75	101	10.34	355	36.34
28	7.09	124	31.39	33.75	-	34.25	105	10.75	460	47.08
26	6.58	150	37.97	34.25	-	34.75	112	11.46	572	58.55
32	8.10	182	46.08	34.75	-	35.25	77	7.88	649	66.43
31	7.85	213	53.92	35.25	-	35.75	73	7.47	722	73.90
28	7.09	241	61.01	35.75	-	36.25	55	5.63	777	79.53
35	8.86	276	69.87	36.25	-	36.75	50	5.12	827	84.65
28	7.09	304	76.96	36.75	-	37.25	38	3.89	865	88.54
16	4.05	320	81.01	37.25	-	37.75	46	4.71	911	93.24
22	5.57	342	86.58	37.75	-	38.25	25	2.56	936	95.80
14	3.54	356	90.13	38.25	-	38.75	19	1.94	955	97.75
8	2.03	364	92.15	38.75	-	39.25	6	0.61	961	98.36
10	2.53	374	94.68	39.25	-	39.75	6	0.61	967	98.98
10	2.53	384	97.22	39.75	-	40.25	6	0.61	973	99.59
4	1.01	388	98.23	40.25	-	40.75	2	0.20	975	99.80
5	1.27	393	99.49	40.75	-	41.25	0	0.00	975	99.80
0	0.00	393	99.49	41.25	-	41.75	0	0.00	975	99.80
1	0.25	394	99.75	41.75	-	42.25	1	0.10	976	99.90
0	0.00	394	99.75	42.25	-	42.75	0	0.00	976	99.90
0	0.00	394	99.75	42.75	-	43.25	1	0.10	977	100.00
0	0.00	394	99.75	43.25	-	43.75				
0	0.00	394	99.75	43.75	-	44.25				
1	0.25	395	100.00	44.25	-	44.75				

(51) HIP BREADTH, SITTING

The distance between the lateral points of the hips or thighs (whichever are broader) is measured with a beam caliper. The participant sits erect with the feet and knees together.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
34.10	13.43	1ST	33.20	13.07
34.50	13.58	2ND	33.70	13.27
34.60	13.62	3RD	34.10	13.43
35.10	13.82	5TH	34.40	13.54
36.20	14.25	10TH	35.20	13.86
36.80	14.49	15TH	35.70	14.06
37.40	14.72	20TH	36.10	14.21
37.80	14.88	25TH	36.40	14.33
38.40	15.12	30TH	36.80	14.49
39.10	15.39	35TH	37.10	14.61
39.50	15.55	40TH	37.50	14.76
39.90	15.71	45TH	37.80	14.88
40.40	15.91	50TH	38.10	15.00
40.70	16.02	55TH	38.50	15.16
41.10	16.18	60TH	38.80	15.28
41.20	16.22	65TH	39.10	15.39
41.60	16.38	70TH	39.40	15.51
42.00	16.54	75TH	39.80	15.67
42.70	16.81	80TH	40.30	15.87
43.40	17.09	85TH	40.80	16.06
44.30	17.44	90TH	41.60	16.38
45.80	18.03	95TH	42.50	16.73
46.40	18.27	97TH	43.30	17.05
47.60	18.74	98TH	43.60	17.17
48.50	19.09	99TH	44.30	17.44

(51) HIP BREADTH, SITTING

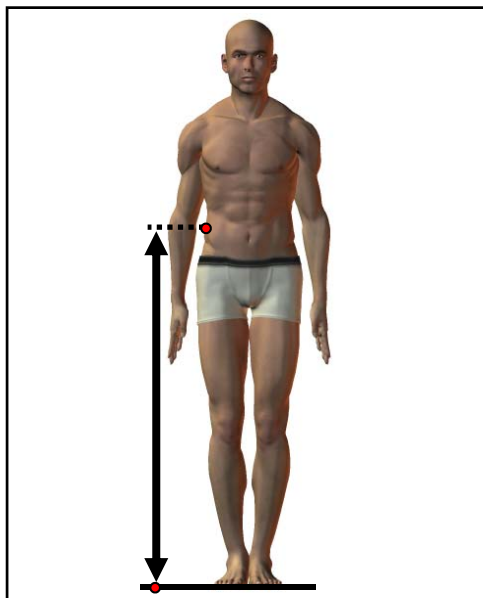
FEMALES		
CM		IN
40.26	MEAN	15.85
0.16	STD ERROR (MEAN)	0.06
3.15	STANDARD DEVIATION	1.24
0.11	STD ERROR (STD DEV)	0.04
32.80	MINIMUM	12.91
51.20	MAXIMUM	20.16
SKEWNESS		0.27
KURTOSIS		2.94
COEFFICIENT OF VARIATION		7.8%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
38.24	MEAN	15.05
0.08	STD ERROR (MEAN)	0.03
2.49	STANDARD DEVIATION	0.98
0.06	STD ERROR (STD DEV)	0.02
31.20	MINIMUM	12.28
48.20	MAXIMUM	18.98
SKEWNESS		0.38
KURTOSIS		3.23
COEFFICIENT OF VARIATION		6.5%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCY TABLE				MALES			
F	FPct	CumF	CumFPct	CM		F	FPct	CumF	CumFPct		
				30.75	-	31.25	1	0.10	1	0.10	
				31.25	-	31.75	0	0.00	1	0.10	
				31.75	-	32.25	3	0.31	4	0.41	
				32.25	-	32.75	8	0.82	12	1.23	
1	0.25	1	0.25	32.75	-	33.25	6	0.61	18	1.84	
3	0.76	4	1.01	33.25	-	33.75	15	1.54	33	3.38	
3	0.76	7	1.77	33.75	-	34.25	21	2.15	54	5.53	
9	2.28	16	4.05	34.25	-	34.75	35	3.58	89	9.11	
4	1.01	20	5.06	34.75	-	35.25	42	4.30	131	13.41	
7	1.77	27	6.84	35.25	-	35.75	53	5.42	184	18.83	
13	3.29	40	10.13	35.75	-	36.25	71	7.27	255	26.10	
15	3.80	55	13.92	36.25	-	36.75	78	7.98	333	34.08	
14	3.54	69	17.47	36.75	-	37.25	72	7.37	405	41.45	
24	6.08	93	23.54	37.25	-	37.75	86	8.80	491	50.26	
21	5.32	114	28.86	37.75	-	38.25	69	7.06	560	57.32	
25	6.33	139	35.19	38.25	-	38.75	75	7.68	635	64.99	
18	4.56	157	39.75	38.75	-	39.25	64	6.55	699	71.55	
28	7.09	185	46.84	39.25	-	39.75	65	6.65	764	78.20	
21	5.32	206	52.15	39.75	-	40.25	43	4.40	807	82.60	
26	6.58	232	58.73	40.25	-	40.75	43	4.40	850	87.00	
36	9.11	268	67.85	40.75	-	41.25	26	2.66	876	89.66	
23	5.82	291	73.67	41.25	-	41.75	28	2.87	904	92.53	
16	4.05	307	77.72	41.75	-	42.25	22	2.25	926	94.78	
16	4.05	323	81.77	42.25	-	42.75	17	1.74	943	96.52	
12	3.04	335	84.81	42.75	-	43.25	11	1.13	954	97.65	
14	3.54	349	88.35	43.25	-	43.75	11	1.13	965	98.77	
6	1.52	355	89.87	43.75	-	44.25	2	0.20	967	98.98	
6	1.52	361	91.39	44.25	-	44.75	3	0.31	970	99.28	
6	1.52	367	92.91	44.75	-	45.25	2	0.20	972	99.49	
11	2.78	378	95.70	45.25	-	45.75	0	0.00	972	99.49	
4	1.01	382	96.71	45.75	-	46.25	1	0.10	973	99.59	
5	1.27	387	97.97	46.25	-	46.75	1	0.10	974	99.69	
0	0.00	387	97.97	46.75	-	47.25	2	0.20	976	99.90	
3	0.76	390	98.73	47.25	-	47.75	0	0.00	976	99.90	
1	0.25	391	98.99	47.75	-	48.25	1	0.10	977	100.00	
1	0.25	392	99.24	48.25	-	48.75					
1	0.25	393	99.49	48.75	-	49.25					
0	0.00	393	99.49	49.25	-	49.75					
1	0.25	394	99.75	49.75	-	50.25					
0	0.00	394	99.75	50.25	-	50.75					
1	0.25	395	100.00	50.75	-	51.25					

(52) ILIOCRISTALE HEIGHT

The vertical distance between a standing surface and the right ilio-cristale landmark is measured with an anthropometer. The participant stands erect with the heels together and the weight distributed equally on both feet. The shoulders and upper extremities are relaxed.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
93.30	36.73	1ST	97.30	38.31
93.50	36.81	2ND	98.20	38.66
93.80	36.93	3RD	99.50	39.17
94.30	37.13	5TH	100.60	39.61
95.30	37.52	10TH	102.10	40.20
96.00	37.80	15TH	103.10	40.59
96.70	38.07	20TH	103.90	40.91
97.30	38.31	25TH	104.50	41.14
97.90	38.54	30TH	105.30	41.46
98.60	38.82	35TH	106.10	41.77
99.20	39.06	40TH	106.90	42.09
99.90	39.33	45TH	107.50	42.32
100.60	39.61	50TH	108.10	42.56
101.00	39.76	55TH	108.70	42.80
101.60	40.00	60TH	109.20	42.99
102.20	40.24	65TH	109.80	43.23
102.60	40.39	70TH	110.30	43.43
103.50	40.75	75TH	111.00	43.70
104.30	41.06	80TH	112.00	44.09
105.50	41.54	85TH	112.80	44.41
106.50	41.93	90TH	114.40	45.04
108.30	42.64	95TH	115.80	45.59
109.60	43.15	97TH	116.60	45.91
110.50	43.50	98TH	117.00	46.06
111.00	43.70	99TH	118.50	46.65

(52) ILIOCRISTALE HEIGHT

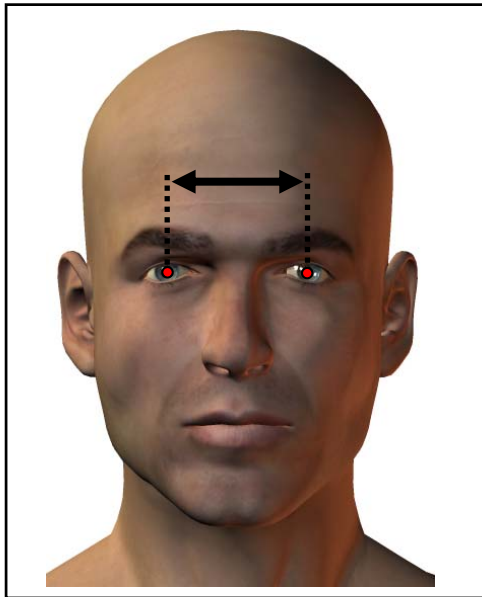
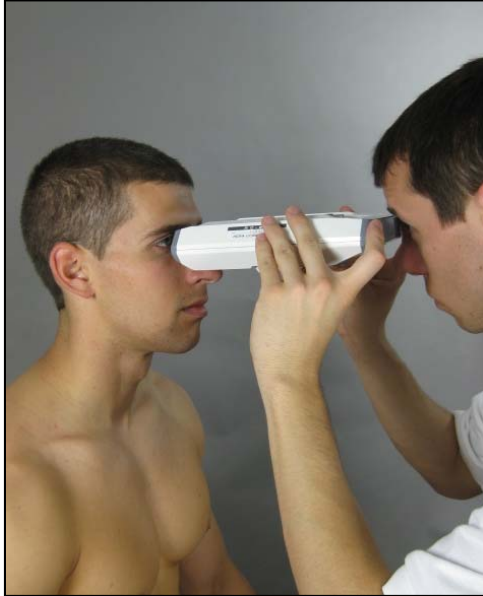
FEMALES		
CM		IN
100.67	MEAN	39.64
0.22	STD ERROR (MEAN)	0.08
4.28	STANDARD DEVIATION	1.68
0.15	STD ERROR (STD DEV)	0.06
92.20	MINIMUM	36.30
113.20	MAXIMUM	44.57
SKEWNESS		0.36
KURTOSIS		2.53
COEFFICIENT OF VARIATION		4.3%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
107.99	MEAN	42.52
0.15	STD ERROR (MEAN)	0.06
4.74	STANDARD DEVIATION	1.87
0.11	STD ERROR (STD DEV)	0.04
91.10	MINIMUM	35.87
124.30	MAXIMUM	48.94
SKEWNESS		0.04
KURTOSIS		3.12
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	CM	F	FPct	CumF	CumFPct			
				90.55	1	0.10	1	0.10			
3	0.76	3	0.76	91.55	0	0.00	1	0.10			
7	1.77	10	2.53	92.55	2	0.20	3	0.31			
11	2.78	21	5.32	93.55	0	0.00	3	0.31			
21	5.32	42	10.63	94.55	1	0.10	4	0.41			
27	6.84	69	17.47	95.55	2	0.20	6	0.61			
34	8.61	103	26.08	96.55	8	0.82	14	1.43			
27	6.84	130	32.91	97.55	13	1.33	27	2.76			
36	9.11	166	42.03	98.55	9	0.92	36	3.68			
27	6.84	193	48.86	99.55	22	2.25	58	5.94			
38	9.62	231	58.48	100.55	37	3.79	95	9.72			
34	8.61	265	67.09	101.55	37	3.79	132	13.51			
28	7.09	293	74.18	102.55	47	4.81	179	18.32			
25	6.33	318	80.51	103.55	63	6.45	242	24.77			
17	4.30	335	84.81	104.55	55	5.63	297	30.40			
18	4.56	353	89.37	105.55	85	8.70	382	39.10			
11	2.78	364	92.15	106.55	78	7.98	460	47.08			
4	1.01	368	93.16	107.55	87	8.90	547	55.99			
14	3.54	382	96.71	108.55	84	8.60	631	64.59			
7	1.77	389	98.48	109.55	82	8.39	713	72.98			
5	1.27	394	99.75	110.55	58	5.94	771	78.92			
0	0.00	394	99.75	111.55	45	4.61	816	83.52			
1	0.25	395	100.00	112.55	44	4.50	860	88.02			
				113.55	33	3.38	893	91.40			
				114.55	31	3.17	924	94.58			
				115.55	23	2.35	947	96.93			
				116.55	13	1.33	960	98.26			
				117.55	7	0.72	967	98.98			
				118.55	2	0.20	969	99.18			
				119.55	1	0.10	970	99.28			
				120.55	2	0.20	972	99.49			
				121.55	2	0.20	974	99.69			
				122.55	1	0.10	975	99.80			
				123.55	2	0.20	977	100.00			

(53) INTERPUPILLARY BREADTH

The distance between the two pupils is measured with a pupillometer.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
5.25	2.07	1ST	5.50	2.17
5.35	2.11	2ND	5.70	2.24
5.40	2.13	3RD	5.70	2.24
5.45	2.15	5TH	5.80	2.28
5.60	2.20	10TH	5.95	2.34
5.70	2.24	15TH	6.05	2.38
5.75	2.26	20TH	6.10	2.40
5.80	2.28	25TH	6.15	2.42
5.85	2.30	30TH	6.20	2.44
5.90	2.32	35TH	6.20	2.44
5.95	2.34	40TH	6.25	2.46
6.00	2.36	45TH	6.30	2.48
6.00	2.36	50TH	6.35	2.50
6.10	2.40	55TH	6.40	2.52
6.10	2.40	60TH	6.40	2.52
6.15	2.42	65TH	6.45	2.54
6.20	2.44	70TH	6.50	2.56
6.25	2.46	75TH	6.55	2.58
6.30	2.48	80TH	6.60	2.60
6.35	2.50	85TH	6.70	2.64
6.45	2.54	90TH	6.75	2.66
6.55	2.58	95TH	6.90	2.72
6.60	2.60	97TH	7.00	2.76
6.65	2.62	98TH	7.05	2.78
6.75	2.66	99TH	7.10	2.80

(53) INTERPUPILLARY BREADTH

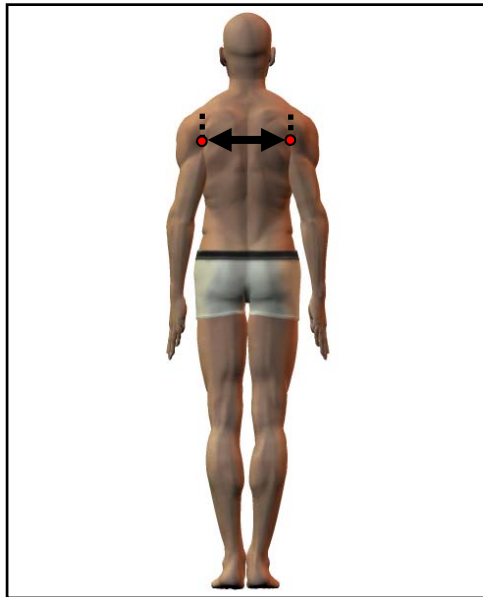
FEMALES		
<u>CM</u>		<u>IN</u>
6.03	MEAN	2.37
0.02	STD ERROR (MEAN)	0.01
0.33	STANDARD DEVIATION	0.13
0.01	STD ERROR (STD DEV)	0.00
5.10	MINIMUM	2.01
7.30	MAXIMUM	2.87
SKEWNESS		-0.13
KURTOSIS		2.82
COEFFICIENT OF VARIATION		5.4%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
6.34	MEAN	2.50
0.01	STD ERROR (MEAN)	0.00
0.32	STANDARD DEVIATION	0.13
0.01	STD ERROR (STD DEV)	0.00
5.30	MINIMUM	2.09
7.30	MAXIMUM	2.87
SKEWNESS		-0.07
KURTOSIS		3.30
COEFFICIENT OF VARIATION		5.1%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE										
FEMALES							MALES			
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct	
1	0.25	1	0.25	5.05	-	5.15				
1	0.25	2	0.51	5.15	-	5.25				
2	0.51	4	1.01	5.25	-	5.35	4	0.41	4	0.41
8	2.03	12	3.04	5.35	-	5.45	6	0.61	10	1.02
6	1.52	18	4.56	5.45	-	5.55	5	0.51	15	1.54
11	2.78	29	7.34	5.55	-	5.65	6	0.61	21	2.15
20	5.06	49	12.41	5.65	-	5.75	14	1.43	35	3.58
23	5.82	72	18.23	5.75	-	5.85	26	2.66	61	6.24
34	8.61	106	26.84	5.85	-	5.95	40	4.09	101	10.34
44	11.14	150	37.97	5.95	-	6.05	54	5.53	155	15.86
38	9.62	188	47.59	6.05	-	6.15	80	8.19	235	24.05
40	10.13	228	57.72	6.15	-	6.25	136	13.92	371	37.97
41	10.38	269	68.10	6.25	-	6.35	139	14.23	510	52.20
32	8.10	301	76.20	6.35	-	6.45	122	12.49	632	64.69
36	9.11	337	85.32	6.45	-	6.55	96	9.83	728	74.51
21	5.32	358	90.63	6.55	-	6.65	92	9.42	820	83.93
15	3.80	373	94.43	6.65	-	6.75	57	5.83	877	89.76
12	3.04	385	97.47	6.75	-	6.85	42	4.30	919	94.06
6	1.52	391	98.99	6.85	-	6.95	27	2.76	946	96.83
1	0.25	392	99.24	6.95	-	7.05	12	1.23	958	98.06
2	0.51	394	99.75	7.05	-	7.15	12	1.23	970	99.28
0	0.00	394	99.75	7.15	-	7.25	6	0.61	976	99.90
1	0.25	395	100.00	7.25	-	7.35	1	0.10	977	100.00

(54) INTERSCYE I

The distance across the back between the right and left posterior axillary fold landmarks is measured with a tape. The tape is held on the skin surface except where the tape spans the hollow of the back. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
32.00	12.60	1ST	35.80	14.09
32.20	12.68	2ND	36.80	14.49
33.00	12.99	3RD	37.10	14.61
33.10	13.03	5TH	38.00	14.96
34.10	13.43	10TH	39.00	15.35
34.60	13.62	15TH	40.00	15.75
35.30	13.90	20TH	40.90	16.10
35.50	13.98	25TH	41.20	16.22
36.00	14.17	30TH	42.00	16.54
36.30	14.29	35TH	42.30	16.65
36.50	14.37	40TH	42.60	16.77
37.00	14.57	45TH	43.00	16.93
37.30	14.69	50TH	43.50	17.13
37.60	14.80	55TH	44.00	17.32
38.10	15.00	60TH	44.50	17.52
38.50	15.16	65TH	45.00	17.72
39.00	15.35	70TH	45.40	17.87
39.40	15.51	75TH	46.00	18.11
39.80	15.67	80TH	46.50	18.31
40.50	15.94	85TH	47.20	18.58
41.30	16.26	90TH	48.20	18.98
42.60	16.77	95TH	49.50	19.49
43.50	17.13	97TH	50.70	19.96
44.30	17.44	98TH	51.10	20.12
44.90	17.68	99TH	52.00	20.47

(54) INTERSCYE I

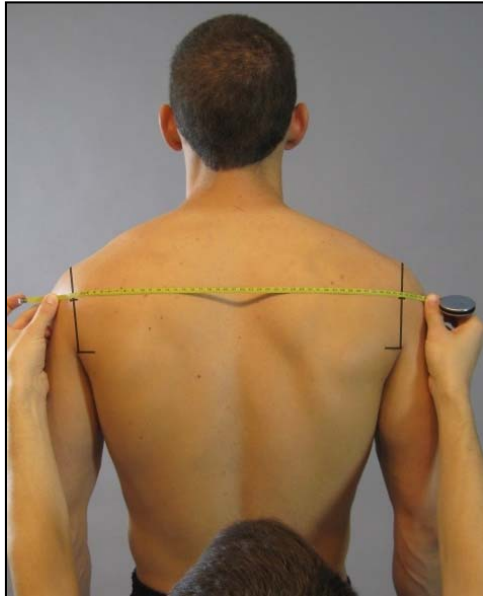
FEMALES		
CM		IN
37.57	MEAN	14.79
0.14	STD ERROR (MEAN)	0.06
2.84	STANDARD DEVIATION	1.12
0.10	STD ERROR (STD DEV)	0.04
30.00	MINIMUM	11.81
45.00	MAXIMUM	17.72
SKEWNESS		0.33
KURTOSIS		2.95
COEFFICIENT OF VARIATION		7.6%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
43.65	MEAN	17.19
0.11	STD ERROR (MEAN)	0.04
3.50	STANDARD DEVIATION	1.38
0.08	STD ERROR (STD DEV)	0.03
33.00	MINIMUM	12.99
56.70	MAXIMUM	22.32
SKEWNESS		0.12
KURTOSIS		2.98
COEFFICIENT OF VARIATION		8.0%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE										
FEMALES						MALES				
F	FPct	CumF	CumFPct	CM		F	FPct	CumF	CumFPct	
1	0.25	1	0.25	29.75	-	30.25				
0	0.00	1	0.25	30.25	-	30.75				
1	0.25	2	0.51	30.75	-	31.25				
1	0.25	3	0.76	31.25	-	31.75				
6	1.52	9	2.28	31.75	-	32.25				
2	0.51	11	2.78	32.25	-	32.75				
13	3.29	24	6.08	32.75	-	33.25	1	0.10	1	0.10
7	1.77	31	7.85	33.25	-	33.75	1	0.10	2	0.20
21	5.32	52	13.16	33.75	-	34.25	1	0.10	3	0.31
18	4.56	70	17.72	34.25	-	34.75	2	0.20	5	0.51
17	4.30	87	22.03	34.75	-	35.25	2	0.20	7	0.72
26	6.58	113	28.61	35.25	-	35.75	4	0.41	11	1.13
29	7.34	142	35.95	35.75	-	36.25	7	0.72	18	1.84
33	8.35	175	44.30	36.25	-	36.75	5	0.51	23	2.35
26	6.58	201	50.89	36.75	-	37.25	12	1.23	35	3.58
29	7.34	230	58.23	37.25	-	37.75	10	1.02	45	4.61
25	6.33	255	64.56	37.75	-	38.25	20	2.05	65	6.65
16	4.05	271	68.61	38.25	-	38.75	20	2.05	85	8.70
20	5.06	291	73.67	38.75	-	39.25	28	2.87	113	11.57
21	5.32	312	78.99	39.25	-	39.75	38	3.89	151	15.46
14	3.54	326	82.53	39.75	-	40.25	24	2.46	175	17.91
14	3.54	340	86.08	40.25	-	40.75	47	4.81	222	22.72
11	2.78	351	88.86	40.75	-	41.25	53	5.42	275	28.15
10	2.53	361	91.39	41.25	-	41.75	36	3.68	311	31.83
11	2.78	372	94.18	41.75	-	42.25	70	7.16	381	39.00
6	1.52	378	95.70	42.25	-	42.75	63	6.45	444	45.45
4	1.01	382	96.71	42.75	-	43.25	68	6.96	512	52.41
3	0.76	385	97.47	43.25	-	43.75	55	5.63	567	58.03
2	0.51	387	97.97	43.75	-	44.25	53	5.42	620	63.46
3	0.76	390	98.73	44.25	-	44.75	43	4.40	663	67.86
5	1.27	395	100.00	44.75	-	45.25	57	5.83	720	73.69
				45.25	-	45.75	32	3.28	752	76.97
				45.75	-	46.25	47	4.81	799	81.78
				46.25	-	46.75	36	3.68	835	85.47
				46.75	-	47.25	29	2.97	864	88.43
				47.25	-	47.75	19	1.94	883	90.38
				47.75	-	48.25	21	2.15	904	92.53
				48.25	-	48.75	14	1.43	918	93.96
				48.75	-	49.25	13	1.33	931	95.29
				49.25	-	49.75	10	1.02	941	96.32
				49.75	-	50.25	9	0.92	950	97.24
				50.25	-	50.75	11	1.13	961	98.36
				50.75	-	51.25	6	0.61	967	98.98
				51.25	-	51.75	4	0.41	971	99.39
				51.75	-	52.25	1	0.10	972	99.49
				52.25	-	52.75	3	0.31	975	99.80
				52.75	-	53.25	0	0.00	975	99.80
				53.25	-	53.75	1	0.10	976	99.90
				53.75	-	54.25	0	0.00	976	99.90
				54.25	-	54.75	0	0.00	976	99.90
				54.75	-	55.25	0	0.00	976	99.90
				55.25	-	55.75	0	0.00	976	99.90
				55.75	-	56.25	0	0.00	976	99.90
				56.25	-	56.75	1	0.10	977	100.00

(55) INTERSCYE II

The distance across the back between the right and left midscye landmarks is measured with a tape. The tape is held on the skin surface except where it spans the hollow of the back. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
33.10	13.03	1ST	38.50	15.16
34.40	13.54	2ND	38.80	15.28
35.90	14.13	3RD	39.20	15.43
36.10	14.21	5TH	40.20	15.83
36.70	14.45	10TH	41.40	16.30
37.10	14.61	15TH	42.20	16.61
37.50	14.76	20TH	43.00	16.93
38.00	14.96	25TH	43.50	17.13
38.30	15.08	30TH	44.00	17.32
38.50	15.16	35TH	44.50	17.52
39.10	15.39	40TH	44.70	17.60
39.50	15.55	45TH	45.10	17.76
39.60	15.59	50TH	45.50	17.91
40.10	15.79	55TH	46.00	18.11
40.50	15.94	60TH	46.20	18.19
40.80	16.06	65TH	46.70	18.39
41.10	16.18	70TH	47.10	18.54
41.40	16.30	75TH	47.80	18.82
41.80	16.46	80TH	48.10	18.94
42.20	16.61	85TH	48.80	19.21
43.00	16.93	90TH	49.40	19.45
44.00	17.32	95TH	51.00	20.08
45.00	17.72	97TH	52.00	20.47
45.00	17.72	98TH	52.20	20.55
46.20	18.19	99TH	53.50	21.06

(55) INTERSCYE II

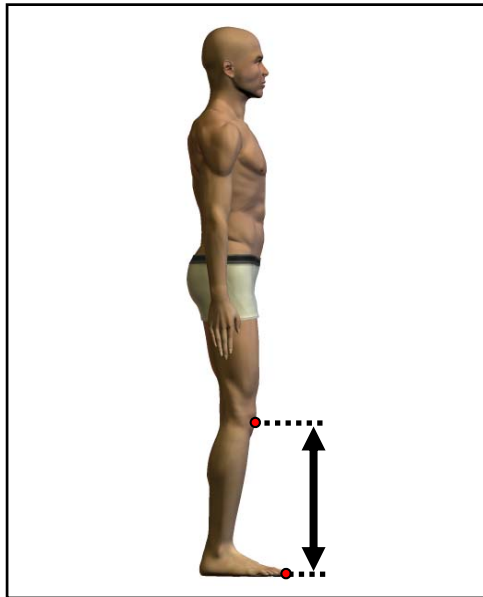
FEMALES		
CM		IN
39.75	MEAN	15.65
0.13	STD ERROR (MEAN)	0.05
2.50	STANDARD DEVIATION	0.99
0.09	STD ERROR (STD DEV)	0.04
33.00	MINIMUM	12.99
47.50	MAXIMUM	18.70
SKEWNESS		0.10
KURTOSIS		3.21
COEFFICIENT OF VARIATION		6.3%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
45.55	MEAN	17.93
0.10	STD ERROR (MEAN)	0.04
3.18	STANDARD DEVIATION	1.25
0.07	STD ERROR (STD DEV)	0.03
36.40	MINIMUM	14.33
57.80	MAXIMUM	22.76
SKEWNESS		0.05
KURTOSIS		3.12
COEFFICIENT OF VARIATION		7.0%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCY TABLE				MALES			
F	FPct	CumF	CumFPct	CM		F	FPct	CumF	CumFPct		
3	0.76	3	0.76	32.75	-	33.25					
1	0.25	4	1.01	33.25	-	33.75					
0	0.00	4	1.01	33.75	-	34.25					
1	0.25	5	1.27	34.25	-	34.75					
1	0.25	6	1.52	34.75	-	35.25					
3	0.76	9	2.28	35.25	-	35.75					
9	2.28	18	4.56	35.75	-	36.25					
18	4.56	36	9.11	36.25	-	36.75	1	0.10	0.10		
23	5.82	59	14.94	36.75	-	37.25	4	0.41	0.51		
24	6.08	83	21.01	37.25	-	37.75	2	0.20	0.72		
34	8.61	117	29.62	37.75	-	38.25	1	0.10	0.82		
24	6.08	141	35.70	38.25	-	38.75	10	1.02	1.84		
27	6.84	168	42.53	38.75	-	39.25	12	1.23	3.07		
33	8.35	201	50.89	39.25	-	39.75	6	0.61	3.68		
30	7.59	231	58.48	39.75	-	40.25	14	1.43	5.12		
32	8.10	263	66.58	40.25	-	40.75	18	1.84	6.96		
33	8.35	296	74.94	40.75	-	41.25	29	2.97	9.93		
21	5.32	317	80.25	41.25	-	41.75	31	3.17	13.10		
21	5.32	338	85.57	41.75	-	42.25	42	4.30	17.40		
11	2.78	349	88.35	42.25	-	42.75	31	3.17	20.57		
14	3.54	363	91.90	42.75	-	43.25	41	4.20	24.77		
5	1.27	368	93.16	43.25	-	43.75	46	4.71	29.48		
13	3.29	381	96.46	43.75	-	44.25	62	6.35	35.82		
4	1.01	385	97.47	44.25	-	44.75	66	6.76	42.58		
4	1.01	389	98.48	44.75	-	45.25	69	7.06	49.64		
2	0.51	391	98.99	45.25	-	45.75	62	6.35	54.77		
1	0.25	392	99.24	45.75	-	46.25	74	7.57	62.34		
1	0.25	393	99.49	46.25	-	46.75	60	6.14	68.48		
0	0.00	393	99.49	46.75	-	47.25	50	5.12	73.60		
2	0.51	395	100.00	47.25	-	47.75	39	3.99	77.59		
				47.75	-	48.25	60	6.14	83.73		
				48.25	-	48.75	21	2.15	85.88		
				48.75	-	49.25	36	3.68	89.56		
				49.25	-	49.75	21	2.15	91.71		
				49.75	-	50.25	19	1.94	93.65		
				50.25	-	50.75	9	0.92	94.57		
				50.75	-	51.25	10	1.02	95.59		
				51.25	-	51.75	8	0.82	96.41		
				51.75	-	52.25	10	1.02	97.43		
				52.25	-	52.75	5	0.51	97.94		
				52.75	-	53.25	1	0.10	98.04		
				53.25	-	53.75	3	0.31	98.35		
				53.75	-	54.25	2	0.20	98.55		
				54.25	-	54.75	1	0.10	98.65		
				54.75	-	55.25	0	0.00	98.65		
				55.25	-	55.75	0	0.00	98.65		
				55.75	-	56.25	0	0.00	98.65		
				56.25	-	56.75	0	0.00	98.65		
				56.75	-	57.25	0	0.00	98.65		
				57.25	-	57.75	0	0.00	98.65		
				57.75	-	58.25	1	0.10	98.75		

(56) KNEE HEIGHT, MIDPATELLA

The vertical distance between a standing surface and the midpatella landmark is measured with an anthropometer. The participant stands erect with the heels together and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
41.40	16.30	1ST	44.00	17.32
41.50	16.34	2ND	44.50	17.52
41.70	16.42	3RD	44.70	17.60
41.90	16.50	5TH	45.20	17.80
42.90	16.89	10TH	46.00	18.11
43.20	17.01	15TH	46.60	18.35
43.50	17.13	20TH	47.30	18.62
43.70	17.20	25TH	47.70	18.78
44.00	17.32	30TH	48.00	18.90
44.20	17.40	35TH	48.40	19.06
44.60	17.56	40TH	48.70	19.17
44.90	17.68	45TH	49.00	19.29
45.10	17.76	50TH	49.20	19.37
45.30	17.83	55TH	49.60	19.53
45.50	17.91	60TH	50.00	19.69
45.90	18.07	65TH	50.30	19.80
46.20	18.19	70TH	50.60	19.92
46.50	18.31	75TH	51.10	20.12
46.90	18.46	80TH	51.50	20.28
47.40	18.66	85TH	52.10	20.51
48.00	18.90	90TH	52.70	20.75
49.20	19.37	95TH	53.60	21.10
49.50	19.49	97TH	54.30	21.38
50.00	19.69	98TH	55.00	21.65
50.50	19.88	99TH	56.20	22.13

(56) KNEE HEIGHT, MIDPATELLA

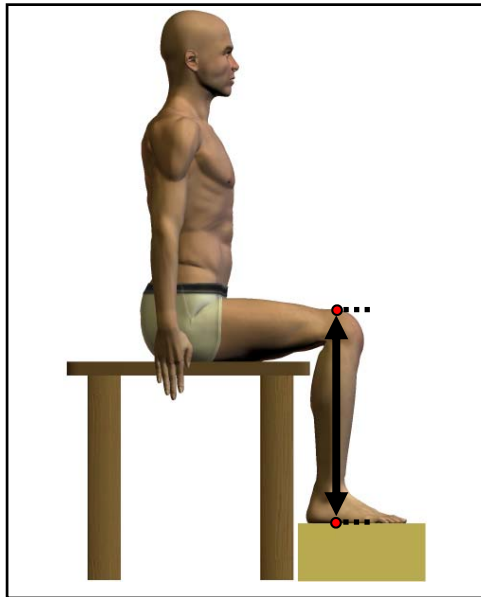
FEMALES		
CM		IN
45.25	MEAN	17.82
0.10	STD ERROR (MEAN)	0.04
2.08	STANDARD DEVIATION	0.82
0.07	STD ERROR (STD DEV)	0.03
39.80	MINIMUM	15.67
53.10	MAXIMUM	20.91
SKEWNESS		0.52
KURTOSIS		3.37
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
49.39	MEAN	19.44
0.08	STD ERROR (MEAN)	0.03
2.58	STANDARD DEVIATION	1.01
0.06	STD ERROR (STD DEV)	0.02
41.70	MINIMUM	16.42
58.40	MAXIMUM	22.99
SKEWNESS		0.17
KURTOSIS		3.01
COEFFICIENT OF VARIATION		5.2%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCY TABLE				MALES			
F	FPct	CumF	CumFPct	CM		F	FPct	CumF	CumFPct		
1	0.25	1	0.25	39.75	-	40.25					
0	0.00	1	0.25	40.25	-	40.75					
2	0.51	3	0.76	40.75	-	41.25					
12	3.04	15	3.80	41.25	-	41.75	1	0.10	0.10		
9	2.28	24	6.08	41.75	-	42.25	0	0.00	0.10		
10	2.53	34	8.61	42.25	-	42.75	2	0.20	0.31		
25	6.33	59	14.94	42.75	-	43.25	3	0.31	0.61		
36	9.11	95	24.05	43.25	-	43.75	3	0.31	0.92		
35	8.86	130	32.91	43.75	-	44.25	8	0.82	1.74		
31	7.85	161	40.76	44.25	-	44.75	16	1.64	3.38		
34	8.61	195	49.37	44.75	-	45.25	22	2.25	5.63		
32	8.10	227	57.47	45.25	-	45.75	31	3.17	8.80		
34	8.61	261	66.08	45.75	-	46.25	33	3.38	12.18		
30	7.59	291	73.67	46.25	-	46.75	42	4.30	16.48		
26	6.58	317	80.25	46.75	-	47.25	50	5.12	21.60		
17	4.30	334	84.56	47.25	-	47.75	59	6.04	27.64		
17	4.30	351	88.86	47.75	-	48.25	56	5.73	33.37		
8	2.03	359	90.89	48.25	-	48.75	89	9.11	42.48		
11	2.78	370	93.67	48.75	-	49.25	82	8.39	50.87		
11	2.78	381	96.46	49.25	-	49.75	63	6.45	57.32		
7	1.77	388	98.23	49.75	-	50.25	72	7.37	64.69		
2	0.51	390	98.73	50.25	-	50.75	66	6.76	71.44		
3	0.76	393	99.49	50.75	-	51.25	61	6.24	77.69		
1	0.25	394	99.75	51.25	-	51.75	47	4.81	82.50		
0	0.00	394	99.75	51.75	-	52.25	48	4.91	87.41		
0	0.00	394	99.75	52.25	-	52.75	34	3.48	90.89		
1	0.25	395	100.00	52.75	-	53.25	24	2.46	93.35		
				53.25	-	53.75	26	2.66	96.01		
				53.75	-	54.25	11	1.13	97.13		
				54.25	-	54.75	9	0.92	98.06		
				54.75	-	55.25	7	0.72	98.77		
				55.25	-	55.75	3	0.31	99.08		
				55.75	-	56.25	3	0.31	99.39		
				56.25	-	56.75	4	0.41	99.80		
				56.75	-	57.25	0	0.00	99.80		
				57.25	-	57.75	1	0.10	99.90		
				57.75	-	58.25	0	0.00	99.90		
				58.25	-	58.75	1	0.10	100.00		

(57) KNEE HEIGHT, SITTING

The vertical distance between a footrest surface and the suprapatella landmark is measured with an anthropometer. The participant sits with the thighs parallel, the knees flexed 90°, and the feet in line with the thighs.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
47.30	18.62	1ST	50.30	19.80
47.70	18.78	2ND	50.60	19.92
48.00	18.90	3RD	51.20	20.16
48.30	19.02	5TH	51.50	20.28
48.90	19.25	10TH	52.30	20.59
49.20	19.37	15TH	53.20	20.94
49.40	19.45	20TH	53.60	21.10
49.70	19.57	25TH	54.10	21.30
50.10	19.72	30TH	54.40	21.42
50.40	19.84	35TH	54.80	21.57
50.70	19.96	40TH	55.20	21.73
51.30	20.20	45TH	55.60	21.89
51.50	20.28	50TH	55.80	21.97
51.70	20.35	55TH	56.20	22.13
51.90	20.43	60TH	56.50	22.24
52.20	20.55	65TH	56.80	22.36
52.60	20.71	70TH	57.20	22.52
53.10	20.91	75TH	57.60	22.68
53.50	21.06	80TH	58.00	22.83
53.90	21.22	85TH	58.40	22.99
54.50	21.46	90TH	59.10	23.27
55.60	21.89	95TH	60.20	23.70
56.40	22.20	97TH	60.70	23.90
56.60	22.28	98TH	61.30	24.13
57.10	22.48	99TH	61.90	24.37

(57) KNEE HEIGHT, SITTING

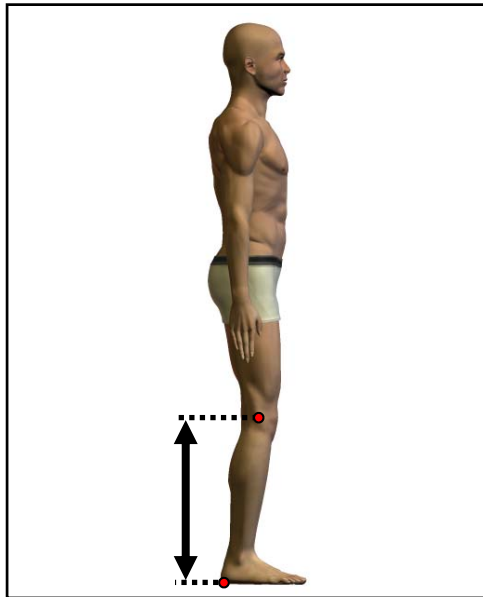
FEMALES		
CM		IN
51.55	MEAN	20.30
0.11	STD ERROR (MEAN)	0.04
2.27	STANDARD DEVIATION	0.89
0.08	STD ERROR (STD DEV)	0.03
47.00	MINIMUM	18.50
59.30	MAXIMUM	23.35
SKEWNESS		0.46
KURTOSIS		2.87
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
55.83	MEAN	21.98
0.08	STD ERROR (MEAN)	0.03
2.59	STANDARD DEVIATION	1.02
0.06	STD ERROR (STD DEV)	0.02
47.60	MINIMUM	18.74
64.80	MAXIMUM	25.51
SKEWNESS		0.06
KURTOSIS		3.00
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCY TABLE				MALES			
F	FPct	CumF	CumFPct	CM		F	FPct	CumF	CumFPct		
2	0.51	2	0.51	46.75	-	47.25					
6	1.52	8	2.03	47.25	-	47.75	1	0.10	1	0.10	
6	1.52	14	3.54	47.75	-	48.25	1	0.10	2	0.20	
16	4.05	30	7.59	48.25	-	48.75	1	0.10	3	0.31	
25	6.33	55	13.92	48.75	-	49.25	0	0.00	3	0.31	
31	7.85	86	21.77	49.25	-	49.75	5	0.51	8	0.82	
29	7.34	115	29.11	49.75	-	50.25	4	0.41	12	1.23	
31	7.85	146	36.96	50.25	-	50.75	13	1.33	25	2.56	
18	4.56	164	41.52	50.75	-	51.25	11	1.13	36	3.68	
33	8.35	197	49.87	51.25	-	51.75	28	2.87	64	6.55	
43	10.89	240	60.76	51.75	-	52.25	27	2.76	91	9.31	
25	6.33	265	67.09	52.25	-	52.75	38	3.89	129	13.20	
23	5.82	288	72.91	52.75	-	53.25	33	3.38	162	16.58	
26	6.58	314	79.49	53.25	-	53.75	56	5.73	218	22.31	
18	4.56	332	84.05	53.75	-	54.25	52	5.32	270	27.64	
13	3.29	345	87.34	54.25	-	54.75	76	7.78	346	35.41	
15	3.80	360	91.14	54.75	-	55.25	61	6.24	407	41.66	
7	1.77	367	92.91	55.25	-	55.75	84	8.60	491	50.26	
9	2.28	376	95.19	55.75	-	56.25	73	7.47	564	57.73	
10	2.53	386	97.72	56.25	-	56.75	67	6.86	631	64.59	
3	0.76	389	98.48	56.75	-	57.25	72	7.37	703	71.95	
3	0.76	392	99.24	57.25	-	57.75	59	6.04	762	77.99	
2	0.51	394	99.75	57.75	-	58.25	43	4.40	805	82.40	
0	0.00	394	99.75	58.25	-	58.75	57	5.83	862	88.23	
0	0.00	394	99.75	58.75	-	59.25	22	2.25	884	90.48	
1	0.25	395	100.00	59.25	-	59.75	33	3.38	917	93.86	
				59.75	-	60.25	19	1.94	936	95.80	
				60.25	-	60.75	14	1.43	950	97.24	
				60.75	-	61.25	11	1.13	961	98.36	
				61.25	-	61.75	6	0.61	967	98.98	
				61.75	-	62.25	2	0.20	969	99.18	
				62.25	-	62.75	5	0.51	974	99.69	
				62.75	-	63.25	0	0.00	974	99.69	
				63.25	-	63.75	1	0.10	975	99.80	
				63.75	-	64.25	0	0.00	975	99.80	
				64.25	-	64.75	1	0.10	976	99.90	
				64.75	-	65.25	1	0.10	977	100.00	

(58) LATERAL FEMORAL EPICONDYLE HEIGHT

The vertical distance between a standing surface and the standing lateral femoral epicondyle landmark is measured with an anthropometer. The participant stands erect with the heels together and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
42.60	16.77	1ST	44.50	17.52
43.30	17.05	2ND	45.00	17.72
43.40	17.09	3RD	45.20	17.80
43.80	17.24	5TH	45.60	17.95
44.40	17.48	10TH	46.40	18.27
44.70	17.60	15TH	47.00	18.50
45.10	17.76	20TH	47.50	18.70
45.40	17.87	25TH	47.90	18.86
45.50	17.91	30TH	48.20	18.98
45.90	18.07	35TH	48.60	19.13
46.10	18.15	40TH	49.00	19.29
46.30	18.23	45TH	49.20	19.37
46.50	18.31	50TH	49.50	19.49
46.90	18.46	55TH	49.80	19.61
47.20	18.58	60TH	50.10	19.72
47.60	18.74	65TH	50.40	19.84
47.80	18.82	70TH	50.80	20.00
48.20	18.98	75TH	51.20	20.16
48.50	19.09	80TH	51.60	20.31
49.10	19.33	85TH	52.10	20.51
50.00	19.69	90TH	52.60	20.71
50.80	20.00	95TH	53.50	21.06
51.70	20.35	97TH	54.60	21.50
51.80	20.39	98TH	54.80	21.57
52.40	20.63	99TH	55.50	21.85

(58) LATERAL FEMORAL EPICONDYLE HEIGHT

FEMALES		
<u>CM</u>		<u>IN</u>
46.87	MEAN	18.45
0.11	STD ERROR (MEAN)	0.04
2.16	STANDARD DEVIATION	0.85
0.08	STD ERROR (STD DEV)	0.03
41.10	MINIMUM	16.18
55.50	MAXIMUM	21.85
SKEWNESS		0.63
KURTOSIS		3.54
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
49.55	MEAN	19.51
0.08	STD ERROR (MEAN)	0.03
2.43	STANDARD DEVIATION	0.96
0.06	STD ERROR (STD DEV)	0.02
42.00	MINIMUM	16.54
57.30	MAXIMUM	22.56
SKEWNESS		0.12
KURTOSIS		2.98
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	40.75 - 41.25							
1	0.25	2	0.51	41.25 - 41.75							
0	0.00	2	0.51	41.75 - 42.25	3	0.31	3	0.31			
3	0.76	5	1.27	42.25 - 42.75	0	0.00	3	0.31			
3	0.76	8	2.03	42.75 - 43.25	1	0.10	4	0.41			
12	3.04	20	5.06	43.25 - 43.75	1	0.10	5	0.51			
13	3.29	33	8.35	43.75 - 44.25	3	0.31	8	0.82			
26	6.58	59	14.94	44.25 - 44.75	5	0.51	13	1.33			
22	5.57	81	20.51	44.75 - 45.25	22	2.25	35	3.58			
39	9.87	120	30.38	45.25 - 45.75	24	2.46	59	6.04			
32	8.10	152	38.48	45.75 - 46.25	30	3.07	89	9.11			
41	10.38	193	48.86	46.25 - 46.75	31	3.17	120	12.28			
24	6.08	217	54.94	46.75 - 47.25	42	4.30	162	16.58			
30	7.59	247	62.53	47.25 - 47.75	57	5.83	219	22.42			
33	8.35	280	70.89	47.75 - 48.25	78	7.98	297	30.40			
29	7.34	309	78.23	48.25 - 48.75	67	6.86	364	37.26			
11	2.78	320	81.01	48.75 - 49.25	81	8.29	445	45.55			
20	5.06	340	86.08	49.25 - 49.75	89	9.11	534	54.66			
15	3.80	355	89.87	49.75 - 50.25	83	8.50	617	63.15			
13	3.29	368	93.16	50.25 - 50.75	63	6.45	680	69.60			
12	3.04	380	96.20	50.75 - 51.25	68	6.96	748	76.56			
4	1.01	384	97.22	51.25 - 51.75	57	5.83	805	82.40			
5	1.27	389	98.48	51.75 - 52.25	47	4.81	852	87.21			
3	0.76	392	99.24	52.25 - 52.75	36	3.68	888	90.89			
1	0.25	393	99.49	52.75 - 53.25	32	3.28	920	94.17			
0	0.00	393	99.49	53.25 - 53.75	15	1.54	935	95.70			
1	0.25	394	99.75	53.75 - 54.25	12	1.23	947	96.93			
0	0.00	394	99.75	54.25 - 54.75	12	1.23	959	98.16			
0	0.00	394	99.75	54.75 - 55.25	8	0.82	967	98.98			
1	0.25	395	100.00	55.25 - 55.75	2	0.20	969	99.18			
				55.75 - 56.25	3	0.31	972	99.49			
				56.25 - 56.75	2	0.20	974	99.69			
				56.75 - 57.25	2	0.20	976	99.90			
				57.25 - 57.75	1	0.10	977	100.00			

(59) LATERAL MALLEOLUS HEIGHT

The vertical distance between a standing surface and the lateral malleolus landmark is measured with a modified height gauge. The participant stands erect with the heels together and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
5.30	2.09	1ST	6.20	2.44
5.40	2.13	2ND	6.40	2.52
5.50	2.17	3RD	6.50	2.56
5.70	2.24	5TH	6.70	2.64
5.80	2.28	10TH	6.90	2.72
5.90	2.32	15TH	7.00	2.76
6.00	2.36	20TH	7.10	2.80
6.10	2.40	25TH	7.20	2.83
6.20	2.44	30TH	7.30	2.87
6.30	2.48	35TH	7.40	2.91
6.30	2.48	40TH	7.40	2.91
6.40	2.52	45TH	7.50	2.95
6.40	2.52	50TH	7.50	2.95
6.50	2.56	55TH	7.60	2.99
6.50	2.56	60TH	7.70	3.03
6.60	2.60	65TH	7.70	3.03
6.70	2.64	70TH	7.80	3.07
6.70	2.64	75TH	7.90	3.11
6.80	2.68	80TH	7.90	3.11
6.90	2.72	85TH	8.10	3.19
7.00	2.76	90TH	8.30	3.27
7.20	2.83	95TH	8.50	3.35
7.30	2.87	97TH	8.60	3.39
7.50	2.95	98TH	8.70	3.43
7.70	3.03	99TH	8.80	3.46

(59) LATERAL MALLEOLUS HEIGHT

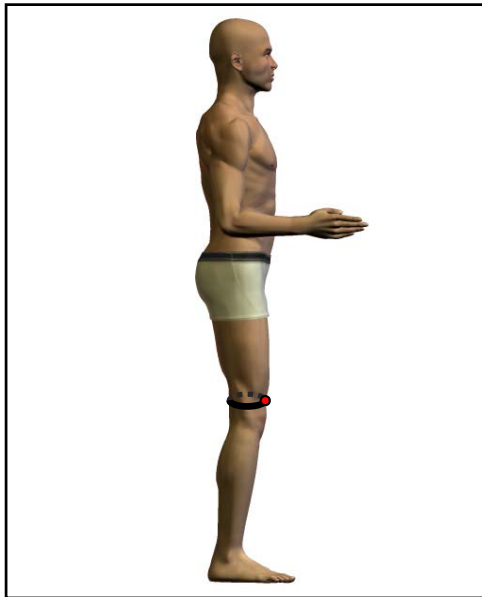
FEMALES		
<u>CM</u>		<u>IN</u>
6.42	MEAN	2.53
0.02	STD ERROR (MEAN)	0.01
0.48	STANDARD DEVIATION	0.19
0.02	STD ERROR (STD DEV)	0.01
4.90	MINIMUM	1.93
7.80	MAXIMUM	3.07
SKEWNESS		0.03
KURTOSIS		2.92
COEFFICIENT OF VARIATION		7.4%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
7.54	MEAN	2.97
0.02	STD ERROR (MEAN)	0.01
0.54	STANDARD DEVIATION	0.21
0.01	STD ERROR (STD DEV)	0.00
5.90	MINIMUM	2.32
9.50	MAXIMUM	3.74
SKEWNESS		0.12
KURTOSIS		3.24
COEFFICIENT OF VARIATION		7.2%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	4.75 - 4.95							
3	0.76	4	1.01	4.95 - 5.15							
7	1.77	11	2.78	5.15 - 5.35							
11	2.78	22	5.57	5.35 - 5.55							
29	7.34	51	12.91	5.55 - 5.75							
40	10.13	91	23.04	5.75 - 5.95	2	0.20	2	0.20			
46	11.65	137	34.68	5.95 - 6.15	2	0.20	4	0.41			
60	15.19	197	49.87	6.15 - 6.35	10	1.02	14	1.43			
71	17.97	268	67.85	6.35 - 6.55	18	1.84	32	3.28			
48	12.15	316	80.00	6.55 - 6.75	50	5.12	82	8.39			
41	10.38	357	90.38	6.75 - 6.95	50	5.12	132	13.51			
19	4.81	376	95.19	6.95 - 7.15	98	10.03	230	23.54			
11	2.78	387	97.97	7.15 - 7.35	117	11.98	347	35.52			
4	1.01	391	98.99	7.35 - 7.55	186	19.04	533	54.55			
3	0.76	394	99.75	7.55 - 7.75	144	14.74	677	69.29			
1	0.25	395	100.00	7.75 - 7.95	104	10.64	781	79.94			
				7.95 - 8.15	68	6.96	849	86.90			
				8.15 - 8.35	51	5.22	900	92.12			
				8.35 - 8.55	47	4.81	947	96.93			
				8.55 - 8.75	15	1.54	962	98.46			
				8.75 - 8.95	12	1.23	974	99.69			
				8.95 - 9.15	1	0.10	975	99.80			
				9.15 - 9.35	0	0.00	975	99.80			
				9.35 - 9.55	2	0.20	977	100.00			

(60) LOWER THIGH CIRCUMFERENCE

The horizontal circumference of the right thigh at the level of the suprapatella landmark is measured with a tape. The participant stands erect with the feet about 10 cm apart and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
33.20	13.07	1ST	35.40	13.94
34.20	13.46	2ND	35.80	14.09
34.60	13.62	3RD	36.20	14.25
35.00	13.78	5TH	36.60	14.41
35.80	14.09	10TH	37.80	14.88
36.40	14.33	15TH	38.40	15.12
37.00	14.57	20TH	38.80	15.28
37.50	14.76	25TH	39.40	15.51
37.70	14.84	30TH	39.70	15.63
38.00	14.96	35TH	40.20	15.83
38.50	15.16	40TH	40.50	15.94
38.90	15.31	45TH	40.80	16.06
39.50	15.55	50TH	41.20	16.22
39.90	15.71	55TH	41.40	16.30
40.30	15.87	60TH	41.80	16.46
40.90	16.10	65TH	42.20	16.61
41.50	16.34	70TH	42.60	16.77
41.80	16.46	75TH	43.20	17.01
42.40	16.69	80TH	43.70	17.20
43.00	16.93	85TH	44.30	17.44
44.00	17.32	90TH	44.80	17.64
45.80	18.03	95TH	46.00	18.11
46.80	18.43	97TH	47.50	18.70
47.60	18.74	98TH	48.30	19.02
48.80	19.21	99TH	48.80	19.21

(60) LOWER THIGH CIRCUMFERENCE

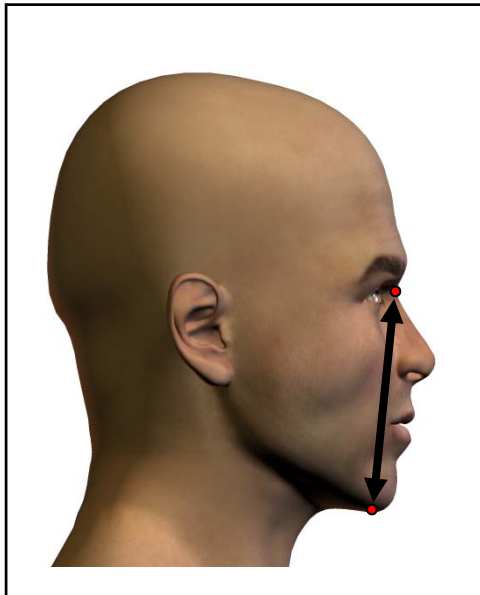
FEMALES		
CM		IN
39.78	MEAN	15.66
0.17	STD ERROR (MEAN)	0.07
3.32	STANDARD DEVIATION	1.31
0.12	STD ERROR (STD DEV)	0.05
32.30	MINIMUM	12.72
52.20	MAXIMUM	20.55
SKEWNESS		0.58
KURTOSIS		3.43
COEFFICIENT OF VARIATION		8.3%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
41.29	MEAN	16.25
0.09	STD ERROR (MEAN)	0.04
2.84	STANDARD DEVIATION	1.12
0.06	STD ERROR (STD DEV)	0.03
32.30	MINIMUM	12.72
50.40	MAXIMUM	19.84
SKEWNESS		0.25
KURTOSIS		3.13
COEFFICIENT OF VARIATION		6.9%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCY TABLE				MALES			
F	FPct	CumF	CumFPct	CENTIMETERS		F	FPct	CumF	CumFPct		
2	0.51	2	0.51	32.25	- 32.75	1	0.10	1	0.10		
3	0.76	5	1.27	32.75	- 33.25	3	0.31	4	0.41		
0	0.00	5	1.27	33.25	- 33.75	0	0.00	4	0.41		
2	0.51	7	1.77	33.75	- 34.25	1	0.10	5	0.51		
4	1.01	11	2.78	34.25	- 34.75	4	0.41	9	0.92		
6	1.52	17	4.30	34.75	- 35.25	6	0.61	15	1.54		
9	2.28	26	6.58	35.25	- 35.75	12	1.23	27	2.76		
16	4.05	42	10.63	35.75	- 36.25	15	1.54	42	4.30		
20	5.06	62	15.70	36.25	- 36.75	24	2.46	66	6.76		
16	4.05	78	19.75	36.75	- 37.25	18	1.84	84	8.60		
32	8.10	110	27.85	37.25	- 37.75	32	3.28	116	11.87		
24	6.08	134	33.92	37.75	- 38.25	38	3.89	154	15.76		
22	5.57	156	39.49	38.25	- 38.75	62	6.35	216	22.11		
24	6.08	180	45.57	38.75	- 39.25	46	4.71	262	26.82		
23	5.82	203	51.39	39.25	- 39.75	73	7.47	335	34.29		
23	5.82	226	57.22	39.75	- 40.25	68	6.96	403	41.25		
26	6.58	252	63.80	40.25	- 40.75	88	9.01	491	50.26		
11	2.78	263	66.58	40.75	- 41.25	70	7.16	561	57.42		
26	6.58	289	73.16	41.25	- 41.75	77	7.88	638	65.30		
19	4.81	308	77.97	41.75	- 42.25	58	5.94	696	71.24		
22	5.57	330	83.54	42.25	- 42.75	63	6.45	759	77.69		
5	1.27	335	84.81	42.75	- 43.25	33	3.38	792	81.06		
11	2.78	346	87.59	43.25	- 43.75	35	3.58	827	84.65		
6	1.52	352	89.11	43.75	- 44.25	29	2.97	856	87.62		
11	2.78	363	91.90	44.25	- 44.75	31	3.17	887	90.79		
3	0.76	366	92.66	44.75	- 45.25	21	2.15	908	92.94		
6	1.52	372	94.18	45.25	- 45.75	20	2.05	928	94.98		
2	0.51	374	94.68	45.75	- 46.25	15	1.54	943	96.52		
3	0.76	377	95.44	46.25	- 46.75	7	0.72	950	97.24		
4	1.01	381	96.46	46.75	- 47.25	6	0.61	956	97.85		
3	0.76	384	97.22	47.25	- 47.75	6	0.61	962	98.46		
3	0.76	387	97.97	47.75	- 48.25	3	0.31	965	98.77		
0	0.00	387	97.97	48.25	- 48.75	6	0.61	971	99.39		
3	0.76	390	98.73	48.75	- 49.25	3	0.31	974	99.69		
1	0.25	391	98.99	49.25	- 49.75	2	0.20	976	99.90		
0	0.00	391	98.99	49.75	- 50.25	0	0.00	976	99.90		
0	0.00	391	98.99	50.25	- 50.75	1	0.10	977	100.00		
1	0.25	392	99.24	50.75	- 51.25						
1	0.25	393	99.49	51.25	- 51.75						
2	0.51	395	100.00	51.75	- 52.25						

(61) MENTON-SELLION LENGTH

The distance between the menton landmark and the sellion landmark is measured with a sliding caliper. The teeth are lightly occluded.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
10.00	3.94	1ST	10.80	4.25
10.10	3.98	2ND	11.00	4.33
10.20	4.02	3RD	11.00	4.33
10.30	4.06	5TH	11.10	4.37
10.60	4.17	10TH	11.40	4.49
10.70	4.21	15TH	11.50	4.53
10.80	4.25	20TH	11.60	4.57
10.90	4.29	25TH	11.70	4.61
10.90	4.29	30TH	11.80	4.65
11.00	4.33	35TH	11.90	4.69
11.10	4.37	40TH	12.00	4.72
11.10	4.37	45TH	12.10	4.76
11.30	4.45	50TH	12.20	4.80
11.40	4.49	55TH	12.20	4.80
11.40	4.49	60TH	12.30	4.84
11.50	4.53	65TH	12.40	4.88
11.60	4.57	70TH	12.50	4.92
11.70	4.61	75TH	12.60	4.96
11.80	4.65	80TH	12.70	5.00
11.90	4.69	85TH	12.80	5.04
12.10	4.76	90TH	13.00	5.12
12.30	4.84	95TH	13.20	5.20
12.40	4.88	97TH	13.40	5.28
12.40	4.88	98TH	13.40	5.28
12.80	5.04	99TH	13.80	5.43

(61) MENTON-SELLION LENGTH

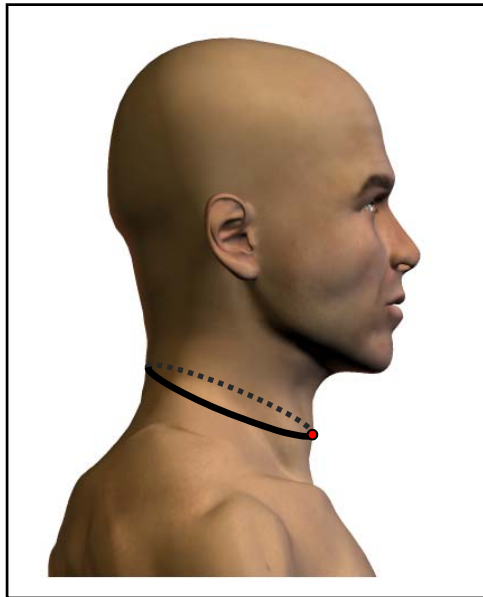
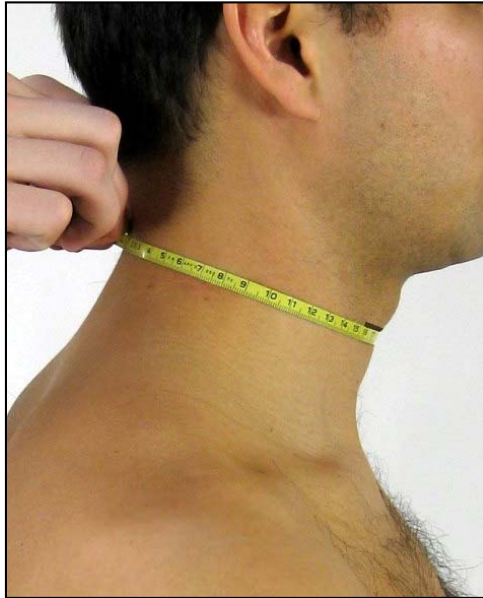
FEMALES		
CM	MEAN	IN
11.28		4.44
0.03	STD ERROR (MEAN)	0.01
0.62	STANDARD DEVIATION	0.24
0.02	STD ERROR (STD DEV)	0.01
9.40	MINIMUM	3.70
13.50	MAXIMUM	5.31
SKEWNESS		0.20
KURTOSIS		3.50
COEFFICIENT OF VARIATION		5.5%
NUMBER OF PARTICIPANTS		395

MALES		
CM	MEAN	IN
12.18		4.79
0.02	STD ERROR (MEAN)	0.01
0.63	STANDARD DEVIATION	0.25
0.01	STD ERROR (STD DEV)	0.01
10.40	MINIMUM	4.09
14.40	MAXIMUM	5.67
SKEWNESS		0.13
KURTOSIS		2.92
COEFFICIENT OF VARIATION		5.2%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	CM	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	9.35 - 9.45							
0	0.00	1	0.25	9.45 - 9.55							
0	0.00	1	0.25	9.55 - 9.65							
1	0.25	2	0.51	9.65 - 9.75							
0	0.00	2	0.51	9.75 - 9.85							
0	0.00	2	0.51	9.85 - 9.95							
2	0.51	4	1.01	9.95 - 10.05							
4	1.01	8	2.03	10.05 - 10.15							
2	0.51	10	2.53	10.15 - 10.25							
9	2.28	19	4.81	10.25 - 10.35							
7	1.77	26	6.58	10.35 - 10.45	1	0.10	1	0.10			
9	2.28	35	8.86	10.45 - 10.55	2	0.20	3	0.31			
13	3.29	48	12.15	10.55 - 10.65	3	0.31	6	0.61			
21	5.32	69	17.47	10.65 - 10.75	1	0.10	7	0.72			
20	5.06	89	22.53	10.75 - 10.85	8	0.82	15	1.54			
21	5.32	110	27.85	10.85 - 10.95	7	0.72	22	2.25			
21	5.32	131	33.16	10.95 - 11.05	13	1.33	35	3.58			
37	9.37	168	42.53	11.05 - 11.15	26	2.66	61	6.24			
16	4.05	184	46.58	11.15 - 11.25	13	1.33	74	7.57			
22	5.57	206	52.15	11.25 - 11.35	20	2.05	94	9.62			
24	6.08	230	58.23	11.35 - 11.45	36	3.68	130	13.31			
27	6.84	257	65.06	11.45 - 11.55	31	3.17	161	16.48			
29	7.34	286	72.41	11.55 - 11.65	42	4.30	203	20.78			
18	4.56	304	76.96	11.65 - 11.75	52	5.32	255	26.10			
17	4.30	321	81.27	11.75 - 11.85	63	6.45	318	32.55			
15	3.80	336	85.06	11.85 - 11.95	57	5.83	375	38.38			
13	3.29	349	88.35	11.95 - 12.05	68	6.96	443	45.34			
15	3.80	364	92.15	12.05 - 12.15	43	4.40	486	49.74			
7	1.77	371	93.92	12.15 - 12.25	73	7.47	559	57.22			
9	2.28	380	96.20	12.25 - 12.35	52	5.32	611	62.54			
8	2.03	388	98.23	12.35 - 12.45	70	7.16	681	69.70			
0	0.00	388	98.23	12.45 - 12.55	44	4.50	725	74.21			
2	0.51	390	98.73	12.55 - 12.65	48	4.91	773	79.12			
1	0.25	391	98.99	12.65 - 12.75	38	3.89	811	83.01			
2	0.51	393	99.49	12.75 - 12.85	45	4.61	856	87.62			
0	0.00	393	99.49	12.85 - 12.95	22	2.25	878	89.87			
0	0.00	393	99.49	12.95 - 13.05	34	3.48	912	93.35			
0	0.00	393	99.49	13.05 - 13.15	15	1.54	927	94.88			
0	0.00	393	99.49	13.15 - 13.25	13	1.33	940	96.21			
0	0.00	393	99.49	13.25 - 13.35	11	1.13	951	97.34			
0	0.00	393	99.49	13.35 - 13.45	9	0.92	960	98.26			
2	0.51	395	100.00	13.45 - 13.55	7	0.72	967	98.98			
				13.55 - 13.65	1	0.10	968	99.08			
				13.65 - 13.75	3	0.31	971	99.39			
				13.75 - 13.85	2	0.20	973	99.59			
				13.85 - 13.95	1	0.10	974	99.69			
				13.95 - 14.05	1	0.10	975	99.80			
				14.05 - 14.15	1	0.10	976	99.90			
				14.15 - 14.25	0	0.00	976	99.90			
				14.25 - 14.35	0	0.00	976	99.90			
				14.35 - 14.45	1	0.10	977	100.00			

(62) NECK CIRCUMFERENCE

The circumference of the neck at the level of the infrathyroid landmark (Adam's apple) is measured with a tape. The plane of the measurement is perpendicular to the long axis of the neck. The participant stands erect with the head in the Frankfurt plane. The shoulders and upper extremities are relaxed.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
29.40	11.57	1ST	34.80	13.70
29.70	11.69	2ND	35.30	13.90
29.90	11.77	3RD	35.50	13.98
30.10	11.85	5TH	36.10	14.21
30.60	12.05	10TH	36.90	14.53
30.90	12.17	15TH	37.40	14.72
31.20	12.28	20TH	37.70	14.84
31.40	12.36	25TH	38.10	15.00
31.60	12.44	30TH	38.40	15.12
31.80	12.52	35TH	38.70	15.24
32.00	12.60	40TH	39.00	15.35
32.10	12.64	45TH	39.20	15.43
32.30	12.72	50TH	39.50	15.55
32.50	12.80	55TH	39.70	15.63
32.80	12.91	60TH	40.00	15.75
33.10	13.03	65TH	40.40	15.91
33.40	13.15	70TH	40.80	16.06
33.80	13.31	75TH	41.50	16.34
34.30	13.50	80TH	42.00	16.54
34.70	13.66	85TH	42.40	16.69
35.40	13.94	90TH	43.20	17.01
36.20	14.25	95TH	44.60	17.56
36.60	14.41	97TH	45.80	18.03
37.00	14.57	98TH	46.60	18.35
37.80	14.88	99TH	47.10	18.54

(62) NECK CIRCUMFERENCE

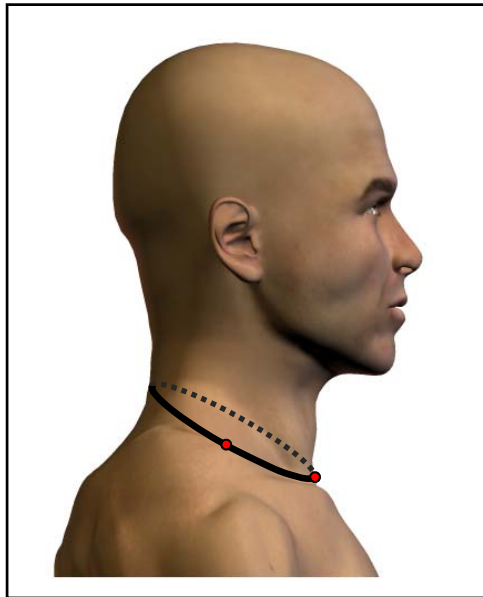
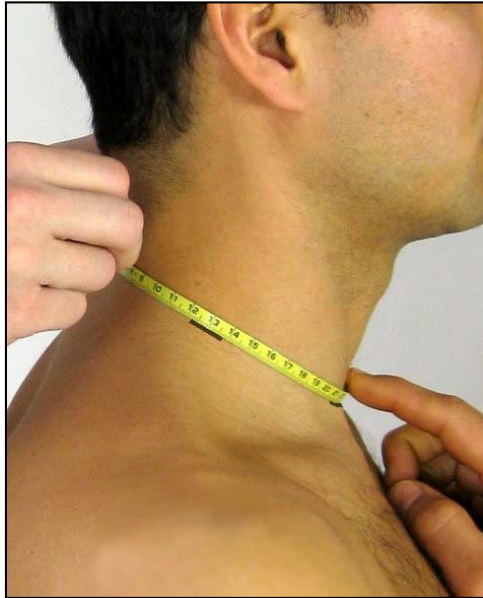
FEMALES		
<u>CM</u>		<u>IN</u>
32.68	MEAN	12.87
0.09	STD ERROR (MEAN)	0.04
1.86	STANDARD DEVIATION	0.73
0.07	STD ERROR (STD DEV)	0.03
28.50	MINIMUM	11.22
39.70	MAXIMUM	15.63
SKEWNESS		0.71
KURTOSIS		3.33
COEFFICIENT OF VARIATION		5.7%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
39.84	MEAN	15.68
0.08	STD ERROR (MEAN)	0.03
2.57	STANDARD DEVIATION	1.01
0.06	STD ERROR (STD DEV)	0.02
33.50	MINIMUM	13.19
49.90	MAXIMUM	19.65
SKEWNESS		0.66
KURTOSIS		3.59
COEFFICIENT OF VARIATION		6.5%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	28.25	-	28.75					
1	0.25	2	0.51	28.75	-	29.25					
5	1.27	7	1.77	29.25	-	29.75					
15	3.80	22	5.57	29.75	-	30.25					
21	5.32	43	10.89	30.25	-	30.75					
36	9.11	79	20.00	30.75	-	31.25					
43	10.89	122	30.89	31.25	-	31.75					
59	14.94	181	45.82	31.75	-	32.25					
45	11.39	226	57.22	32.25	-	32.75					
33	8.35	259	65.57	32.75	-	33.25					
28	7.09	287	72.66	33.25	-	33.75					
28	7.09	315	79.75	33.75	-	34.25	1	0.10			
27	6.84	342	86.58	34.25	-	34.75	9	0.92			
14	3.54	356	90.13	34.75	-	35.25	11	1.13			
10	2.53	366	92.66	35.25	-	35.75	15	1.54			
12	3.04	378	95.70	35.75	-	36.25	32	3.28			
6	1.52	384	97.22	36.25	-	36.75	41	4.20			
4	1.01	388	98.23	36.75	-	37.25	48	4.91			
2	0.51	390	98.73	37.25	-	37.75	76	7.78			
2	0.51	392	99.24	37.75	-	38.25	86	8.80			
2	0.51	394	99.75	38.25	-	38.75	93	9.52			
0	0.00	394	99.75	38.75	-	39.25	98	10.03			
1	0.25	395	100.00	39.25	-	39.75	91	9.31			
				39.75	-	40.25	72	7.37			
				40.25	-	40.75	67	6.86			
				40.75	-	41.25	44	4.50			
				41.25	-	41.75	36	3.68			
				41.75	-	42.25	51	5.22			
				42.25	-	42.75	25	2.56			
				42.75	-	43.25	21	2.15			
				43.25	-	43.75	14	1.43			
				43.75	-	44.25	11	1.13			
				44.25	-	44.75	6	0.61			
				44.75	-	45.25	5	0.51			
				45.25	-	45.75	0	0.00			
				45.75	-	46.25	7	0.72			
				46.25	-	46.75	6	0.61			
				46.75	-	47.25	4	0.41			
				47.25	-	47.75	1	0.10			
				47.75	-	48.25	3	0.31			
				48.25	-	48.75	1	0.10			
				48.75	-	49.25	0	0.00			
				49.25	-	49.75	0	0.00			
				49.75	-	50.25	1	0.10			

(63) NECK CIRCUMFERENCE, BASE

The circumference of the base of the neck is measured with a tape, passing over the drawn lateral and anterior neck landmarks. The participant stands erect with the head in the Frankfurt plane. The shoulders and upper extremities are relaxed.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
33.40	13.15	1ST	38.60	15.20
33.50	13.19	2ND	38.90	15.31
33.80	13.31	3RD	39.30	15.47
34.40	13.54	5TH	39.70	15.63
34.90	13.74	10TH	40.40	15.91
35.20	13.86	15TH	40.80	16.06
35.60	14.02	20TH	41.20	16.22
35.90	14.13	25TH	41.70	16.42
36.10	14.21	30TH	42.00	16.54
36.20	14.25	35TH	42.30	16.65
36.40	14.33	40TH	42.60	16.77
36.60	14.41	45TH	43.00	16.93
36.80	14.49	50TH	43.20	17.01
37.00	14.57	55TH	43.50	17.13
37.20	14.65	60TH	44.00	17.32
37.50	14.76	65TH	44.30	17.44
37.80	14.88	70TH	44.70	17.60
38.00	14.96	75TH	45.30	17.83
38.50	15.16	80TH	45.70	17.99
39.10	15.39	85TH	46.20	18.19
39.60	15.59	90TH	46.80	18.43
40.30	15.87	95TH	47.90	18.86
40.80	16.06	97TH	48.70	19.17
41.00	16.14	98TH	49.90	19.65
41.20	16.22	99TH	50.70	19.96

(63) NECK CIRCUMFERENCE, BASE

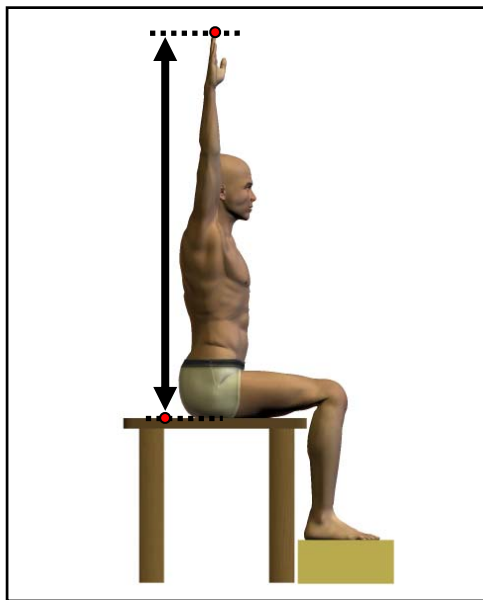
FEMALES		
<u>CM</u>		<u>IN</u>
37.05	MEAN	14.59
0.09	STD ERROR (MEAN)	0.04
1.83	STANDARD DEVIATION	0.72
0.07	STD ERROR (STD DEV)	0.03
33.30	MINIMUM	13.11
44.80	MAXIMUM	17.64
SKEWNESS		0.60
KURTOSIS		3.72
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
43.49	MEAN	17.12
0.08	STD ERROR (MEAN)	0.03
2.57	STANDARD DEVIATION	1.01
0.06	STD ERROR (STD DEV)	0.02
36.70	MINIMUM	14.45
53.10	MAXIMUM	20.91
SKEWNESS		0.50
KURTOSIS		3.27
COEFFICIENT OF VARIATION		5.9%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
9	2.28	9	2.28	33.25 - 33.75							
6	1.52	15	3.80	33.75 - 34.25							
20	5.06	35	8.86	34.25 - 34.75							
27	6.84	62	15.70	34.75 - 35.25							
25	6.33	87	22.03	35.25 - 35.75							
42	10.63	129	32.66	35.75 - 36.25							
59	14.94	188	47.59	36.25 - 36.75	1	0.10	1	0.10			
46	11.65	234	59.24	36.75 - 37.25	3	0.31	4	0.41			
37	9.37	271	68.61	37.25 - 37.75	2	0.20	6	0.61			
35	8.86	306	77.47	37.75 - 38.25	5	0.51	11	1.13			
22	5.57	328	83.04	38.25 - 38.75	11	1.13	22	2.25			
17	4.30	345	87.34	38.75 - 39.25	11	1.13	33	3.38			
17	4.30	362	91.65	39.25 - 39.75	29	2.97	62	6.35			
9	2.28	371	93.92	39.75 - 40.25	45	4.61	107	10.95			
8	2.03	379	95.95	40.25 - 40.75	54	5.53	161	16.48			
11	2.78	390	98.73	40.75 - 41.25	63	6.45	224	22.93			
1	0.25	391	98.99	41.25 - 41.75	59	6.04	283	28.97			
2	0.51	393	99.49	41.75 - 42.25	89	9.11	372	38.08			
0	0.00	393	99.49	42.25 - 42.75	89	9.11	461	47.19			
0	0.00	393	99.49	42.75 - 43.25	88	9.01	549	56.19			
0	0.00	393	99.49	43.25 - 43.75	69	7.06	618	63.25			
0	0.00	393	99.49	43.75 - 44.25	71	7.27	689	70.52			
1	0.25	394	99.75	44.25 - 44.75	60	6.14	749	76.66			
1	0.25	395	100.00	44.75 - 45.25	45	4.61	794	81.27			
				45.25 - 45.75	43	4.40	837	85.67			
				45.75 - 46.25	49	5.02	886	90.69			
				46.25 - 46.75	22	2.25	908	92.94			
				46.75 - 47.25	22	2.25	930	95.19			
				47.25 - 47.75	10	1.02	940	96.21			
				47.75 - 48.25	6	0.61	946	96.83			
				48.25 - 48.75	10	1.02	956	97.85			
				48.75 - 49.25	3	0.31	959	98.16			
				49.25 - 49.75	5	0.51	964	98.67			
				49.75 - 50.25	2	0.20	966	98.87			
				50.25 - 50.75	5	0.51	971	99.39			
				50.75 - 51.25	1	0.10	972	99.49			
				51.25 - 51.75	1	0.10	973	99.59			
				51.75 - 52.25	3	0.31	976	99.90			
				52.25 - 52.75	0	0.00	976	99.90			
				52.75 - 53.25	1	0.10	977	100.00			

(64) OVERHEAD FINGERTIP REACH, SITTING

The vertical distance between a sitting surface and the dactylion III landmark of a seated participant whose arm is extended overhead is measured with an anthropometer. The participant sits erect on a flat surface 45.8* cm high with the right arm and hand extended vertically overhead as far as possible and the palm of the hand facing forward. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
119.20	46.93	1ST	129.90	51.14
121.50	47.83	2ND	130.60	51.42
122.70	48.31	3RD	130.90	51.54
123.60	48.66	5TH	132.30	52.09
125.00	49.21	10TH	134.50	52.95
126.40	49.76	15TH	135.70	53.43
127.20	50.08	20TH	136.70	53.82
127.60	50.24	25TH	137.70	54.21
128.70	50.67	30TH	138.50	54.53
129.70	51.06	35TH	139.50	54.92
130.40	51.34	40TH	140.50	55.31
131.40	51.73	45TH	141.10	55.55
131.90	51.93	50TH	141.90	55.87
132.90	52.32	55TH	142.50	56.10
133.90	52.72	60TH	143.30	56.42
134.90	53.11	65TH	144.50	56.89
135.60	53.39	70TH	145.30	57.20
136.40	53.70	75TH	146.10	57.52
137.90	54.29	80TH	147.10	57.91
139.20	54.80	85TH	148.10	58.31
140.30	55.24	90TH	149.60	58.90
142.00	55.91	95TH	152.30	59.96
144.00	56.69	97TH	154.10	60.67
144.60	56.93	98TH	154.80	60.94
146.70	57.76	99TH	155.70	61.30

¹ The stool height in ANSUR was 40.8 cm .

(64) OVERHEAD FINGERTIP REACH, SITTING

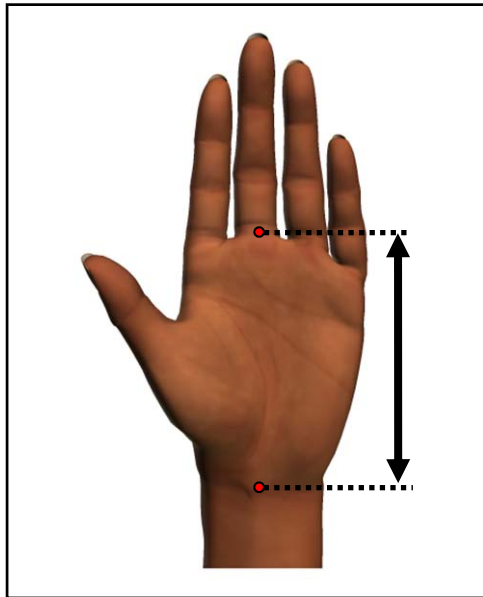
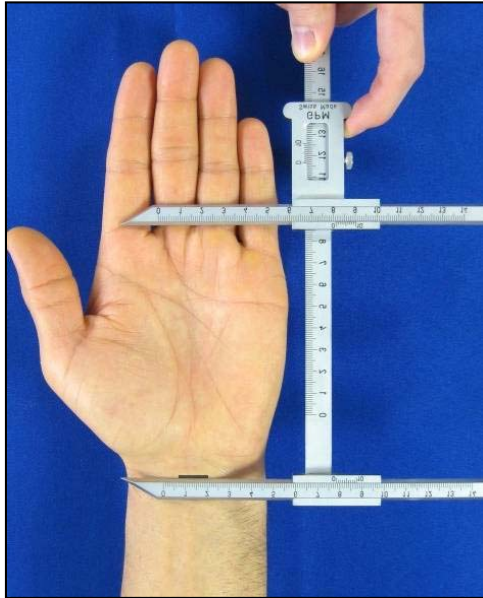
FEMALES		
<u>CM</u>		<u>IN</u>
132.46	MEAN	52.15
0.30	STD ERROR (MEAN)	0.12
5.92	STANDARD DEVIATION	2.33
0.21	STD ERROR (STD DEV)	0.08
118.20	MINIMUM	46.54
150.90	MAXIMUM	59.41
SKEWNESS		0.23
KURTOSIS		2.70
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
141.97	MEAN	55.89
0.19	STD ERROR (MEAN)	0.07
5.95	STANDARD DEVIATION	2.34
0.13	STD ERROR (STD DEV)	0.05
125.30	MINIMUM	49.33
162.40	MAXIMUM	63.94
SKEWNESS		0.14
KURTOSIS		2.77
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES								MALES			
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct		
3	0.76	3	0.76	117.25	-	118.75					
1	0.25	4	1.01	118.75	-	120.25					
4	1.01	8	2.03	120.25	-	121.75					
10	2.53	18	4.56	121.75	-	123.25					
21	5.32	39	9.87	123.25	-	124.75					
18	4.56	57	14.43	124.75	-	126.25	2	0.20	2	0.20	
39	9.87	96	24.30	126.25	-	127.75	3	0.31	5	0.51	
29	7.34	125	31.65	127.75	-	129.25	4	0.41	9	0.92	
41	10.38	166	42.03	129.25	-	130.75	17	1.74	26	2.66	
39	9.87	205	51.90	130.75	-	132.25	22	2.25	48	4.91	
38	9.62	243	61.52	132.25	-	133.75	28	2.87	76	7.78	
27	6.84	270	68.35	133.75	-	135.25	42	4.30	118	12.08	
30	7.59	300	75.95	135.25	-	136.75	72	7.37	190	19.45	
26	6.58	326	82.53	136.75	-	138.25	79	8.09	269	27.53	
20	5.06	346	87.59	138.25	-	139.75	70	7.16	339	34.70	
17	4.30	363	91.90	139.75	-	141.25	97	9.93	436	44.63	
11	2.78	374	94.68	141.25	-	142.75	118	12.08	554	56.70	
11	2.78	385	97.47	142.75	-	144.25	73	7.47	627	64.18	
5	1.27	390	98.73	144.25	-	145.75	84	8.60	711	72.77	
4	1.01	394	99.75	145.75	-	147.25	76	7.78	787	80.55	
0	0.00	394	99.75	147.25	-	148.75	63	6.45	850	87.00	
0	0.00	394	99.75	148.75	-	150.25	44	4.50	894	91.50	
1	0.25	395	100.00	150.25	-	151.75	26	2.66	920	94.17	
				151.75	-	153.25	28	2.87	948	97.03	
				153.25	-	154.75	11	1.13	959	98.16	
				154.75	-	156.25	11	1.13	970	99.28	
				156.25	-	157.75	5	0.51	975	99.80	
				157.75	-	159.25	1	0.10	976	99.90	
				159.25	-	160.75	0	0.00	976	99.90	
				160.75	-	162.25	0	0.00	976	99.90	
				162.25	-	163.75	1	0.10	977	100.00	

(65) PALM LENGTH

The distance between the center of the crease at the base of the middle finger (digit III, base) and the ventral styliion landmark is measured with a Poech sliding caliper. The participant holds the right forearm horizontal with the hand straight, palm up. The fingers are together, and the thumb is abducted approximately 45°. The middle finger is parallel to the long axis of the forearm.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
9.70	3.82	1ST	10.50	4.13
9.90	3.90	2ND	10.70	4.21
9.90	3.90	3RD	10.70	4.21
10.00	3.94	5TH	10.90	4.29
10.20	4.02	10TH	11.10	4.37
10.30	4.06	15TH	11.20	4.41
10.40	4.09	20TH	11.30	4.45
10.50	4.13	25TH	11.40	4.49
10.50	4.13	30TH	11.50	4.53
10.60	4.17	35TH	11.60	4.57
10.70	4.21	40TH	11.70	4.61
10.80	4.25	45TH	11.70	4.61
10.80	4.25	50TH	11.80	4.65
10.90	4.29	55TH	11.80	4.65
11.00	4.33	60TH	11.90	4.69
11.00	4.33	65TH	12.00	4.72
11.10	4.37	70TH	12.00	4.72
11.20	4.41	75TH	12.10	4.76
11.30	4.45	80TH	12.30	4.84
11.40	4.49	85TH	12.40	4.88
11.60	4.57	90TH	12.50	4.92
11.70	4.61	95TH	12.70	5.00
11.80	4.65	97TH	12.80	5.04
12.00	4.72	98TH	12.90	5.08
12.10	4.76	99TH	13.30	5.24

(65) PALM LENGTH

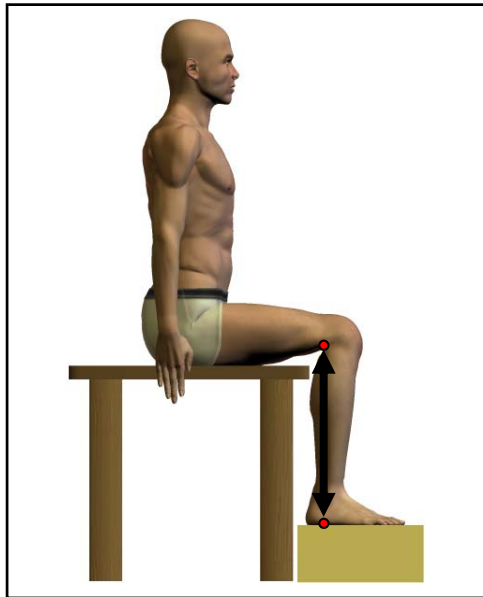
FEMALES		
<u>CM</u>		<u>IN</u>
10.84	MEAN	4.27
0.03	STD ERROR (MEAN)	0.01
0.51	STANDARD DEVIATION	0.20
0.02	STD ERROR (STD DEV)	0.01
9.70	MINIMUM	3.82
12.70	MAXIMUM	5.00
SKEWNESS		0.21
KURTOSIS		2.81
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
11.78	MEAN	4.64
0.02	STD ERROR (MEAN)	0.01
0.56	STANDARD DEVIATION	0.22
0.01	STD ERROR (STD DEV)	0.00
10.00	MINIMUM	3.94
13.50	MAXIMUM	5.31
SKEWNESS		0.09
KURTOSIS		3.10
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE										
FEMALES				<u>CM</u>			MALES			
F	FPct	CumF	CumFPct				F	FPct	CumF	CumFPct
3	0.76	3	0.76	9.65	-	9.75				
2	0.51	5	1.27	9.75	-	9.85				
7	1.77	12	3.04	9.85	-	9.95				
7	1.77	19	4.81	9.95	-	10.05				
2	0.51	21	5.32	10.05	-	10.15	1	0.10	1	0.10
14	3.54	35	8.86	10.15	-	10.25	1	0.10	2	0.20
18	4.56	53	13.42	10.25	-	10.35	0	0.00	2	0.20
22	5.57	75	18.99	10.35	-	10.45	3	0.31	5	0.51
23	5.82	98	24.81	10.45	-	10.55	4	0.41	9	0.92
18	4.56	116	29.37	10.55	-	10.65	7	0.72	16	1.64
31	7.85	147	37.22	10.65	-	10.75	17	1.74	33	3.38
29	7.34	176	44.56	10.75	-	10.85	18	1.84	51	5.22
30	7.59	206	52.15	10.85	-	10.95	22	2.25	73	7.47
29	7.34	235	59.49	10.95	-	11.05	25	2.56	98	10.03
25	6.33	260	65.82	11.05	-	11.15	43	4.40	141	14.43
23	5.82	283	71.65	11.15	-	11.25	28	2.87	169	17.30
18	4.56	301	76.20	11.25	-	11.35	41	4.20	210	21.49
18	4.56	319	80.76	11.35	-	11.45	79	8.09	289	29.58
13	3.29	332	84.05	11.45	-	11.55	59	6.04	348	35.62
15	3.80	347	87.85	11.55	-	11.65	70	7.16	418	42.78
12	3.04	359	90.89	11.65	-	11.75	90	9.21	508	52.00
11	2.78	370	93.67	11.75	-	11.85	80	8.19	588	60.18
2	0.51	372	94.18	11.85	-	11.95	36	3.68	624	63.87
9	2.28	381	96.46	11.95	-	12.05	83	8.50	707	72.36
3	0.76	384	97.22	12.05	-	12.15	36	3.68	743	76.05
5	1.27	389	98.48	12.15	-	12.25	51	5.22	794	81.27
2	0.51	391	98.99	12.25	-	12.35	26	2.66	820	83.93
1	0.25	392	99.24	12.35	-	12.45	55	5.63	875	89.56
1	0.25	393	99.49	12.45	-	12.55	34	3.48	909	93.04
0	0.00	393	99.49	12.55	-	12.65	18	1.84	927	94.88
2	0.51	395	100.00	12.65	-	12.75	21	2.15	948	97.03
				12.75	-	12.85	7	0.72	955	97.75
				12.85	-	12.95	7	0.72	962	98.46
				12.95	-	13.05	4	0.41	966	98.87
				13.05	-	13.15	3	0.31	969	99.18
				13.15	-	13.25	1	0.10	970	99.28
				13.25	-	13.35	3	0.31	973	99.59
				13.35	-	13.45	3	0.31	976	99.90
				13.45	-	13.55	1	0.10	977	100.00

(66) POPLITEAL HEIGHT

The vertical distance from a footrest surface to the back of the right knee (the popliteal fossa at the dorsal juncture of the calf and thigh) is measured with an anthropometer. The participant sits with the thighs parallel, the feet in line with the thighs, and the knees flexed 90°.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
35.20	13.86	1ST	38.10	15.00
35.60	14.02	2ND	38.80	15.28
36.10	14.21	3RD	39.40	15.51
36.30	14.29	5TH	39.70	15.63
36.90	14.53	10TH	40.50	15.94
37.30	14.69	15TH	41.00	16.14
37.70	14.84	20TH	41.40	16.30
38.00	14.96	25TH	41.90	16.50
38.30	15.08	30TH	42.30	16.65
38.50	15.16	35TH	42.60	16.77
38.80	15.28	40TH	43.00	16.93
38.80	15.28	45TH	43.30	17.05
39.20	15.43	50TH	43.50	17.13
39.50	15.55	55TH	43.80	17.24
39.80	15.67	60TH	44.10	17.36
40.10	15.79	65TH	44.40	17.48
40.20	15.83	70TH	44.70	17.60
40.50	15.94	75TH	44.90	17.68
40.90	16.10	80TH	45.30	17.83
41.20	16.22	85TH	45.80	18.03
41.90	16.50	90TH	46.50	18.31
43.00	16.93	95TH	47.40	18.66
43.40	17.09	97TH	47.90	18.86
43.90	17.28	98TH	48.40	19.06
44.20	17.40	99TH	49.20	19.37

(66) POPLITEAL HEIGHT

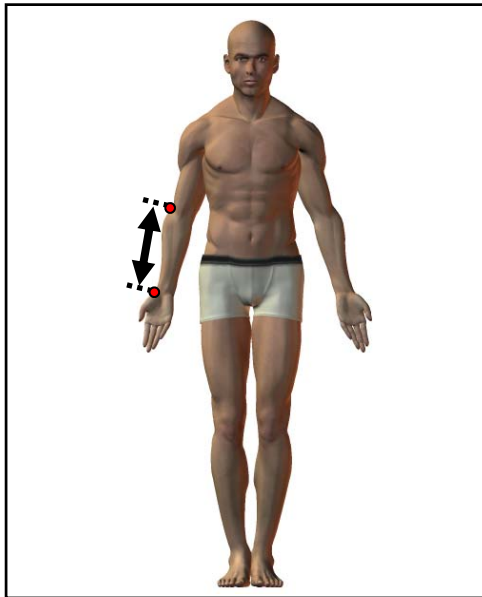
FEMALES		
<u>CM</u>		<u>IN</u>
39.31	MEAN	15.48
0.10	STD ERROR (MEAN)	0.04
1.96	STANDARD DEVIATION	0.77
0.07	STD ERROR (STD DEV)	0.03
32.00	MINIMUM	12.60
46.00	MAXIMUM	18.11
SKEWNESS		0.25
KURTOSIS		2.99
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
43.50	MEAN	17.13
0.07	STD ERROR (MEAN)	0.03
2.34	STANDARD DEVIATION	0.92
0.05	STD ERROR (STD DEV)	0.02
35.30	MINIMUM	13.90
52.10	MAXIMUM	20.51
SKEWNESS		0.05
KURTOSIS		3.23
COEFFICIENT OF VARIATION		5.4%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES								MALES			
F	FPct	CumF	CumFPct	<u>CM</u>				F	FPct	CumF	CumFPct
1	0.25	1	0.25	31.75	-	32.25					
0	0.00	1	0.25	32.25	-	32.75					
0	0.00	1	0.25	32.75	-	33.25					
0	0.00	1	0.25	33.25	-	33.75					
1	0.25	2	0.51	33.75	-	34.25					
0	0.00	2	0.51	34.25	-	34.75					
2	0.51	4	1.01	34.75	-	35.25					
3	0.76	7	1.77	35.25	-	35.75		2	0.20	2	0.20
9	2.28	16	4.05	35.75	-	36.25		1	0.10	3	0.31
16	4.05	32	8.10	36.25	-	36.75		0	0.00	3	0.31
18	4.56	50	12.66	36.75	-	37.25		0	0.00	3	0.31
23	5.82	73	18.48	37.25	-	37.75		2	0.20	5	0.51
30	7.59	103	26.08	37.75	-	38.25		4	0.41	9	0.92
52	13.16	155	39.24	38.25	-	38.75		7	0.72	16	1.64
44	11.14	199	50.38	38.75	-	39.25		8	0.82	24	2.46
28	7.09	227	57.47	39.25	-	39.75		16	1.64	40	4.09
45	11.39	272	68.86	39.75	-	40.25		19	1.94	59	6.04
30	7.59	302	76.46	40.25	-	40.75		43	4.40	102	10.44
23	5.82	325	82.28	40.75	-	41.25		52	5.32	154	15.76
18	4.56	343	86.84	41.25	-	41.75		68	6.96	222	22.72
17	4.30	360	91.14	41.75	-	42.25		44	4.50	266	27.23
6	1.52	366	92.66	42.25	-	42.75		78	7.98	344	35.21
13	3.29	379	95.95	42.75	-	43.25		70	7.16	414	42.37
6	1.52	385	97.47	43.25	-	43.75		100	10.24	514	52.61
6	1.52	391	98.99	43.75	-	44.25		73	7.47	587	60.08
3	0.76	394	99.75	44.25	-	44.75		93	9.52	680	69.60
0	0.00	394	99.75	44.75	-	45.25		67	6.86	747	76.46
0	0.00	394	99.75	45.25	-	45.75		53	5.42	800	81.88
1	0.25	395	100.00	45.75	-	46.25		40	4.09	840	85.98
				46.25	-	46.75		52	5.32	892	91.30
				46.75	-	47.25		25	2.56	917	93.86
				47.25	-	47.75		24	2.46	941	96.32
				47.75	-	48.25		13	1.33	954	97.65
				48.25	-	48.75		9	0.92	963	98.57
				48.75	-	49.25		5	0.51	968	99.08
				49.25	-	49.75		4	0.41	972	99.49
				49.75	-	50.25		0	0.00	972	99.49
				50.25	-	50.75		2	0.20	974	99.69
				50.75	-	51.25		2	0.20	976	99.90
				51.25	-	51.75		0	0.00	976	99.90
				51.75	-	52.25		1	0.10	977	100.00

(67) RADIALE-STYLION LENGTH

The distance between the radiale landmark and the stylium landmark is measured with a beam caliper held parallel to the long axis of the forearm. The participant stands with the arms relaxed at the sides. The hand and fingers are held straight in line with the long axis of the forearm with the palm facing forward.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
21.20	8.35	1ST	24.00	9.45
21.50	8.46	2ND	24.40	9.61
21.80	8.58	3RD	24.80	9.76
22.10	8.70	5TH	25.20	9.92
22.40	8.82	10TH	25.60	10.08
22.60	8.90	15TH	25.90	10.20
22.90	9.02	20TH	26.20	10.31
23.20	9.13	25TH	26.40	10.39
23.30	9.17	30TH	26.50	10.43
23.40	9.21	35TH	26.80	10.55
23.70	9.33	40TH	27.00	10.63
23.80	9.37	45TH	27.20	10.71
24.00	9.45	50TH	27.30	10.75
24.10	9.49	55TH	27.50	10.83
24.20	9.53	60TH	27.60	10.87
24.30	9.57	65TH	27.80	10.94
24.50	9.65	70TH	28.00	11.02
24.70	9.72	75TH	28.20	11.10
25.00	9.84	80TH	28.40	11.18
25.30	9.96	85TH	28.80	11.34
25.60	10.08	90TH	29.00	11.42
26.00	10.24	95TH	29.60	11.65
26.40	10.39	97TH	29.90	11.77
26.40	10.39	98TH	30.00	11.81
26.60	10.47	99TH	30.30	11.93

(67) RADIALE-STYLION LENGTH

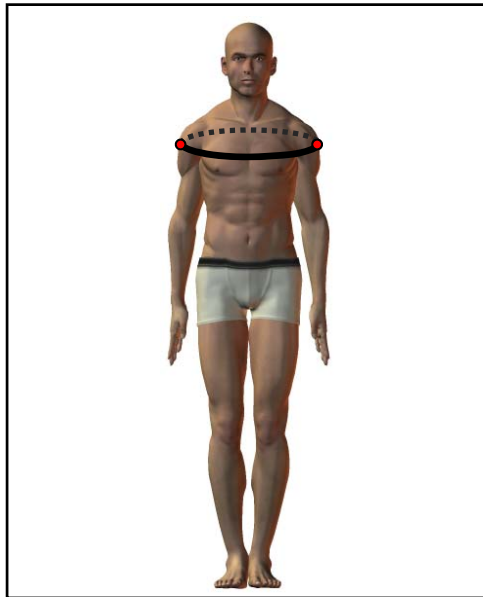
FEMALES		
<u>CM</u>		<u>IN</u>
23.96	MEAN	9.43
0.06	STD ERROR (MEAN)	0.02
1.21	STANDARD DEVIATION	0.48
0.04	STD ERROR (STD DEV)	0.02
21.10	MINIMUM	8.31
28.90	MAXIMUM	11.38
SKEWNESS		0.15
KURTOSIS		2.83
COEFFICIENT OF VARIATION		5.1%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
27.29	MEAN	10.75
0.04	STD ERROR (MEAN)	0.02
1.35	STANDARD DEVIATION	0.53
0.03	STD ERROR (STD DEV)	0.01
22.80	MINIMUM	8.98
31.10	MAXIMUM	12.24
SKEWNESS		-0.05
KURTOSIS		2.96
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES								MALES			
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct		
3	0.76	3	0.76	20.75	-	21.25					
3	0.76	6	1.52	21.25	-	21.75					
16	4.05	22	5.57	21.75	-	22.25					
26	6.58	48	12.15	22.25	-	22.75					
36	9.11	84	21.27	22.75	-	23.25	4	0.41	4	0.41	
55	13.92	139	35.19	23.25	-	23.75	1	0.10	5	0.51	
58	14.68	197	49.87	23.75	-	24.25	11	1.13	16	1.64	
67	16.96	264	66.84	24.25	-	24.75	12	1.23	28	2.87	
41	10.38	305	77.22	24.75	-	25.25	31	3.17	59	6.04	
33	8.35	338	85.57	25.25	-	25.75	72	7.37	131	13.41	
25	6.33	363	91.90	25.75	-	26.25	93	9.52	224	22.93	
17	4.30	380	96.20	26.25	-	26.75	115	11.77	339	34.70	
7	1.77	387	97.97	26.75	-	27.25	137	14.02	476	48.72	
4	1.01	391	98.99	27.25	-	27.75	150	15.35	626	64.07	
1	0.25	392	99.24	27.75	-	28.25	123	12.59	749	76.66	
1	0.25	393	99.49	28.25	-	28.75	78	7.98	827	84.65	
2	0.51	395	100.00	28.75	-	29.25	76	7.78	903	92.43	
				29.25	-	29.75	37	3.79	940	96.21	
				29.75	-	30.25	24	2.46	964	98.67	
				30.25	-	30.75	12	1.23	976	99.90	
				30.75	-	31.25	1	0.10	977	100.00	

(68) SHOULDER CIRCUMFERENCE*

The circumference of the shoulders at the level of the right and left deltoid point landmarks is measured with a tape. The participant stands erect, looking straight ahead. The shoulders and upper extremities are relaxed with the palms facing the thighs. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
92.50	36.42	1ST	105.20	41.42
93.60	36.85	2ND	107.00	42.13
93.80	36.93	3RD	108.00	42.52
95.10	37.44	5TH	109.20	42.99
96.40	37.95	10TH	111.00	43.70
97.60	38.43	15TH	112.20	44.17
98.10	38.62	20TH	113.30	44.61
99.00	38.98	25TH	114.00	44.88
99.40	39.13	30TH	114.80	45.20
100.50	39.57	35TH	115.50	45.47
101.50	39.96	40TH	116.30	45.79
102.20	40.24	45TH	116.80	45.98
102.60	40.39	50TH	117.60	46.30
103.30	40.67	55TH	118.30	46.57
103.70	40.83	60TH	119.00	46.85
104.40	41.10	65TH	119.80	47.17
105.00	41.34	70TH	120.70	47.52
105.70	41.61	75TH	121.50	47.83
106.70	42.01	80TH	122.60	48.27
107.60	42.36	85TH	124.00	48.82
108.50	42.72	90TH	125.80	49.53
111.50	43.90	95TH	128.30	50.51
112.50	44.29	97TH	129.00	50.79
113.70	44.76	98TH	129.90	51.14
115.90	45.63	99TH	131.90	51.93

* The definition of the deltoid landmark has changed since the ANSUR survey; (see Section 2.6). As the level of the two shoulders is often slightly different, this measurement may not always be horizontal.

(68) SHOULDER CIRCUMFERENCE

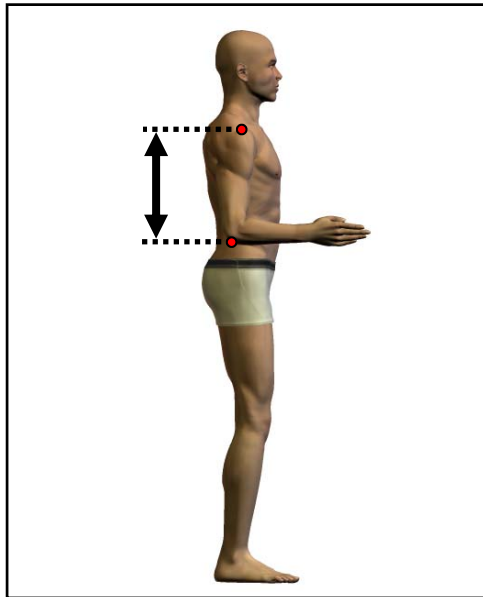
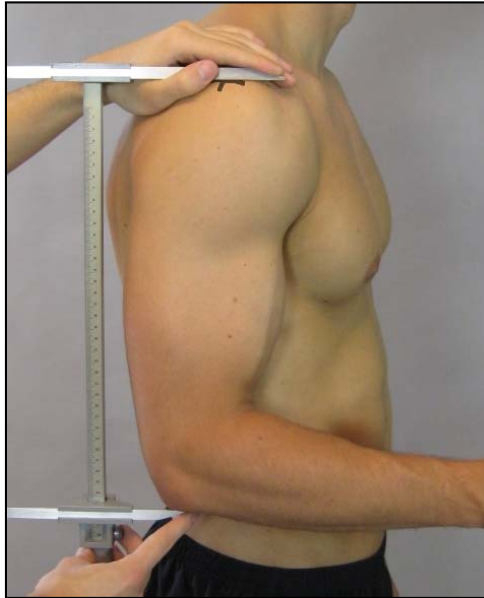
FEMALES		
<u>CM</u>		<u>IN</u>
102.66	MEAN	40.42
0.25	STD ERROR (MEAN)	0.10
4.93	STANDARD DEVIATION	1.94
0.18	STD ERROR (STD DEV)	0.07
91.00	MINIMUM	35.83
120.70	MAXIMUM	47.52
SKEWNESS		0.34
KURTOSIS		3.15
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
117.98	MEAN	46.45
0.18	STD ERROR (MEAN)	0.07
5.77	STANDARD DEVIATION	2.27
0.13	STD ERROR (STD DEV)	0.05
100.20	MINIMUM	39.45
144.00	MAXIMUM	56.69
SKEWNESS		0.36
KURTOSIS		3.63
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCY TABLE				MALES			
F	FPct	CumF	CumFPct	<u>CM</u>		<u>CM</u>		F	FPct	CumF	CumFPct
1	0.25	1	0.25	90.25	-	91.75					
3	0.76	4	1.01	91.75	-	93.25					
5	1.27	9	2.28	93.25	-	94.75					
20	5.06	29	7.34	94.75	-	96.25					
28	7.09	57	14.43	96.25	-	97.75					
43	10.89	100	25.32	97.75	-	99.25					
34	8.61	134	33.92	99.25	-	100.75		1	0.10	1	0.10
35	8.86	169	42.78	100.75	-	102.25		2	0.20	3	0.31
58	14.68	227	57.47	102.25	-	103.75		7	0.72	10	1.02
51	12.91	278	70.38	103.75	-	105.25		5	0.51	15	1.54
32	8.10	310	78.48	105.25	-	106.75		5	0.51	20	2.05
33	8.35	343	86.84	106.75	-	108.25		21	2.15	41	4.20
18	4.56	361	91.39	108.25	-	109.75		34	3.48	75	7.68
8	2.03	369	93.42	109.75	-	111.25		50	5.12	125	12.79
11	2.78	380	96.20	111.25	-	112.75		62	6.35	187	19.14
4	1.01	384	97.22	112.75	-	114.25		108	11.05	295	30.19
2	0.51	386	97.72	114.25	-	115.75		100	10.24	395	40.43
6	1.52	392	99.24	115.75	-	117.25		102	10.44	497	50.87
0	0.00	392	99.24	117.25	-	118.75		98	10.03	595	60.90
2	0.51	394	99.75	118.75	-	120.25		110	11.26	705	72.16
1	0.25	395	100.00	120.25	-	121.75		75	7.68	780	79.84
				121.75	-	123.25		57	5.83	837	85.67
				123.25	-	124.75		44	4.50	881	90.17
				124.75	-	126.25		27	2.76	908	92.94
				126.25	-	127.75		20	2.05	928	94.98
				127.75	-	129.25		24	2.46	952	97.44
				129.25	-	130.75		11	1.13	963	98.57
				130.75	-	132.25		6	0.61	969	99.18
				132.25	-	133.75		2	0.20	971	99.39
				133.75	-	135.25		2	0.20	973	99.59
				135.25	-	136.75		2	0.20	975	99.80
				136.75	-	138.25		0	0.00	975	99.80
				138.25	-	139.75		0	0.00	975	99.80
				139.75	-	141.25		0	0.00	975	99.80
				141.25	-	142.75		0	0.00	975	99.80
				142.75	-	144.25		2	0.20	977	100.00

(69) SHOULDER-ELBOW LENGTH

The distance between the right acromion landmark and the olecranon bottom landmark is measured with a beam caliper parallel to the long axis of the upper arm. The participant stands with the right upper arm hanging at the side and the elbow flexed 90°. The hand is straight, and the palm faces inward.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
31.00	12.20	1ST	32.60	12.83
31.20	12.28	2ND	33.00	12.99
31.50	12.40	3RD	33.50	13.19
31.60	12.44	5TH	33.90	13.35
32.10	12.64	10TH	34.50	13.58
32.30	12.72	15TH	34.90	13.74
32.50	12.80	20TH	35.30	13.90
32.70	12.87	25TH	35.60	14.02
32.90	12.95	30TH	35.70	14.06
33.10	13.03	35TH	36.10	14.21
33.30	13.11	40TH	36.30	14.29
33.50	13.19	45TH	36.50	14.37
33.70	13.27	50TH	36.70	14.45
33.80	13.31	55TH	37.00	14.57
34.00	13.39	60TH	37.10	14.61
34.20	13.46	65TH	37.30	14.69
34.50	13.58	70TH	37.60	14.80
34.90	13.74	75TH	37.90	14.92
35.20	13.86	80TH	38.10	15.00
35.40	13.94	85TH	38.60	15.20
35.80	14.09	90TH	38.90	15.31
36.70	14.45	95TH	39.40	15.51
36.90	14.53	97TH	39.80	15.67
37.20	14.65	98TH	40.00	15.75
37.60	14.80	99TH	40.50	15.94

(69) SHOULDER-ELBOW LENGTH

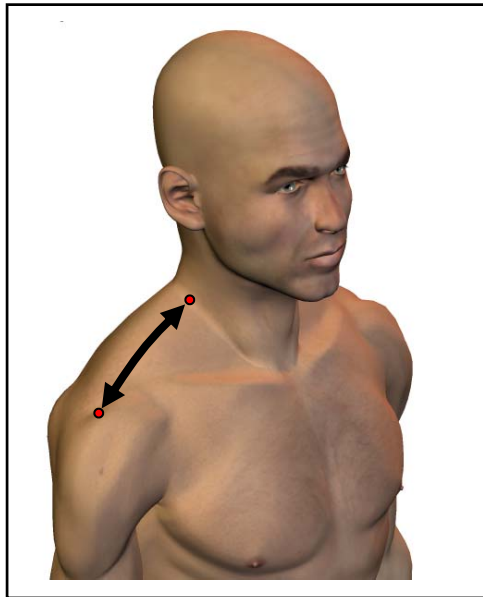
FEMALES		
<u>CM</u>		<u>IN</u>
33.83	MEAN	13.32
0.07	STD ERROR (MEAN)	0.03
1.48	STANDARD DEVIATION	0.58
0.05	STD ERROR (STD DEV)	0.02
30.80	MINIMUM	12.13
38.00	MAXIMUM	14.96
SKEWNESS		0.48
KURTOSIS		2.78
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
36.70	MEAN	14.45
0.05	STD ERROR (MEAN)	0.02
1.70	STANDARD DEVIATION	0.67
0.04	STD ERROR (STD DEV)	0.02
30.90	MINIMUM	12.17
42.30	MAXIMUM	16.65
SKEWNESS		-0.08
KURTOSIS		3.04
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE										
FEMALES				<u>CM</u>			MALES			
F	FPct	CumF	CumFPct				F	FPct	CumF	CumFPct
10	2.53	10	2.53	30.75	-	31.25	2	0.20	2	0.20
15	3.80	25	6.33	31.25	-	31.75	1	0.10	3	0.31
31	7.85	56	14.18	31.75	-	32.25	1	0.10	4	0.41
49	12.41	105	26.58	32.25	-	32.75	10	1.02	14	1.43
47	11.90	152	38.48	32.75	-	33.25	9	0.92	23	2.35
49	12.41	201	50.89	33.25	-	33.75	12	1.23	35	3.58
51	12.91	252	63.80	33.75	-	34.25	35	3.58	70	7.16
31	7.85	283	71.65	34.25	-	34.75	62	6.35	132	13.51
38	9.62	321	81.27	34.75	-	35.25	61	6.24	193	19.75
28	7.09	349	88.35	35.25	-	35.75	97	9.93	290	29.68
18	4.56	367	92.91	35.75	-	36.25	94	9.62	384	39.30
12	3.04	379	95.95	36.25	-	36.75	124	12.69	508	52.00
10	2.53	389	98.48	36.75	-	37.25	105	10.75	613	62.74
4	1.01	393	99.49	37.25	-	37.75	100	10.24	713	72.98
2	0.51	395	100.00	37.75	-	38.25	79	8.09	792	81.06
				38.25	-	38.75	71	7.27	863	88.33
				38.75	-	39.25	43	4.40	906	92.73
				39.25	-	39.75	33	3.38	939	96.11
				39.75	-	40.25	25	2.56	964	98.67
				40.25	-	40.75	9	0.92	973	99.59
				40.75	-	41.25	1	0.10	974	99.69
				41.25	-	41.75	1	0.10	975	99.80
				41.75	-	42.25	1	0.10	976	99.90
				42.25	-	42.75	1	0.10	977	100.00

(70) SHOULDER LENGTH

The surface distance between the right trapezius landmark and the right acromion landmark is measured with a tape. The participant stands erect, looking straight ahead. The shoulders and upper extremities are relaxed.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
11.40	4.49	1ST	12.50	4.92
11.50	4.53	2ND	12.80	5.04
11.70	4.61	3RD	13.10	5.16
12.10	4.76	5TH	13.30	5.24
12.40	4.88	10TH	13.60	5.35
12.60	4.96	15TH	14.00	5.51
12.80	5.04	20TH	14.10	5.55
12.90	5.08	25TH	14.40	5.67
13.00	5.12	30TH	14.50	5.71
13.10	5.16	35TH	14.60	5.75
13.20	5.20	40TH	14.80	5.83
13.40	5.28	45TH	15.00	5.91
13.50	5.31	50TH	15.00	5.91
13.70	5.39	55TH	15.20	5.98
13.80	5.43	60TH	15.30	6.02
13.90	5.47	65TH	15.50	6.10
14.00	5.51	70TH	15.60	6.14
14.20	5.59	75TH	15.80	6.22
14.30	5.63	80TH	16.00	6.30
14.50	5.71	85TH	16.10	6.34
14.80	5.83	90TH	16.40	6.46
15.20	5.98	95TH	16.70	6.57
15.30	6.02	97TH	17.20	6.77
15.50	6.10	98TH	17.30	6.81
16.00	6.30	99TH	17.60	6.93

(70) SHOULDER LENGTH

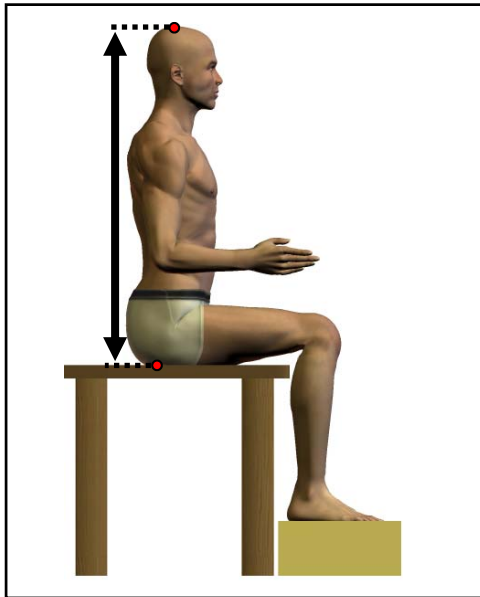
FEMALES		
<u>CM</u>		<u>IN</u>
13.55	MEAN	5.33
0.05	STD ERROR (MEAN)	0.02
0.95	STANDARD DEVIATION	0.37
0.03	STD ERROR (STD DEV)	0.01
10.80	MINIMUM	4.25
16.40	MAXIMUM	6.46
SKEWNESS		0.10
KURTOSIS		3.05
COEFFICIENT OF VARIATION		7.0%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
15.04	MEAN	5.92
0.03	STD ERROR (MEAN)	0.01
1.06	STANDARD DEVIATION	0.42
0.02	STD ERROR (STD DEV)	0.01
12.00	MINIMUM	4.72
18.10	MAXIMUM	7.13
SKEWNESS		0.00
KURTOSIS		2.98
COEFFICIENT OF VARIATION		7.1%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct		
1	0.25	1	0.25	10.75	-	10.95					
1	0.25	2	0.51	10.95	-	11.15					
0	0.00	2	0.51	11.15	-	11.35					
3	0.76	5	1.27	11.35	-	11.55					
6	1.52	11	2.78	11.55	-	11.75					
4	1.01	15	3.80	11.75	-	11.95					
5	1.27	20	5.06	11.95	-	12.15					
14	3.54	34	8.61	12.15	-	12.35	3	0.31	3	0.31	
24	6.08	58	14.68	12.35	-	12.55	2	0.20	5	0.51	
16	4.05	74	18.73	12.55	-	12.75	4	0.41	9	0.92	
24	6.08	98	24.81	12.75	-	12.95	3	0.31	12	1.23	
31	7.85	129	32.66	12.95	-	13.15	3	0.31	15	1.54	
31	7.85	160	40.51	12.95	-	13.35	12	1.23	27	2.76	
35	8.86	195	49.37	13.15	-	13.55	13	1.33	40	4.09	
27	6.84	222	56.20	13.35	-	13.75	32	3.28	72	7.37	
25	6.33	247	62.53	13.55	-	13.95	31	3.17	103	10.54	
34	8.61	281	71.14	13.75	-	13.95	24	2.46	127	13.00	
20	5.06	301	76.20	13.95	-	14.15	66	6.76	193	19.75	
21	5.32	322	81.52	14.15	-	14.35	40	4.09	233	23.85	
15	3.80	337	85.32	14.35	-	14.55	80	8.19	313	32.04	
13	3.29	350	88.61	14.55	-	14.75	72	7.37	385	39.41	
12	3.04	362	91.65	14.75	-	14.95	57	5.83	442	45.24	
15	3.80	377	95.44	14.95	-	15.15	81	8.29	523	53.53	
6	1.52	383	96.96	15.15	-	15.35	57	5.83	580	59.37	
6	1.52	389	98.48	15.35	-	15.55	80	8.19	660	67.55	
1	0.25	390	98.73	15.55	-	15.75	67	6.86	727	74.41	
2	0.51	392	99.24	15.75	-	15.95	47	4.81	774	79.22	
2	0.51	394	99.75	15.95	-	16.15	71	7.27	845	86.49	
1	0.25	395	100.00	16.15	-	16.35	29	2.97	874	89.46	
				16.35	-	16.55	35	3.58	909	93.04	
				16.55	-	16.75	23	2.35	932	95.39	
				16.75	-	16.95	8	0.82	940	96.21	
				16.95	-	17.15	13	1.33	953	97.54	
				17.15	-	17.35	11	1.13	964	98.67	
				17.35	-	17.55	5	0.51	969	99.18	
				17.55	-	17.75	3	0.31	972	99.49	
				17.75	-	17.95	2	0.20	974	99.69	
				17.95	-	18.15	3	0.31	977	100.00	

(71) SITTING HEIGHT

The vertical distance between a sitting surface and the top of the head is measured with an anthropometer. The participant sits erect with the head in the Frankfurt plane. The shoulders and upper arms are relaxed, and the forearms and hands are extended forward horizontally with the palms facing each other. The thighs are parallel, and the knees are flexed 90° with the feet in line with the thighs. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
80.10	31.54	1ST	85.80	33.78
81.40	32.05	2ND	86.60	34.09
81.70	32.17	3RD	87.10	34.29
82.40	32.44	5TH	87.50	34.45
83.40	32.83	10TH	88.60	34.88
84.20	33.15	15TH	89.20	35.12
84.90	33.43	20TH	89.80	35.35
85.20	33.54	25TH	90.40	35.59
85.60	33.70	30TH	91.00	35.83
85.80	33.78	35TH	91.50	36.02
86.40	34.02	40TH	92.00	36.22
86.80	34.17	45TH	92.50	36.42
87.30	34.37	50TH	92.80	36.54
87.70	34.53	55TH	93.30	36.73
88.00	34.65	60TH	93.60	36.85
88.40	34.80	65TH	94.10	37.05
88.70	34.92	70TH	94.50	37.20
89.00	35.04	75TH	95.00	37.40
89.80	35.35	80TH	95.70	37.68
90.70	35.71	85TH	96.30	37.91
91.40	35.98	90TH	97.40	38.35
92.40	36.38	95TH	98.50	38.78
93.00	36.61	97TH	99.40	39.13
93.80	36.93	98TH	99.90	39.33
94.70	37.28	99TH	101.50	39.96

(71) SITTING HEIGHT

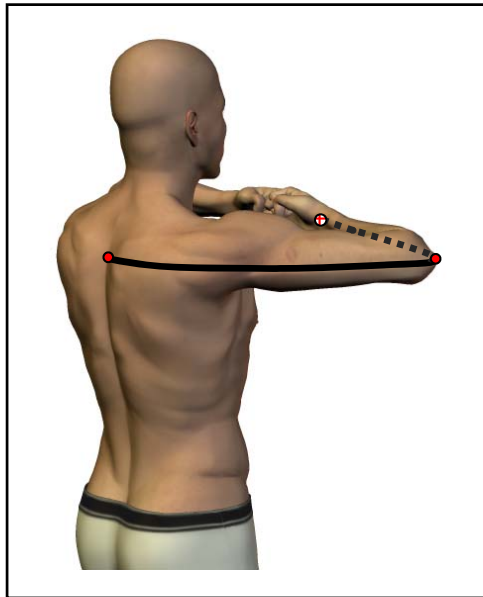
FEMALES		
<u>CM</u>		<u>IN</u>
87.29	MEAN	34.36
0.15	STD ERROR (MEAN)	0.06
3.07	STANDARD DEVIATION	1.21
0.11	STD ERROR (STD DEV)	0.04
78.50	MINIMUM	30.91
96.10	MAXIMUM	37.83
SKEWNESS		0.13
KURTOSIS		3.05
COEFFICIENT OF VARIATION		3.5%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
92.86	MEAN	36.56
0.11	STD ERROR (MEAN)	0.04
3.38	STANDARD DEVIATION	1.33
0.08	STD ERROR (STD DEV)	0.03
83.40	MINIMUM	32.83
103.80	MAXIMUM	40.87
SKEWNESS		0.22
KURTOSIS		2.99
COEFFICIENT OF VARIATION		3.6%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	77.55 - 78.55							
6	1.52	7	1.77	78.55 - 79.55							
8	2.03	15	3.80	79.55 - 80.55							
15	3.80	30	7.59	80.55 - 81.55							
20	5.06	50	12.66	81.55 - 82.55							
31	7.85	81	20.51	82.55 - 83.55	2	0.20	2	0.20			
29	7.34	110	27.85	83.55 - 84.55	3	0.31	5	0.51			
51	12.91	161	40.76	84.55 - 85.55	3	0.31	8	0.82			
42	10.63	203	51.39	85.55 - 86.55	12	1.23	20	2.05			
43	10.89	246	62.28	86.55 - 87.55	31	3.17	51	5.22			
46	11.65	292	73.92	87.55 - 88.55	43	4.40	94	9.62			
38	9.62	330	83.54	88.55 - 89.55	69	7.06	163	16.68			
20	5.06	350	88.61	89.55 - 90.55	84	8.60	247	25.28			
19	4.81	369	93.42	90.55 - 91.55	87	8.90	334	34.19			
14	3.54	383	96.96	91.55 - 92.55	108	11.05	442	45.24			
6	1.52	389	98.48	92.55 - 93.55	121	12.38	563	57.63			
2	0.51	391	98.99	93.55 - 94.55	114	11.67	677	69.29			
2	0.51	393	99.49	94.55 - 95.55	90	9.21	767	78.51			
2	0.51	395	100.00	95.55 - 96.55	71	7.27	838	85.77			
				96.55 - 97.55	46	4.71	884	90.48			
				97.55 - 98.55	42	4.30	926	94.78			
				98.55 - 99.55	23	2.35	949	97.13			
				99.55 - 100.55	15	1.54	964	98.67			
				100.55 - 101.55	8	0.82	972	99.49			
				101.55 - 102.55	1	0.10	973	99.59			
				102.55 - 103.55	2	0.20	975	99.80			
				103.55 - 104.55	2	0.20	977	100.00			

(72) SLEEVE LENGTH: SPINE-WRIST

The horizontal surface distance from the midspine landmark, across the olecranon, center landmark at the tip of the raised right elbow, to the dorsal stylium landmark is measured with a tape. The measurement is taken while the participant holds his/her arms up in a horizontal position parallel to the standing surface and joins them by bringing the fists together at the metacarpophalangeal and proximal interphalangeal knuckles. The forearms and fists are in a straight line.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
75.70	29.80	1ST	82.90	32.64
76.20	30.00	2ND	83.20	32.76
76.40	30.08	3RD	83.50	32.87
76.80	30.24	5TH	84.40	33.23
77.50	30.51	10TH	86.00	33.86
78.10	30.75	15TH	87.00	34.25
78.50	30.91	20TH	87.80	34.57
79.00	31.10	25TH	88.30	34.76
79.40	31.26	30TH	88.70	34.92
80.00	31.50	35TH	89.00	35.04
80.20	31.57	40TH	89.50	35.24
80.50	31.69	45TH	90.00	35.43
80.70	31.77	50TH	90.40	35.59
81.10	31.93	55TH	90.80	35.75
81.50	32.09	60TH	91.50	36.02
82.00	32.28	65TH	91.90	36.18
82.50	32.48	70TH	92.40	36.38
83.50	32.87	75TH	92.90	36.57
84.00	33.07	80TH	93.50	36.81
84.80	33.39	85TH	94.00	37.01
85.70	33.74	90TH	95.00	37.40
87.10	34.29	95TH	96.50	37.99
88.10	34.69	97TH	97.20	38.27
88.20	34.72	98TH	98.30	38.70
89.00	35.04	99TH	99.40	39.13

(72) SLEEVE LENGTH: SPINE-WRIST

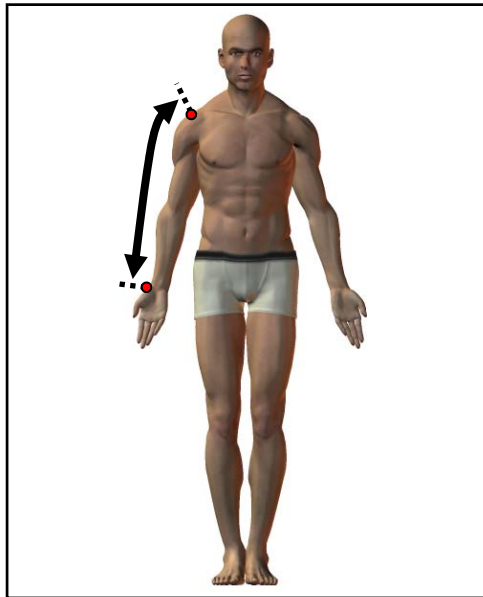
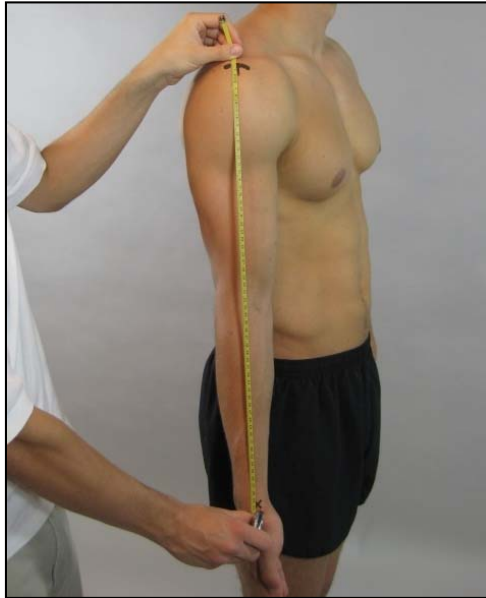
FEMALES		
CM		IN
81.24	MEAN	31.98
0.16	STD ERROR (MEAN)	0.06
3.12	STANDARD DEVIATION	1.23
0.11	STD ERROR (STD DEV)	0.04
74.70	MINIMUM	29.41
91.50	MAXIMUM	36.02
SKEWNESS		0.49
KURTOSIS		2.79
COEFFICIENT OF VARIATION		3.8%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
90.52	MEAN	35.64
0.11	STD ERROR (MEAN)	0.05
3.58	STANDARD DEVIATION	1.41
0.08	STD ERROR (STD DEV)	0.03
78.50	MINIMUM	30.91
101.80	MAXIMUM	40.08
SKEWNESS		0.05
KURTOSIS		3.10
COEFFICIENT OF VARIATION		4.0%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCY TABLE				MALES			
F	FPct	CumF	CumFPct	CM		F	FPct	CumF	CumFPct		
2	0.51	2	0.51	74.55	-	75.55					
10	2.53	12	3.04	75.55	-	76.55					
24	6.08	36	9.11	76.55	-	77.55					
40	10.13	76	19.24	77.55	-	78.55	2	0.20	0.20		
36	9.11	112	28.35	78.55	-	79.55	1	0.10	0.31		
58	14.68	170	43.04	79.55	-	80.55	1	0.10	0.41		
44	11.14	214	54.18	80.55	-	81.55	2	0.20	0.61		
46	11.65	260	65.82	81.55	-	82.55	5	0.51	1.13		
27	6.84	287	72.66	82.55	-	83.55	22	2.25	3.38		
33	8.35	320	81.01	83.55	-	84.55	25	2.56	5.94		
26	6.58	346	87.59	84.55	-	85.55	31	3.17	9.11		
17	4.30	363	91.90	85.55	-	86.55	41	4.20	13.31		
14	3.54	377	95.44	86.55	-	87.55	69	7.06	20.37		
10	2.53	387	97.97	87.55	-	88.55	100	10.24	30.60		
6	1.52	393	99.49	88.55	-	89.55	110	11.26	41.86		
0	0.00	393	99.49	89.55	-	90.55	119	12.18	54.04		
2	0.51	395	100.00	90.55	-	91.55	88	9.01	63.05		
				91.55	-	92.55	88	9.01	72.06		
				92.55	-	93.55	82	8.39	80.45		
				93.55	-	94.55	73	7.47	87.92		
				94.55	-	95.55	42	4.30	92.22		
				95.55	-	96.55	33	3.38	95.60		
				96.55	-	97.55	20	2.05	97.65		
				97.55	-	98.55	8	0.82	98.46		
				98.55	-	99.55	9	0.92	99.39		
				99.55	-	100.55	5	0.51	99.90		
				100.55	-	101.55	0	0.00	99.90		
				101.55	-	102.55	1	0.10	100.00		

(73) SLEEVE OUTSEAM

The straight-line distance between the right acromion landmark and the stylium landmark is measured with a tape. The participant stands erect with both arms straight at the sides with the hands straight and the palms facing forward.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
49.80	19.61	1ST	53.10	20.91
50.50	19.88	2ND	54.00	21.26
50.60	19.92	3RD	54.60	21.50
51.20	20.16	5TH	55.60	21.89
51.70	20.35	10TH	56.60	22.28
52.40	20.63	15TH	57.20	22.52
52.70	20.75	20TH	57.60	22.68
53.00	20.87	25TH	58.10	22.87
53.20	20.94	30TH	58.50	23.03
53.50	21.06	35TH	59.00	23.23
53.70	21.14	40TH	59.40	23.39
54.00	21.26	45TH	59.60	23.46
54.20	21.34	50TH	60.00	23.62
54.80	21.57	55TH	60.20	23.70
55.00	21.65	60TH	60.60	23.86
55.50	21.85	65TH	61.00	24.02
55.90	22.01	70TH	61.50	24.21
56.10	22.09	75TH	61.90	24.37
56.60	22.28	80TH	62.50	24.61
57.20	22.52	85TH	62.90	24.76
58.00	22.83	90TH	63.50	25.00
59.20	23.31	95TH	64.50	25.39
60.00	23.62	97TH	65.20	25.67
60.20	23.70	98TH	65.70	25.87
61.10	24.06	99TH	66.20	26.06

(73) SLEEVE OUTSEAM

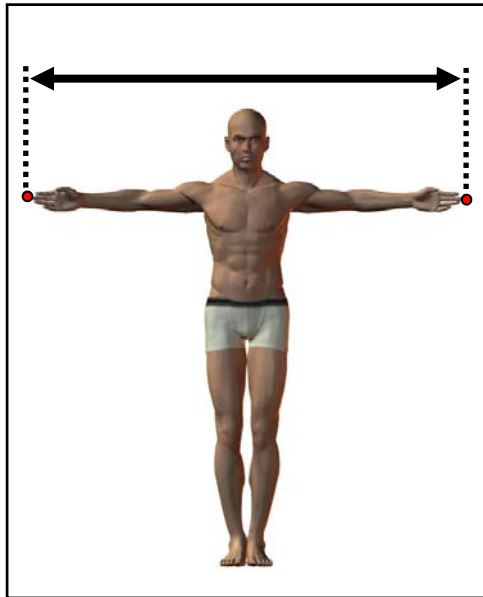
FEMALES		
<u>CM</u>		<u>IN</u>
54.67	MEAN	21.52
0.12	STD ERROR (MEAN)	0.05
2.39	STANDARD DEVIATION	0.94
0.09	STD ERROR (STD DEV)	0.03
49.70	MINIMUM	19.57
61.60	MAXIMUM	24.25
SKEWNESS		0.47
KURTOSIS		2.94
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
59.99	MEAN	23.62
0.09	STD ERROR (MEAN)	0.03
2.76	STANDARD DEVIATION	1.09
0.06	STD ERROR (STD DEV)	0.02
50.70	MINIMUM	19.96
69.10	MAXIMUM	27.20
SKEWNESS		-0.05
KURTOSIS		3.07
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCY TABLE				MALES			
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct		
7	1.77	7	1.77	49.55	-	50.55					
22	5.57	29	7.34	50.55	-	51.55	1	0.10	1	0.10	
30	7.59	59	14.94	51.55	-	52.55	7	0.72	8	0.82	
68	17.22	127	32.15	52.55	-	53.55	5	0.51	13	1.33	
63	15.95	190	48.10	53.55	-	54.55	13	1.33	26	2.66	
54	13.67	244	61.77	54.55	-	55.55	28	2.87	54	5.53	
47	11.90	291	73.67	55.55	-	56.55	57	5.83	111	11.36	
45	11.39	336	85.06	56.55	-	57.55	78	7.98	189	19.34	
27	6.84	363	91.90	57.55	-	58.55	115	11.77	304	31.12	
16	4.05	379	95.95	58.55	-	59.55	134	13.72	438	44.83	
10	2.53	389	98.48	59.55	-	60.55	139	14.23	577	59.06	
5	1.27	394	99.75	60.55	-	61.55	135	13.82	712	72.88	
1	0.25	395	100.00	61.55	-	62.55	92	9.42	804	82.29	
				62.55	-	63.55	72	7.37	876	89.66	
				63.55	-	64.55	47	4.81	923	94.47	
				64.55	-	65.55	29	2.97	952	97.44	
				65.55	-	66.55	18	1.84	970	99.28	
				66.55	-	67.55	6	0.61	976	99.90	
				67.55	-	68.55	0	0.00	976	99.90	
				68.55	-	69.55	1	0.10	977	100.00	

(74) SPAN

The distance between the tips of the middle fingers (dactylion III) of the horizontally outstretched arms is measured on a wall chart. The participant stands erect with the back against a wall-mounted scale and the heels together. Both arms and hands are stretched horizontally along the wall with the tip of the middle finger of one hand just touching a side wall. A block is placed at the tip of the middle finger of the other hand to establish the measurement on the scale. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
155.50	61.22	1ST	163.20	64.25
155.90	61.38	2ND	165.20	65.04
156.00	61.42	3RD	166.40	65.51
157.40	61.97	5TH	168.20	66.22
158.20	62.28	10TH	171.40	67.48
159.30	62.72	15TH	173.20	68.19
160.10	63.03	20TH	174.60	68.74
161.20	63.46	25TH	175.70	69.17
162.00	63.78	30TH	177.20	69.76
162.80	64.09	35TH	178.40	70.24
164.00	64.57	40TH	179.10	70.51
164.90	64.92	45TH	180.10	70.91
165.90	65.31	50TH	180.90	71.22
166.80	65.67	55TH	182.00	71.65
167.80	66.06	60TH	183.00	72.05
168.80	66.46	65TH	184.20	72.52
169.80	66.85	70TH	185.20	72.91
170.90	67.28	75TH	186.00	73.23
172.70	67.99	80TH	187.10	73.66
173.80	68.43	85TH	188.60	74.25
175.70	69.17	90TH	190.30	74.92
179.40	70.63	95TH	193.50	76.18
180.60	71.10	97TH	195.50	76.97
181.90	71.61	98TH	196.50	77.36
183.20	72.13	99TH	198.10	77.99

(74) SPAN

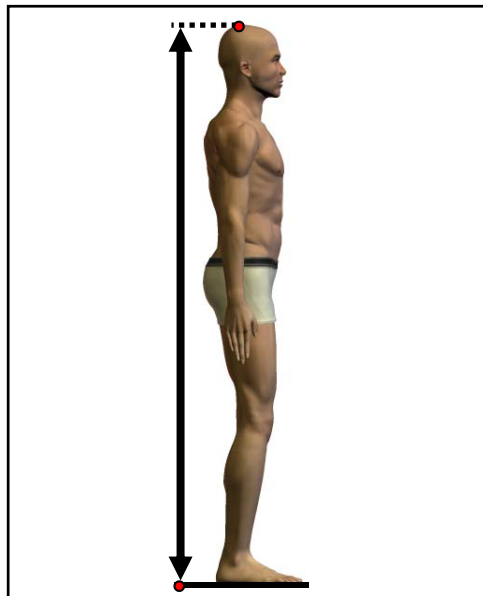
FEMALES		
<u>CM</u>		<u>IN</u>
166.52	MEAN	65.56
0.34	STD ERROR (MEAN)	0.13
6.71	STANDARD DEVIATION	2.64
0.24	STD ERROR (STD DEV)	0.09
155.40	MINIMUM	61.18
192.80	MAXIMUM	75.91
SKEWNESS		0.50
KURTOSIS		2.62
COEFFICIENT OF VARIATION		4.0%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
180.97	MEAN	71.25
0.24	STD ERROR (MEAN)	0.10
7.55	STANDARD DEVIATION	2.97
0.17	STD ERROR (STD DEV)	0.07
156.30	MINIMUM	61.54
205.20	MAXIMUM	80.79
SKEWNESS		-0.05
KURTOSIS		3.01
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
7	1.77	7	1.77	154.75 - 156.25	1	0.10	1	0.10			
11	2.78	18	4.56	156.25 - 157.75	2	0.20	3	0.31			
25	6.33	43	10.89	157.75 - 159.25	2	0.20	5	0.51			
28	7.09	71	17.97	159.25 - 160.75	3	0.31	8	0.82			
30	7.59	101	25.57	160.75 - 162.25	4	0.41	12	1.23			
31	7.85	132	33.42	162.25 - 163.75	7	0.72	19	1.94			
28	7.09	160	40.51	163.75 - 165.25	10	1.02	29	2.97			
30	7.59	190	48.10	165.25 - 166.75	21	2.15	50	5.12			
31	7.85	221	55.95	166.75 - 168.25	17	1.74	67	6.86			
32	8.10	253	64.05	168.25 - 169.75	32	3.28	99	10.13			
22	5.57	275	69.62	169.75 - 171.25	43	4.40	142	14.53			
21	5.32	296	74.94	171.25 - 172.75	39	3.99	181	18.53			
28	7.09	324	82.03	172.75 - 174.25	64	6.55	245	25.08			
13	3.29	337	85.32	174.25 - 175.75	56	5.73	301	30.81			
14	3.54	351	88.86	175.75 - 177.25	73	7.47	374	38.28			
13	3.29	364	92.15	177.25 - 178.75	86	8.80	460	47.08			
8	2.03	372	94.18	178.75 - 180.25	81	8.29	541	55.37			
5	1.27	377	95.44	180.25 - 181.75	67	6.86	608	62.23			
10	2.53	387	97.97	181.75 - 183.25	58	5.94	666	68.17			
1	0.25	388	98.23	183.25 - 184.75	90	9.21	756	77.38			
5	1.27	393	99.49	184.75 - 186.25	50	5.12	806	82.50			
1	0.25	394	99.75	186.25 - 187.75	40	4.09	846	86.59			
0	0.00	394	99.75	187.75 - 189.25	34	3.48	880	90.07			
0	0.00	394	99.75	189.25 - 190.75	22	2.25	902	92.32			
0	0.00	394	99.75	190.75 - 192.25	28	2.87	930	95.19			
1	0.25	395	100.00	192.25 - 193.75	16	1.64	946	96.83			
				193.75 - 195.25	16	1.64	962	98.46			
				195.25 - 196.75	8	0.82	970	99.28			
				196.75 - 198.25	3	0.31	973	99.59			
				198.25 - 199.75	2	0.20	975	99.80			
				199.75 - 201.25	0	0.00	975	99.80			
				201.25 - 202.75	1	0.10	976	99.90			
				202.75 - 204.25	1	0.10	977	100.00			
				204.25 - 205.75							

(75) STATURE

The vertical distance from a standing surface to the top of the head is measured with an anthropometer. The participant stands erect with the head in the Frankfurt plane. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
155.00	61.02	1ST	162.50	63.98
155.60	61.26	2ND	163.70	64.45
156.30	61.54	3RD	164.60	64.80
156.90	61.77	5TH	166.50	65.55
158.40	62.36	10TH	169.20	66.61
159.10	62.64	15TH	171.10	67.36
159.70	62.87	20TH	172.00	67.72
160.60	63.23	25TH	172.90	68.07
161.70	63.66	30TH	173.90	68.46
162.50	63.98	35TH	174.70	68.78
163.10	64.21	40TH	175.80	69.21
163.70	64.45	45TH	176.90	69.65
164.60	64.80	50TH	177.70	69.96
165.70	65.24	55TH	178.40	70.24
166.40	65.51	60TH	179.30	70.59
167.00	65.75	65TH	180.20	70.94
167.40	65.91	70TH	180.90	71.22
168.60	66.38	75TH	181.90	71.61
169.80	66.85	80TH	182.90	72.01
171.80	67.64	85TH	184.10	72.48
173.50	68.31	90TH	185.80	73.15
175.40	69.06	95TH	188.40	74.17
177.00	69.69	97TH	189.30	74.53
177.20	69.76	98TH	190.40	74.96
178.20	70.16	99TH	192.00	75.59

(75) STATURE

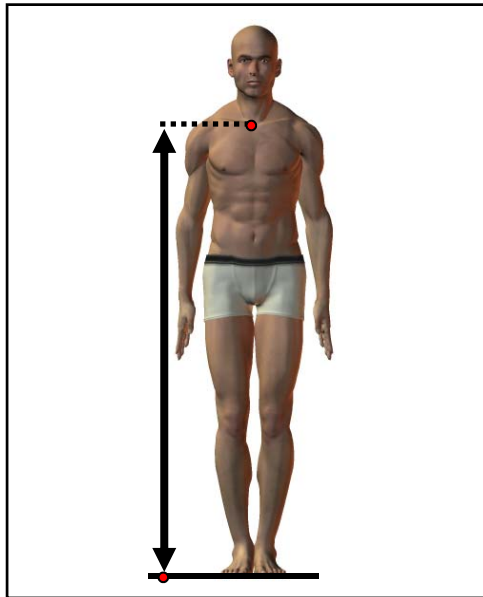
FEMALES		
<u>CM</u>		<u>IN</u>
165.17	MEAN	65.03
0.29	STD ERROR (MEAN)	0.11
5.71	STANDARD DEVIATION	2.25
0.20	STD ERROR (STD DEV)	0.08
151.60	MINIMUM	59.69
182.70	MAXIMUM	71.93
SKEWNESS		0.46
KURTOSIS		2.71
COEFFICIENT OF VARIATION		3.5%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
177.50	MEAN	69.88
0.21	STD ERROR (MEAN)	0.08
6.52	STANDARD DEVIATION	2.57
0.15	STD ERROR (STD DEV)	0.06
154.80	MINIMUM	60.94
201.30	MAXIMUM	79.25
SKEWNESS		-0.03
KURTOSIS		2.99
COEFFICIENT OF VARIATION		3.7%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE										
FEMALES							MALES			
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct	
1	0.25	1	0.25	150.25	-	151.75				
1	0.25	2	0.51	151.75	-	153.25				
3	0.76	5	1.27	153.25	-	154.75				
11	2.78	16	4.05	154.75	-	156.25				
21	5.32	37	9.37	156.25	-	157.75	1	0.10	1	0.10
38	9.62	75	18.99	157.75	-	159.25	0	0.00	1	0.10
37	9.37	112	28.35	159.25	-	160.75	1	0.10	2	0.20
33	8.35	145	36.71	160.75	-	162.25	1	0.10	3	0.31
43	10.89	188	47.59	162.25	-	163.75	3	0.31	6	0.61
31	7.85	219	55.44	163.75	-	165.25	14	1.43	20	2.05
46	11.65	265	67.09	165.25	-	166.75	11	1.13	31	3.17
30	7.59	295	74.68	166.75	-	168.25	20	2.05	51	5.22
24	6.08	319	80.76	168.25	-	169.75	27	2.76	78	7.98
15	3.80	334	84.56	169.75	-	171.25	36	3.68	114	11.67
19	4.81	353	89.37	171.25	-	172.75	51	5.22	165	16.89
17	4.30	370	93.67	172.75	-	174.25	71	7.27	236	24.16
9	2.28	379	95.95	174.25	-	175.75	69	7.06	305	31.22
10	2.53	389	98.48	175.75	-	177.25	88	9.01	393	40.23
4	1.01	393	99.49	177.25	-	178.75	74	7.57	467	47.80
0	0.00	393	99.49	178.75	-	180.25	92	9.42	559	57.22
1	0.25	394	99.75	180.25	-	181.75	77	7.88	636	65.10
1	0.25	395	100.00	181.75	-	183.25	75	7.68	711	72.77
				183.25	-	184.75	75	7.68	786	80.45
				184.75	-	186.25	60	6.14	846	86.59
				186.25	-	187.75	44	4.50	890	91.10
				187.75	-	189.25	29	2.97	919	94.06
				189.25	-	190.75	25	2.56	944	96.62
				190.75	-	192.25	14	1.43	958	98.06
				192.25	-	193.75	9	0.92	967	98.98
				193.75	-	195.25	4	0.41	971	99.39
				195.25	-	196.75	4	0.41	975	99.80
				196.75	-	198.25	0	0.00	975	99.80
				198.25	-	199.75	1	0.10	976	99.90
				199.75	-	201.25	0	0.00	976	99.90
				201.25	-	202.75	0	0.00	976	99.90
							1	0.10	977	100.00

(76) SUPRASTERNALE HEIGHT

The vertical distance between a standing surface and the suprasternale landmark is measured with an anthropometer. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
125.70	49.49	1ST	132.50	52.17
126.20	49.69	2ND	133.60	52.60
127.00	50.00	3RD	134.50	52.95
127.30	50.12	5TH	135.80	53.46
128.60	50.63	10TH	138.00	54.33
129.60	51.02	15TH	139.70	55.00
130.30	51.30	20TH	141.00	55.51
131.20	51.65	25TH	141.40	55.67
131.80	51.89	30TH	142.20	55.98
132.40	52.13	35TH	143.20	56.38
132.90	52.32	40TH	143.90	56.65
133.60	52.60	45TH	144.90	57.05
134.30	52.87	50TH	145.70	57.36
134.80	53.07	55TH	146.50	57.68
135.80	53.46	60TH	147.20	57.95
136.20	53.62	65TH	147.70	58.15
136.90	53.90	70TH	148.50	58.46
138.10	54.37	75TH	149.30	58.78
138.90	54.69	80TH	150.50	59.25
140.70	55.39	85TH	151.50	59.65
141.80	55.83	90TH	152.90	60.20
144.00	56.69	95TH	155.30	61.14
144.70	56.97	97TH	156.20	61.50
145.00	57.09	98TH	157.00	61.81
147.80	58.19	99TH	158.20	62.28

(76) SUPRASTERNALE HEIGHT

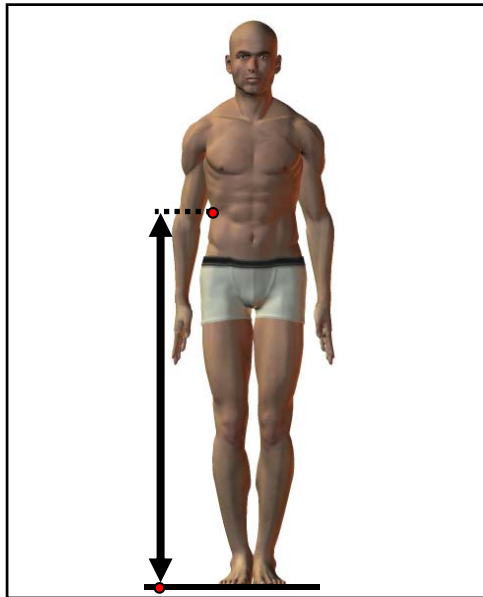
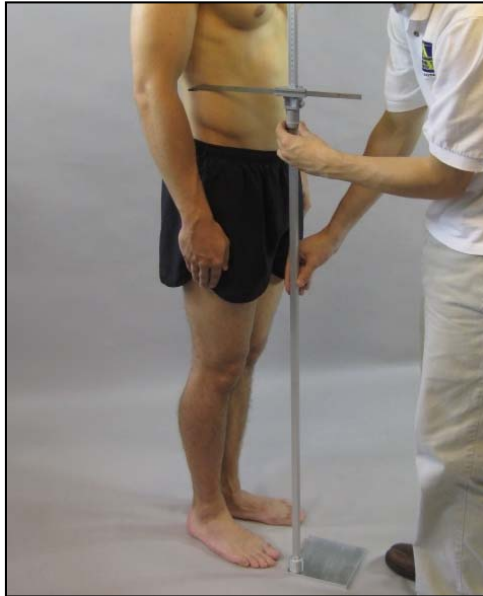
FEMALES		
<u>CM</u>		<u>IN</u>
134.76	MEAN	53.06
0.25	STD ERROR (MEAN)	0.10
5.00	STANDARD DEVIATION	1.97
0.18	STD ERROR (STD DEV)	0.07
123.60	MINIMUM	48.66
150.60	MAXIMUM	59.29
SKEWNESS		0.44
KURTOSIS		2.78
COEFFICIENT OF VARIATION		3.7%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
145.51	MEAN	57.29
0.19	STD ERROR (MEAN)	0.07
5.79	STANDARD DEVIATION	2.28
0.13	STD ERROR (STD DEV)	0.05
124.10	MINIMUM	48.86
166.10	MAXIMUM	65.39
SKEWNESS		-0.04
KURTOSIS		3.02
COEFFICIENT OF VARIATION		4.0%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
2	0.51	2	0.51	123.55 - 124.55	1	0.10	1	0.10			
4	1.01	6	1.52	124.55 - 125.55	0	0.00	1	0.10			
9	2.28	15	3.80	125.55 - 126.55	0	0.00	1	0.10			
12	3.04	27	6.84	126.55 - 127.55	0	0.00	1	0.10			
11	2.78	38	9.62	127.55 - 128.55	2	0.20	3	0.31			
26	6.58	64	16.20	128.55 - 129.55	0	0.00	3	0.31			
31	7.85	95	24.05	129.55 - 130.55	2	0.20	5	0.51			
27	6.84	122	30.89	130.55 - 131.55	0	0.00	5	0.51			
29	7.34	151	38.23	131.55 - 132.55	8	0.82	13	1.33			
29	7.34	180	45.57	132.55 - 133.55	7	0.72	20	2.05			
25	6.33	205	51.90	133.55 - 134.55	12	1.23	32	3.28			
32	8.10	237	60.00	134.55 - 135.55	12	1.23	44	4.50			
34	8.61	271	68.61	135.55 - 136.55	25	2.56	69	7.06			
22	5.57	293	74.18	136.55 - 137.55	25	2.56	94	9.62			
19	4.81	312	78.99	137.55 - 138.55	28	2.87	122	12.49			
12	3.04	324	82.03	138.55 - 139.55	30	3.07	152	15.56			
10	2.53	334	84.56	139.55 - 140.55	41	4.20	193	19.75			
15	3.80	349	88.35	140.55 - 141.55	57	5.83	250	25.59			
16	4.05	365	92.41	141.55 - 142.55	60	6.14	310	31.73			
10	2.53	375	94.94	142.55 - 143.55	62	6.35	372	38.08			
10	2.53	385	97.47	143.55 - 144.55	66	6.76	438	44.83			
5	1.27	390	98.73	144.55 - 145.55	52	5.32	490	50.15			
0	0.00	390	98.73	145.55 - 146.55	67	6.86	557	57.01			
2	0.51	392	99.24	146.55 - 147.55	69	7.06	626	64.07			
1	0.25	393	99.49	147.55 - 148.55	65	6.65	691	70.73			
1	0.25	394	99.75	148.55 - 149.55	59	6.04	750	76.77			
0	0.00	394	99.75	149.55 - 150.55	36	3.68	786	80.45			
1	0.25	395	100.00	150.55 - 151.55	47	4.81	833	85.26			
				151.55 - 152.55	35	3.58	868	88.84			
				152.55 - 153.55	38	3.89	906	92.73			
				153.55 - 154.55	14	1.43	920	94.17			
				154.55 - 155.55	17	1.74	937	95.91			
				155.55 - 156.55	16	1.64	953	97.54			
				156.55 - 157.55	11	1.13	964	98.67			
				157.55 - 158.55	5	0.51	969	99.18			
				158.55 - 159.55	2	0.20	971	99.39			
				159.55 - 160.55	2	0.20	973	99.59			
				160.55 - 161.55	2	0.20	975	99.80			
				161.55 - 162.55	0	0.00	975	99.80			
				162.55 - 163.55	0	0.00	975	99.80			
				163.55 - 164.55	1	0.10	976	99.90			
				164.55 - 165.55	0	0.00	976	99.90			
				165.55 - 166.55	1	0.10	977	100.00			

(77) TENTH RIB HEIGHT

The vertical distance between a standing surface and the tenth rib landmark is measured with an anthropometer. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
98.30	38.70	1ST	101.70	40.04
99.20	39.06	2ND	102.60	40.39
99.30	39.09	3RD	103.50	40.75
99.70	39.25	5TH	104.60	41.18
101.00	39.76	10TH	106.60	41.97
101.90	40.12	15TH	108.00	42.52
102.80	40.47	20TH	108.60	42.76
103.10	40.59	25TH	109.60	43.15
103.80	40.87	30TH	110.30	43.43
104.40	41.10	35TH	110.90	43.66
105.30	41.46	40TH	111.60	43.94
105.90	41.69	45TH	112.30	44.21
106.30	41.85	50TH	112.80	44.41
106.70	42.01	55TH	113.40	44.65
107.40	42.28	60TH	114.00	44.88
108.00	42.52	65TH	114.70	45.16
108.80	42.83	70TH	115.40	45.43
109.30	43.03	75TH	115.80	45.59
110.10	43.35	80TH	116.90	46.02
111.80	44.02	85TH	117.80	46.38
112.70	44.37	90TH	119.20	46.93
115.00	45.28	95TH	120.70	47.52
115.50	45.47	97TH	121.80	47.95
115.90	45.63	98TH	122.30	48.15
116.70	45.94	99TH	123.50	48.62

(77) TENTH RIB HEIGHT

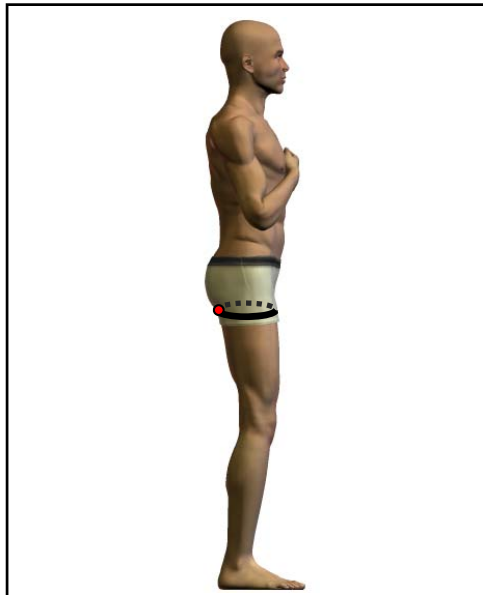
FEMALES		
<u>CM</u>		<u>IN</u>
106.60	MEAN	41.97
0.22	STD ERROR (MEAN)	0.09
4.42	STANDARD DEVIATION	1.74
0.16	STD ERROR (STD DEV)	0.06
97.00	MINIMUM	38.19
121.80	MAXIMUM	47.95
SKEWNESS		0.41
KURTOSIS		2.84
COEFFICIENT OF VARIATION		4.1%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
112.81	MEAN	44.41
0.16	STD ERROR (MEAN)	0.06
4.89	STANDARD DEVIATION	1.92
0.11	STD ERROR (STD DEV)	0.04
96.20	MINIMUM	37.87
129.90	MAXIMUM	51.14
SKEWNESS		0.02
KURTOSIS		3.09
COEFFICIENT OF VARIATION		4.3%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE										
FEMALES				<u>CM</u>		MALES				
F	FPct	CumF	CumFPct			F	FPct	CumF	CumFPct	
				95.55	-	96.55	1	0.10	1	0.10
1	0.25	1	0.25	96.55	-	97.55	0	0.00	1	0.10
4	1.01	5	1.27	97.55	-	98.55	2	0.20	3	0.31
5	1.27	10	2.53	98.55	-	99.55	0	0.00	3	0.31
12	3.04	22	5.57	99.55	-	100.55	2	0.20	5	0.51
21	5.32	43	10.89	100.55	-	101.55	6	0.61	11	1.13
23	5.82	66	16.71	101.55	-	102.55	10	1.02	21	2.15
38	9.62	104	26.33	102.55	-	103.55	12	1.23	33	3.38
29	7.34	133	33.67	103.55	-	104.55	17	1.74	50	5.12
33	8.35	166	42.03	104.55	-	105.55	24	2.46	74	7.57
36	9.11	202	51.14	105.55	-	106.55	30	3.07	104	10.64
37	9.37	239	60.51	106.55	-	107.55	46	4.71	150	15.35
29	7.34	268	67.85	107.55	-	108.55	48	4.91	198	20.27
27	6.84	295	74.68	108.55	-	109.55	51	5.22	249	25.49
23	5.82	318	80.51	109.55	-	110.55	81	8.29	330	33.78
14	3.54	332	84.05	110.55	-	111.55	69	7.06	399	40.84
15	3.80	347	87.85	111.55	-	112.55	72	7.37	471	48.21
17	4.30	364	92.15	112.55	-	113.55	92	9.42	563	57.63
5	1.27	369	93.42	113.55	-	114.55	62	6.35	625	63.97
11	2.78	380	96.20	114.55	-	115.55	80	8.19	705	72.16
10	2.53	390	98.73	115.55	-	116.55	61	6.24	766	78.40
3	0.76	393	99.49	116.55	-	117.55	49	5.02	815	83.42
1	0.25	394	99.75	117.55	-	118.55	38	3.89	853	87.31
0	0.00	394	99.75	118.55	-	119.55	42	4.30	895	91.61
0	0.00	394	99.75	119.55	-	120.55	26	2.66	921	94.27
0	0.00	394	99.75	120.55	-	121.55	19	1.94	940	96.21
1	0.25	395	100.00	121.55	-	122.55	19	1.94	959	98.16
				122.55	-	123.55	7	0.72	966	98.87
				123.55	-	124.55	4	0.41	970	99.28
				124.55	-	125.55	1	0.10	971	99.39
				125.55	-	126.55	0	0.00	971	99.39
				126.55	-	127.55	2	0.20	973	99.59
				127.55	-	128.55	2	0.20	975	99.80
				128.55	-	129.55	1	0.10	976	99.90
				129.55	-	130.55	1	0.10	977	100.00

(78) THIGH CIRCUMFERENCE

The circumference of the right thigh at the gluteal furrow landmark is measured with a tape. The measurement is taken perpendicular to the long axis of the thigh. The participant stands erect with the weight distributed equally on both feet. The legs are spread apart just enough so that the thighs do not touch.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
50.60	19.92	1ST	52.30	20.59
51.70	20.35	2ND	53.80	21.18
51.90	20.43	3RD	54.20	21.34
52.80	20.79	5TH	55.40	21.81
54.50	21.46	10TH	57.10	22.48
55.30	21.77	15TH	58.10	22.87
56.30	22.17	20TH	58.90	23.19
57.50	22.64	25TH	59.80	23.54
58.10	22.87	30TH	60.50	23.82
59.30	23.35	35TH	61.10	24.06
59.80	23.54	40TH	61.70	24.29
60.90	23.98	45TH	62.30	24.53
61.50	24.21	50TH	62.80	24.72
61.90	24.37	55TH	63.30	24.92
62.60	24.65	60TH	64.00	25.20
63.40	24.96	65TH	64.70	25.47
64.00	25.20	70TH	65.50	25.79
64.60	25.43	75TH	66.20	26.06
65.80	25.91	80TH	66.90	26.34
67.60	26.61	85TH	68.10	26.81
68.90	27.13	90TH	69.50	27.36
71.30	28.07	95TH	71.00	27.95
72.40	28.50	97TH	72.80	28.66
72.80	28.66	98TH	73.80	29.06
73.50	28.94	99TH	75.00	29.53

(78) THIGH CIRCUMFERENCE

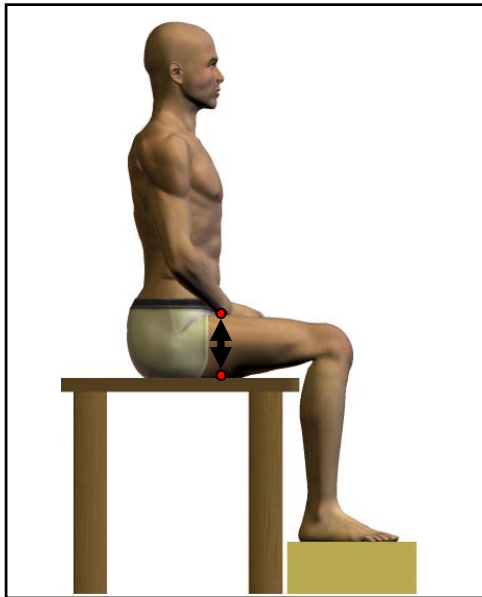
FEMALES		
<u>CM</u>		<u>IN</u>
61.41	MEAN	24.18
0.28	STD ERROR (MEAN)	0.11
5.49	STANDARD DEVIATION	2.16
0.20	STD ERROR (STD DEV)	0.08
47.80	MINIMUM	18.82
80.20	MAXIMUM	31.57
SKEWNESS		0.29
KURTOSIS		2.98
COEFFICIENT OF VARIATION		8.9%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
63.04	MEAN	24.82
0.15	STD ERROR (MEAN)	0.06
4.83	STANDARD DEVIATION	1.90
0.11	STD ERROR (STD DEV)	0.04
47.30	MINIMUM	18.62
80.60	MAXIMUM	31.73
SKEWNESS		0.25
KURTOSIS		3.23
COEFFICIENT OF VARIATION		7.7%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
				46.55 - 47.55	1	0.10	1	0.10			
1	0.25	1	0.25	47.55 - 48.55	0	0.00	1	0.10			
1	0.25	2	0.51	48.55 - 49.55	2	0.20	3	0.31			
2	0.51	4	1.01	49.55 - 50.55	0	0.00	3	0.31			
2	0.51	6	1.52	50.55 - 51.55	4	0.41	7	0.72			
8	2.03	14	3.54	51.55 - 52.55	10	1.02	17	1.74			
9	2.28	23	5.82	52.55 - 53.55	12	1.23	29	2.97			
11	2.78	34	8.61	53.55 - 54.55	22	2.25	51	5.22			
17	4.30	51	12.91	54.55 - 55.55	17	1.74	68	6.96			
22	5.57	73	18.48	55.55 - 56.55	30	3.07	98	10.03			
20	5.06	93	23.54	56.55 - 57.55	42	4.30	140	14.33			
24	6.08	117	29.62	57.55 - 58.55	64	6.55	204	20.88			
26	6.58	143	36.20	58.55 - 59.55	66	6.76	270	27.64			
31	7.85	174	44.05	59.55 - 60.55	61	6.24	331	33.88			
30	7.59	204	51.65	60.55 - 61.55	90	9.21	421	43.09			
28	7.09	232	58.73	61.55 - 62.55	87	8.90	508	52.00			
23	5.82	255	64.56	62.55 - 63.55	92	9.42	600	61.41			
27	6.84	282	71.39	63.55 - 64.55	64	6.55	664	67.96			
19	4.81	301	76.20	64.55 - 65.55	58	5.94	722	73.90			
21	5.32	322	81.52	65.55 - 66.55	64	6.55	786	80.45			
14	3.54	336	85.06	66.55 - 67.55	42	4.30	828	84.75			
19	4.81	355	89.87	67.55 - 68.55	40	4.09	868	88.84			
12	3.04	367	92.91	68.55 - 69.55	30	3.07	898	91.91			
4	1.01	371	93.92	69.55 - 70.55	29	2.97	927	94.88			
6	1.52	377	95.44	70.55 - 71.55	17	1.74	944	96.62			
5	1.27	382	96.71	71.55 - 72.55	10	1.02	954	97.65			
9	2.28	391	98.99	72.55 - 73.55	5	0.51	959	98.16			
1	0.25	392	99.24	73.55 - 74.55	6	0.61	965	98.77			
0	0.00	392	99.24	74.55 - 75.55	3	0.31	968	99.08			
0	0.00	392	99.24	75.55 - 76.55	1	0.10	969	99.18			
0	0.00	392	99.24	76.55 - 77.55	3	0.31	972	99.49			
0	0.00	392	99.24	77.55 - 78.55	3	0.31	975	99.80			
2	0.51	394	99.75	78.55 - 79.55	1	0.10	976	99.90			
1	0.25	395	100.00	79.55 - 80.55	0	0.00	976	99.90			
				80.55 - 81.55	1	0.10	977	100.00			

(79) THIGH CLEARANCE

The vertical distance between a sitting surface and the thigh point, top landmark is measured with an anthropometer. The participant sits with the thighs parallel, knees flexed 90°, and the feet in line with the thighs.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
14.20	5.59	1ST	15.30	6.02
14.20	5.59	2ND	15.70	6.18
14.40	5.67	3RD	15.80	6.22
14.70	5.79	5TH	16.00	6.30
15.10	5.94	10TH	16.50	6.50
15.40	6.06	15TH	16.80	6.61
15.60	6.14	20TH	17.00	6.69
15.70	6.18	25TH	17.20	6.77
15.90	6.26	30TH	17.40	6.85
16.20	6.38	35TH	17.50	6.89
16.30	6.42	40TH	17.70	6.97
16.40	6.46	45TH	18.00	7.09
16.50	6.50	50TH	18.10	7.13
16.70	6.57	55TH	18.30	7.20
16.90	6.65	60TH	18.50	7.28
17.00	6.69	65TH	18.60	7.32
17.30	6.81	70TH	18.80	7.40
17.40	6.85	75TH	19.10	7.52
17.60	6.93	80TH	19.40	7.64
18.00	7.09	85TH	19.70	7.76
18.30	7.20	90TH	20.20	7.95
18.90	7.44	95TH	20.60	8.11
19.60	7.72	97TH	21.50	8.46
19.80	7.80	98TH	21.70	8.54
20.30	7.99	99TH	22.70	8.94

(79) THIGH CLEARANCE

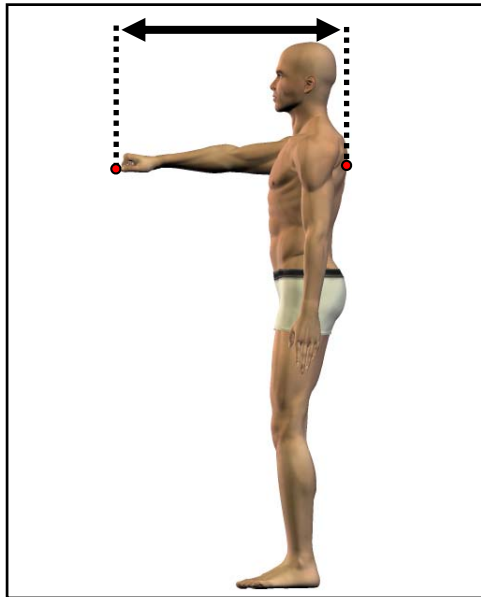
FEMALES		
CM		IN
16.65	MEAN	6.56
0.07	STD ERROR (MEAN)	0.03
1.30	STANDARD DEVIATION	0.51
0.05	STD ERROR (STD DEV)	0.02
13.50	MINIMUM	5.31
21.20	MAXIMUM	8.35
SKEWNESS		0.45
KURTOSIS		3.22
COEFFICIENT OF VARIATION		7.8%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
18.24	MEAN	7.18
0.05	STD ERROR (MEAN)	0.02
1.47	STANDARD DEVIATION	0.58
0.03	STD ERROR (STD DEV)	0.01
14.00	MINIMUM	5.51
26.10	MAXIMUM	10.28
SKEWNESS		0.69
KURTOSIS		4.33
COEFFICIENT OF VARIATION		8.1%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	CM	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	13.45 - 13.70							
2	0.51	3	0.76	13.70 - 13.95							
0	0.00	3	0.76	13.95 - 14.20	1	0.10	1	0.10			
6	1.52	9	2.28	14.20 - 14.45	0	0.00	1	0.10			
4	1.01	13	3.29	14.45 - 14.70	0	0.00	1	0.10			
12	3.04	25	6.33	14.70 - 14.95	2	0.20	3	0.31			
10	2.53	35	8.86	14.95 - 15.20	6	0.61	9	0.92			
20	5.06	55	13.92	15.20 - 15.45	9	0.92	18	1.84			
22	5.57	77	19.49	15.45 - 15.70	7	0.72	25	2.56			
34	8.61	111	28.10	15.70 - 15.95	18	1.84	43	4.40			
14	3.54	125	31.65	15.95 - 16.20	22	2.25	65	6.65			
47	11.90	172	43.54	16.20 - 16.45	42	4.30	107	10.95			
22	5.57	194	49.11	16.45 - 16.70	24	2.46	131	13.41			
40	10.13	234	59.24	16.70 - 16.95	60	6.14	191	19.55			
23	5.82	257	65.06	16.95 - 17.20	52	5.32	243	24.87			
33	8.35	290	73.42	17.20 - 17.45	83	8.50	326	33.37			
12	3.04	302	76.46	17.45 - 17.70	54	5.53	380	38.89			
20	5.06	322	81.52	17.70 - 17.95	87	8.90	467	47.80			
13	3.29	335	84.81	17.95 - 18.20	55	5.63	522	53.43			
21	5.32	356	90.13	18.20 - 18.45	88	9.01	610	62.44			
8	2.03	364	92.15	18.45 - 18.70	50	5.12	660	67.55			
10	2.53	374	94.68	18.70 - 18.95	69	7.06	729	74.62			
3	0.76	377	95.44	18.95 - 19.20	39	3.99	768	78.61			
4	1.01	381	96.46	19.20 - 19.45	46	4.71	814	83.32			
1	0.25	382	96.71	19.45 - 19.70	27	2.76	841	86.08			
5	1.27	387	97.97	19.70 - 19.95	41	4.20	882	90.28			
0	0.00	387	97.97	19.95 - 20.20	14	1.43	896	91.71			
6	1.52	393	99.49	20.20 - 20.45	26	2.66	922	94.37			
0	0.00	393	99.49	20.45 - 20.70	15	1.54	937	95.91			
1	0.25	394	99.75	20.70 - 20.95	9	0.92	946	96.83			
0	0.00	394	99.75	20.95 - 21.20	5	0.51	951	97.34			
1	0.25	395	100.00	21.20 - 21.45	6	0.61	957	97.95			
				21.45 - 21.70	4	0.41	961	98.36			
				21.70 - 21.95	8	0.82	969	99.18			
				21.95 - 22.20	0	0.00	969	99.18			
				22.20 - 22.45	0	0.00	969	99.18			
				22.45 - 22.70	1	0.10	970	99.28			
				22.70 - 22.95	2	0.20	972	99.49			
				22.95 - 23.20	2	0.20	974	99.69			
				23.20 - 23.45	1	0.10	975	99.80			
				23.45 - 23.70	0	0.00	975	99.80			
				23.70 - 23.95	0	0.00	975	99.80			
				23.95 - 24.20	0	0.00	975	99.80			
				24.20 - 24.45	1	0.10	976	99.90			
				24.45 - 24.70	0	0.00	976	99.90			
				24.70 - 24.95	0	0.00	976	99.90			
				24.95 - 25.20	0	0.00	976	99.90			
				25.20 - 25.45	0	0.00	976	99.90			
				25.45 - 25.70	0	0.00	976	99.90			
				25.70 - 25.95	0	0.00	976	99.90			
				25.95 - 26.20	1	0.10	977	100.00			

(80) THUMB TIP REACH

The horizontal distance from a back wall to the tip of the right thumb is measured on a wall scale. The participant stands erect in a corner, looking straight ahead with the feet together and the heels 20 cm from the back wall. The buttocks and shoulders are against the wall. The right arm and hand, palm down, are stretched forward horizontally along a scale on the side wall. The thumb continues the horizontal line of the arm, and the remaining fingers curve around to form a fist. The participant's right shoulder is held against the rear wall (not shown in the photo in order to show participant position).



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
65.50	25.79	1ST	72.10	28.39
66.70	26.26	2ND	72.90	28.70
67.40	26.54	3RD	73.40	28.90
67.80	26.69	5TH	74.50	29.33
69.20	27.24	10TH	75.60	29.76
70.60	27.80	15TH	76.30	30.04
71.20	28.03	20TH	77.10	30.35
71.50	28.15	25TH	77.70	30.59
72.10	28.39	30TH	78.50	30.91
72.60	28.58	35TH	79.20	31.18
72.90	28.70	40TH	79.50	31.30
73.40	28.90	45TH	80.10	31.54
74.10	29.17	50TH	80.50	31.69
74.60	29.37	55TH	81.00	31.89
74.90	29.49	60TH	81.40	32.05
75.50	29.72	65TH	81.80	32.20
76.00	29.92	70TH	82.40	32.44
76.60	30.16	75TH	83.00	32.68
77.30	30.43	80TH	83.80	32.99
78.00	30.71	85TH	84.90	33.43
79.40	31.26	90TH	86.00	33.86
81.30	32.01	95TH	87.80	34.57
82.10	32.32	97TH	89.10	35.08
84.10	33.11	98TH	89.80	35.35
85.10	33.50	99TH	90.70	35.71

(80) THUMB TIP REACH

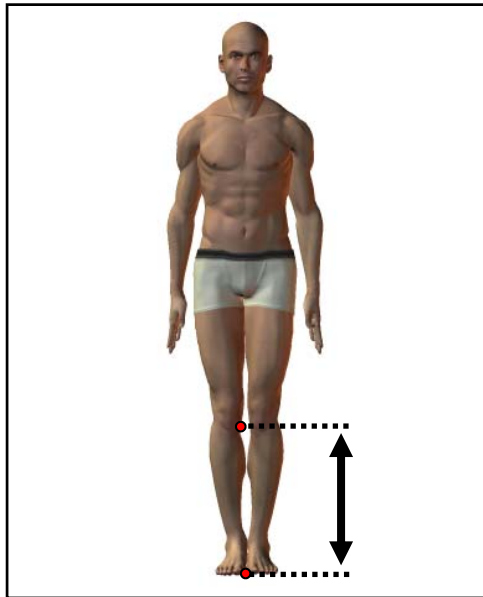
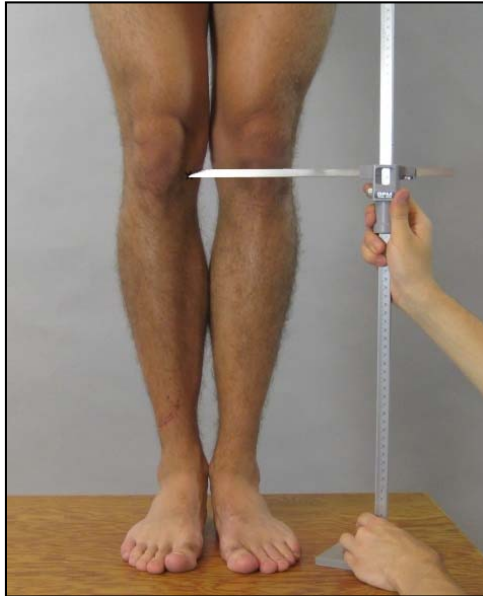
FEMALES		
<u>CM</u>		<u>IN</u>
74.20	MEAN	29.21
0.20	STD ERROR (MEAN)	0.08
3.94	STANDARD DEVIATION	1.55
0.14	STD ERROR (STD DEV)	0.06
64.20	MINIMUM	25.28
87.40	MAXIMUM	34.41
SKEWNESS		0.33
KURTOSIS		3.41
COEFFICIENT OF VARIATION		5.3%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
80.62	MEAN	31.74
0.13	STD ERROR (MEAN)	0.05
4.02	STANDARD DEVIATION	1.58
0.09	STD ERROR (STD DEV)	0.04
69.30	MINIMUM	27.28
92.30	MAXIMUM	36.34
SKEWNESS		0.25
KURTOSIS		2.92
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	63.55 - 64.55							
2	0.51	3	0.76	64.55 - 65.55							
1	0.25	4	1.01	65.55 - 66.55							
7	1.77	11	2.78	66.55 - 67.55							
9	2.28	20	5.06	67.55 - 68.55							
12	3.04	32	8.10	68.55 - 69.55	1	0.10	1	0.10			
14	3.54	46	11.65	69.55 - 70.55	2	0.20	3	0.31			
39	9.87	85	21.52	70.55 - 71.55	3	0.31	6	0.61			
38	9.62	123	31.14	71.55 - 72.55	12	1.23	18	1.84			
44	11.14	167	42.28	72.55 - 73.55	25	2.56	43	4.40			
31	7.85	198	50.13	73.55 - 74.55	14	1.43	57	5.83			
47	11.90	245	62.03	74.55 - 75.55	40	4.09	97	9.93			
26	6.58	271	68.61	75.55 - 76.55	71	7.27	168	17.20			
31	7.85	302	76.46	76.55 - 77.55	65	6.65	233	23.85			
23	5.82	325	82.28	77.55 - 78.55	67	6.86	300	30.71			
20	5.06	345	87.34	78.55 - 79.55	99	10.13	399	40.84			
19	4.81	364	92.15	79.55 - 80.55	106	10.85	505	51.69			
9	2.28	373	94.43	80.55 - 81.55	112	11.46	617	63.15			
7	1.77	380	96.20	81.55 - 82.55	91	9.31	708	72.47			
3	0.76	383	96.96	82.55 - 83.55	74	7.57	782	80.04			
6	1.52	389	98.48	83.55 - 84.55	56	5.73	838	85.77			
2	0.51	391	98.99	84.55 - 85.55	37	3.79	875	89.56			
3	0.76	394	99.75	85.55 - 86.55	38	3.89	913	93.45			
1	0.25	395	100.00	86.55 - 87.55	22	2.25	935	95.70			
				87.55 - 88.55	13	1.33	948	97.03			
				88.55 - 89.55	14	1.43	962	98.46			
				89.55 - 90.55	7	0.72	969	99.18			
				90.55 - 91.55	4	0.41	973	99.59			
				91.55 - 92.55	4	0.41	977	100.00			

(81) TIBIAL HEIGHT

The vertical distance between a standing surface and the tibiale landmark is measured with an anthropometer. The participant stands erect on a table with the feet together and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
40.10	15.79	1ST	41.90	16.50
40.40	15.91	2ND	42.30	16.65
40.60	15.98	3RD	42.60	16.77
41.30	16.26	5TH	43.10	16.97
41.50	16.34	10TH	43.70	17.20
42.00	16.54	15TH	44.20	17.40
42.40	16.69	20TH	44.80	17.64
42.60	16.77	25TH	45.30	17.83
42.80	16.85	30TH	45.60	17.95
43.00	16.93	35TH	46.00	18.11
43.30	17.05	40TH	46.30	18.23
43.50	17.13	45TH	46.70	18.39
43.70	17.20	50TH	46.90	18.46
44.00	17.32	55TH	47.10	18.54
44.30	17.44	60TH	47.50	18.70
44.70	17.60	65TH	47.80	18.82
44.90	17.68	70TH	48.10	18.94
45.20	17.80	75TH	48.40	19.06
45.70	17.99	80TH	48.80	19.21
46.30	18.23	85TH	49.30	19.41
47.00	18.50	90TH	49.80	19.61
47.60	18.74	95TH	50.80	20.00
48.40	19.06	97TH	51.10	20.12
48.50	19.09	98TH	51.80	20.39
49.50	19.49	99TH	52.90	20.83

(81) TIBIAL HEIGHT

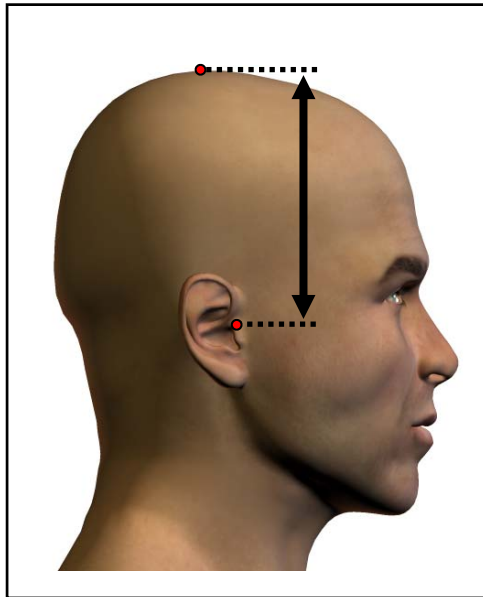
FEMALES		
<u>CM</u>		<u>IN</u>
44.02	MEAN	17.33
0.10	STD ERROR (MEAN)	0.04
2.06	STANDARD DEVIATION	0.81
0.07	STD ERROR (STD DEV)	0.03
38.90	MINIMUM	15.31
51.90	MAXIMUM	20.43
SKEWNESS		0.58
KURTOSIS		3.39
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
46.87	MEAN	18.45
0.08	STD ERROR (MEAN)	0.03
2.36	STANDARD DEVIATION	0.93
0.05	STD ERROR (STD DEV)	0.02
39.90	MINIMUM	15.71
54.60	MAXIMUM	21.50
SKEWNESS		0.10
KURTOSIS		2.97
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	38.75	-						
2	0.51	3	0.76	39.25	-						
3	0.76	6	1.52	39.75	-	3	0.31	3	0.31		
11	2.78	17	4.30	40.25	-	40.25	1	0.10	4	0.41	
6	1.52	23	5.82	40.75	-	41.25	3	0.31	7	0.72	
19	4.81	42	10.63	41.25	-	41.75	6	0.61	13	1.33	
24	6.08	66	16.71	41.75	-	42.25	5	0.51	18	1.84	
40	10.13	106	26.84	42.25	-	42.75	15	1.54	33	3.38	
36	9.11	142	35.95	42.75	-	43.25	28	2.87	61	6.24	
42	10.63	184	46.58	43.25	-	43.75	40	4.09	101	10.34	
26	6.58	210	53.16	43.75	-	44.25	48	4.91	149	15.25	
31	7.85	241	61.01	44.25	-	44.75	44	4.50	193	19.75	
38	9.62	279	70.63	44.75	-	45.25	47	4.81	240	24.56	
25	6.33	304	76.96	45.25	-	45.75	72	7.37	312	31.93	
17	4.30	321	81.27	45.75	-	46.25	76	7.78	388	39.71	
19	4.81	340	86.08	46.25	-	46.75	80	8.19	468	47.90	
21	5.32	361	91.39	46.75	-	47.25	84	8.60	552	56.50	
8	2.03	369	93.42	47.25	-	47.75	89	9.11	641	65.61	
8	2.03	377	95.44	47.75	-	48.25	80	8.19	721	73.80	
7	1.77	384	97.22	48.25	-	48.75	55	5.63	776	79.43	
5	1.27	389	98.48	48.75	-	49.25	51	5.22	827	84.65	
5	1.27	394	99.75	49.25	-	49.75	47	4.81	874	89.46	
0	0.00	394	99.75	49.75	-	50.25	35	3.58	909	93.04	
0	0.00	394	99.75	50.25	-	50.75	21	2.15	930	95.19	
0	0.00	394	99.75	50.75	-	51.25	17	1.74	947	96.93	
0	0.00	394	99.75	51.25	-	51.75	10	1.02	957	97.95	
1	0.25	395	100.00	51.75	-	52.25	6	0.61	963	98.57	
				52.25	-	52.75	2	0.20	965	98.77	
				52.75	-	53.25	5	0.51	970	99.28	
				53.25	-	53.75	2	0.20	972	99.49	
				53.75	-	54.25	4	0.41	976	99.90	
				54.25	-	54.75	1	0.10	977	100.00	

(82) TRAGION – TOP OF HEAD*

The vertical distance between the right tragion landmark and the horizontal plane tangent to the top of the head is measured with a beam caliper with a paddle blade. The participant sits with the head in the Frankfurt plane. For female participants with braids or cornrows, the measurement includes the styled hair.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
11.30	4.45	1ST	11.90	4.69
11.40	4.49	2ND	12.00	4.72
11.50	4.53	3RD	12.10	4.76
11.70	4.61	5TH	12.20	4.80
11.80	4.65	10TH	12.50	4.92
12.00	4.72	15TH	12.60	4.96
12.20	4.80	20TH	12.70	5.00
12.20	4.80	25TH	12.80	5.04
12.30	4.84	30TH	12.90	5.08
12.40	4.88	35TH	13.00	5.12
12.50	4.92	40TH	13.10	5.16
12.50	4.92	45TH	13.20	5.20
12.60	4.96	50TH	13.30	5.24
12.70	5.00	55TH	13.30	5.24
12.80	5.04	60TH	13.40	5.28
12.80	5.04	65TH	13.40	5.28
13.00	5.12	70TH	13.50	5.31
13.00	5.12	75TH	13.60	5.35
13.10	5.16	80TH	13.70	5.39
13.20	5.20	85TH	13.90	5.47
13.40	5.28	90TH	14.00	5.51
13.70	5.39	95TH	14.20	5.59
13.90	5.47	97TH	14.30	5.63
13.90	5.47	98TH	14.40	5.67
14.10	5.55	99TH	14.50	5.71

* This measurement is not equivalent to ANSUR for females. See text on page 47 for details.

(82) TRAGION-TOP OF HEAD

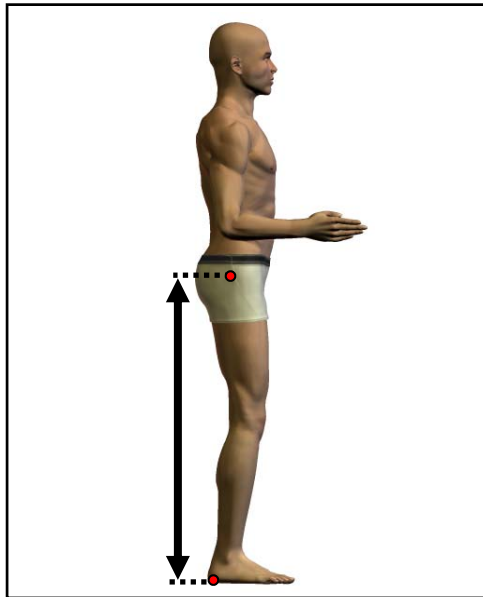
FEMALES		
<u>CM</u>		<u>IN</u>
12.64	MEAN	4.98
0.03	STD ERROR (MEAN)	0.01
0.61	STANDARD DEVIATION	0.24
0.02	STD ERROR (STD DEV)	0.01
11.20	MINIMUM	4.41
14.30	MAXIMUM	5.63
SKEWNESS		0.17
KURTOSIS		2.92
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
13.23	MEAN	5.21
0.02	STD ERROR (MEAN)	0.01
0.58	STANDARD DEVIATION	0.23
0.01	STD ERROR (STD DEV)	0.01
11.40	MINIMUM	4.49
14.90	MAXIMUM	5.87
SKEWNESS		-0.15
KURTOSIS		3.01
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES								MALES			
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct		
2	0.51	2	0.51	11.15	-	11.25					
3	0.76	5	1.27	11.25	-	11.35					
4	1.01	9	2.28	11.35	-	11.45	3	0.31	3	0.31	
5	1.27	14	3.54	11.45	-	11.55	0	0.00	3	0.31	
6	1.52	20	5.06	11.55	-	11.65	0	0.00	3	0.31	
11	2.78	31	7.85	11.65	-	11.75	1	0.10	4	0.41	
10	2.53	41	10.38	11.75	-	11.85	2	0.20	6	0.61	
7	1.77	48	12.15	11.85	-	11.95	1	0.10	7	0.72	
18	4.56	66	16.71	11.95	-	12.05	9	0.92	16	1.64	
13	3.29	79	20.00	12.05	-	12.15	8	0.82	24	2.46	
21	5.32	100	25.32	12.15	-	12.25	19	1.94	43	4.40	
19	4.81	119	30.13	12.25	-	12.35	11	1.13	54	5.53	
23	5.82	142	35.95	12.35	-	12.45	17	1.74	71	7.27	
29	7.34	171	43.29	12.45	-	12.55	30	3.07	101	10.34	
16	4.05	187	47.34	12.55	-	12.65	37	3.79	138	14.12	
24	6.08	211	53.42	12.65	-	12.75	64	6.55	202	20.68	
31	7.85	242	61.27	12.75	-	12.85	47	4.81	249	25.49	
27	6.84	269	68.10	12.85	-	12.95	43	4.40	292	29.89	
32	8.10	301	76.20	12.95	-	13.05	81	8.29	373	38.18	
12	3.04	313	79.24	13.05	-	13.15	50	5.12	423	43.30	
21	5.32	334	84.56	13.15	-	13.25	58	5.94	481	49.23	
9	2.28	343	86.84	13.25	-	13.35	87	8.90	568	58.14	
11	2.78	354	89.62	13.35	-	13.45	79	8.09	647	66.22	
7	1.77	361	91.39	13.45	-	13.55	61	6.24	708	72.47	
4	1.01	365	92.41	13.55	-	13.65	42	4.30	750	76.77	
11	2.78	376	95.19	13.65	-	13.75	53	5.42	803	82.19	
6	1.52	382	96.71	13.75	-	13.85	39	3.99	842	86.18	
4	1.01	386	97.72	13.85	-	13.95	34	3.48	876	89.66	
2	0.51	388	98.23	13.95	-	14.05	40	4.09	916	93.76	
3	0.76	391	98.99	14.05	-	14.15	15	1.54	931	95.29	
1	0.25	392	99.24	14.15	-	14.25	15	1.54	946	96.83	
3	0.76	395	100.00	14.25	-	14.35	10	1.02	956	97.85	
				14.35	-	14.45	7	0.72	963	98.57	
				14.45	-	14.55	6	0.61	969	99.18	
				14.55	-	14.65	2	0.20	971	99.39	
				14.65	-	14.75	2	0.20	973	99.59	
				14.75	-	14.85	2	0.20	975	99.80	
				14.85	-	14.95	2	0.20	977	100.00	

(83) TROCHANTERION HEIGHT

The vertical distance between a standing surface and the trochanterion landmark is measured with an anthropometer. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
78.50	30.91	1ST	81.10	31.93
78.70	30.98	2ND	82.20	32.36
79.00	31.10	3RD	82.60	32.52
79.50	31.30	5TH	83.80	32.99
80.50	31.69	10TH	85.40	33.62
81.40	32.05	15TH	86.90	34.21
81.90	32.24	20TH	87.80	34.57
82.70	32.56	25TH	88.60	34.88
83.00	32.68	30TH	89.20	35.12
83.40	32.83	35TH	89.90	35.39
84.00	33.07	40TH	90.40	35.59
84.40	33.23	45TH	90.80	35.75
84.80	33.39	50TH	91.40	35.98
85.40	33.62	55TH	91.90	36.18
86.00	33.86	60TH	92.60	36.46
86.60	34.09	65TH	93.10	36.65
87.10	34.29	70TH	93.70	36.89
87.40	34.41	75TH	94.30	37.13
88.30	34.76	80TH	95.20	37.48
89.30	35.16	85TH	95.90	37.76
90.40	35.59	90TH	96.80	38.11
91.60	36.06	95TH	98.70	38.86
93.00	36.61	97TH	99.70	39.25
93.40	36.77	98TH	100.50	39.57
93.60	36.85	99TH	101.60	40.00

(83) TROCHANTERION HEIGHT

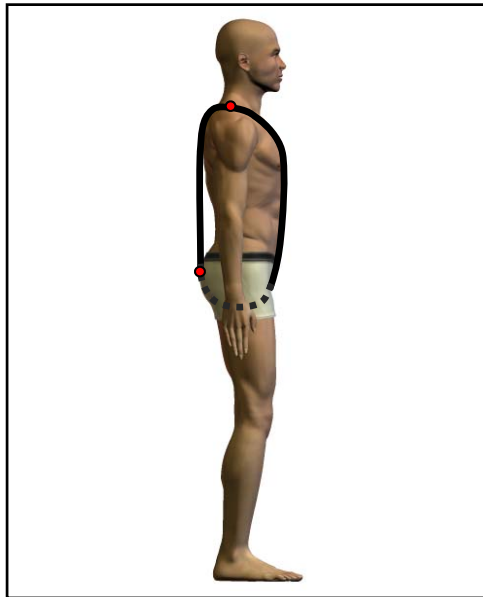
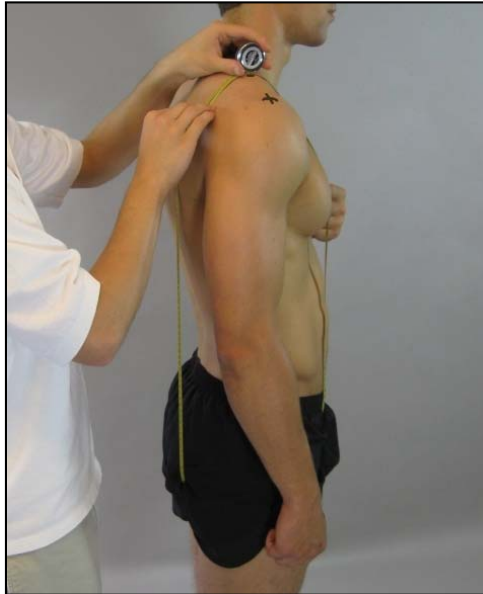
FEMALES		
CM		IN
85.22	MEAN	33.55
0.19	STD ERROR (MEAN)	0.07
3.74	STANDARD DEVIATION	1.47
0.13	STD ERROR (STD DEV)	0.05
77.80	MINIMUM	30.63
99.80	MAXIMUM	39.29
SKEWNESS		0.48
KURTOSIS		3.16
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
91.41	MEAN	35.99
0.14	STD ERROR (MEAN)	0.06
4.49	STANDARD DEVIATION	1.77
0.10	STD ERROR (STD DEV)	0.04
76.00	MINIMUM	29.92
110.60	MAXIMUM	43.54
SKEWNESS		0.04
KURTOSIS		3.47
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE										
FEMALES							MALES			
F	FPct	CumF	CumFPct	CM		F	FPct	CumF	CumFPct	
				75.55	-	76.55	1	0.10	1	0.10
				76.55	-	77.55	0	0.00	1	0.10
5	1.27	5	1.27	77.55	-	78.55	1	0.10	2	0.20
11	2.78	16	4.05	78.55	-	79.55	1	0.10	3	0.31
18	4.56	34	8.61	79.55	-	80.55	4	0.41	7	0.72
23	5.82	57	14.43	80.55	-	81.55	11	1.13	18	1.84
30	7.59	87	22.03	81.55	-	82.55	10	1.02	28	2.87
41	10.38	128	32.41	82.55	-	83.55	18	1.84	46	4.71
42	10.63	170	43.04	83.55	-	84.55	25	2.56	71	7.27
37	9.37	207	52.41	84.55	-	85.55	33	3.38	104	10.64
31	7.85	238	60.25	85.55	-	86.55	39	3.99	143	14.64
45	11.39	283	71.65	86.55	-	87.55	50	5.12	193	19.75
29	7.34	312	78.99	87.55	-	88.55	64	6.55	257	26.31
21	5.32	333	84.30	88.55	-	89.55	83	8.50	340	34.80
17	4.30	350	88.61	89.55	-	90.55	95	9.72	435	44.52
15	3.80	365	92.41	90.55	-	91.55	89	9.11	524	53.63
12	3.04	377	95.44	91.55	-	92.55	78	7.98	602	61.62
7	1.77	384	97.22	92.55	-	93.55	81	8.29	683	69.91
8	2.03	392	99.24	93.55	-	94.55	81	8.29	764	78.20
1	0.25	393	99.49	94.55	-	95.55	56	5.73	820	83.93
1	0.25	394	99.75	95.55	-	96.55	51	5.22	871	89.15
0	0.00	394	99.75	96.55	-	97.55	32	3.28	903	92.43
0	0.00	394	99.75	97.55	-	98.55	27	2.76	930	95.19
0	0.00	394	99.75	98.55	-	99.55	18	1.84	948	97.03
1	0.25	395	100.00	99.55	-	100.55	12	1.23	960	98.26
				100.55	-	101.55	5	0.51	965	98.77
				101.55	-	102.55	7	0.72	972	99.49
				102.55	-	103.55	0	0.00	972	99.49
				103.55	-	104.55	2	0.20	974	99.69
				104.55	-	105.55	1	0.10	975	99.80
				105.55	-	106.55	0	0.00	975	99.80
				106.55	-	107.55	0	0.00	975	99.80
				107.55	-	108.55	0	0.00	975	99.80
				108.55	-	109.55	1	0.10	976	99.90
				109.55	-	110.55	0	0.00	976	99.90
				110.55	-	111.55	1	0.10	977	100.00

(84) VERTICAL TRUNK CIRCUMFERENCE (USA)

The vertical circumference of the torso is measured with a tape passing over the buttock point posterior landmark, to the right of the genitalia, midway between the sternum and the anterior axillary fold and across the midshoulder landmark. The participant stands erect, looking straight ahead with the right arm hanging relaxed at the side. The heels are together with the weight distributed equally on both feet. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
142.10	55.94	1ST	149.90	59.02
144.40	56.85	2ND	151.30	59.57
144.90	57.05	3RD	152.80	60.16
146.80	57.80	5TH	154.40	60.79
148.20	58.35	10TH	157.60	62.05
150.10	59.09	15TH	159.40	62.76
151.30	59.57	20TH	160.70	63.27
151.60	59.69	25TH	162.20	63.86
152.60	60.08	30TH	163.30	64.29
153.90	60.59	35TH	164.40	64.72
154.70	60.91	40TH	165.50	65.16
155.70	61.30	45TH	166.50	65.55
157.00	61.81	50TH	167.20	65.83
157.80	62.13	55TH	168.10	66.18
158.60	62.44	60TH	169.60	66.77
159.50	62.80	65TH	170.50	67.13
160.90	63.35	70TH	171.40	67.48
162.00	63.78	75TH	172.80	68.03
163.50	64.37	80TH	174.10	68.54
164.40	64.72	85TH	175.80	69.21
167.10	65.79	90TH	178.50	70.28
169.30	66.65	95TH	180.30	70.98
172.50	67.91	97TH	183.40	72.20
173.40	68.27	98TH	184.30	72.56
178.60	70.31	99TH	188.40	74.17

(84) VERTICAL TRUNK CIRCUMFERENCE (USA)

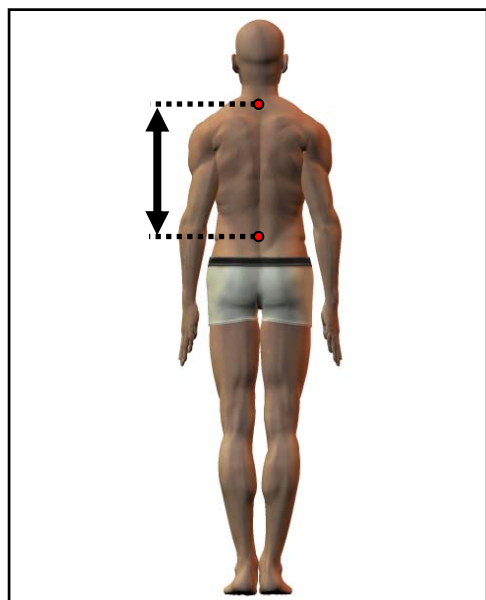
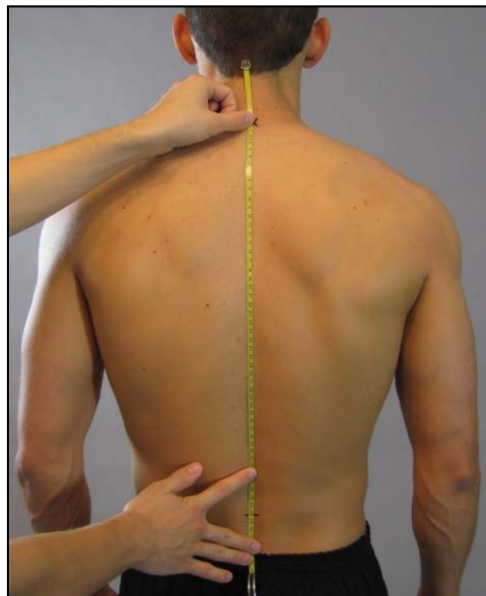
FEMALES		
<u>CM</u>		<u>IN</u>
157.29	MEAN	61.93
0.37	STD ERROR (MEAN)	0.15
7.33	STANDARD DEVIATION	2.89
0.26	STD ERROR (STD DEV)	0.10
140.00	MINIMUM	55.12
181.10	MAXIMUM	71.30
SKEWNESS		0.47
KURTOSIS		3.26
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
167.60	MEAN	65.98
0.26	STD ERROR (MEAN)	0.10
7.97	STANDARD DEVIATION	3.14
0.18	STD ERROR (STD DEV)	0.07
143.20	MINIMUM	56.38
191.80	MAXIMUM	75.51
SKEWNESS		0.16
KURTOSIS		3.03
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES								MALES			
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct		
3	0.76	3	0.76	139.75	-	141.25					
4	1.01	7	1.77	141.25	-	142.75					
6	1.52	13	3.29	142.75	-	144.25	1	0.10	1	0.10	
10	2.53	23	5.82	144.25	-	145.75	0	0.00	1	0.10	
14	3.54	37	9.37	145.75	-	147.25	4	0.41	5	0.51	
21	5.32	58	14.68	147.25	-	148.75	5	0.51	10	1.02	
21	5.32	79	20.00	148.75	-	150.25	11	1.13	21	2.15	
39	9.87	118	29.87	150.25	-	151.75	13	1.33	34	3.48	
26	6.58	144	36.46	151.75	-	153.25	19	1.94	53	5.42	
34	8.61	178	45.06	153.25	-	154.75	18	1.84	71	7.27	
34	8.61	212	53.67	154.75	-	156.25	25	2.56	96	9.83	
29	7.34	241	61.01	156.25	-	157.75	36	3.68	132	13.51	
34	8.61	275	69.62	157.75	-	159.25	44	4.50	176	18.01	
22	5.57	297	75.19	159.25	-	160.75	68	6.96	244	24.97	
23	5.82	320	81.01	160.75	-	162.25	65	6.65	309	31.63	
18	4.56	338	85.57	162.25	-	163.75	66	6.76	375	38.38	
15	3.80	353	89.37	163.75	-	165.25	75	7.68	450	46.06	
9	2.28	362	91.65	165.25	-	166.75	81	8.29	531	54.35	
7	1.77	369	93.42	166.75	-	168.25	82	8.39	613	62.74	
13	3.29	382	96.71	168.25	-	169.75	45	4.61	658	67.35	
3	0.76	385	97.47	169.75	-	171.25	66	6.76	724	74.10	
4	1.01	389	98.48	171.25	-	172.75	59	6.04	783	80.14	
2	0.51	391	98.99	172.75	-	174.25	54	5.53	837	85.67	
1	0.25	392	99.24	174.25	-	175.75	35	3.58	872	89.25	
0	0.00	392	99.24	175.75	-	177.25	26	2.66	898	91.91	
1	0.25	393	99.49	177.25	-	178.75	21	2.15	919	94.06	
0	0.00	393	99.49	178.75	-	180.25	22	2.25	941	96.32	
2	0.51	395	100.00	180.25	-	181.75	9	0.92	950	97.24	
				181.75	-	183.25	6	0.61	956	97.85	
				183.25	-	184.75	7	0.72	963	98.57	
				184.75	-	186.25	4	0.41	967	98.98	
				186.25	-	187.75	1	0.10	968	99.08	
				187.75	-	189.25	5	0.51	973	99.59	
				189.25	-	190.75	1	0.10	974	99.69	
				190.75	-	192.25	3	0.31	977	100.00	

(85) WAIST BACK LENGTH (OMPHALION)*

The surface distance between the cervicale landmark and the posterior omphalion landmark is measured with a tape. The participant stands erect with the head in the Frankfurt plane. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
37.70	14.84	1ST	42.80	16.85
37.80	14.88	2ND	43.50	17.13
38.30	15.08	3RD	44.00	17.32
39.10	15.39	5TH	44.60	17.56
40.00	15.75	10TH	45.50	17.91
40.50	15.94	15TH	46.10	18.15
41.00	16.14	20TH	46.60	18.35
41.30	16.26	25TH	47.00	18.50
41.70	16.42	30TH	47.40	18.66
41.90	16.50	35TH	47.70	18.78
42.20	16.61	40TH	48.00	18.90
42.50	16.73	45TH	48.20	18.98
42.90	16.89	50TH	48.60	19.13
43.10	16.97	55TH	48.90	19.25
43.40	17.09	60TH	49.30	19.41
43.80	17.24	65TH	49.70	19.57
44.10	17.36	70TH	50.00	19.69
44.70	17.60	75TH	50.30	19.80
45.10	17.76	80TH	50.70	19.96
45.50	17.91	85TH	51.40	20.24
46.00	18.11	90TH	52.10	20.51
47.00	18.50	95TH	53.00	20.87
47.50	18.70	97TH	53.40	21.02
48.60	19.13	98TH	53.60	21.10
49.50	19.49	99TH	54.40	21.42

* In ANSUR cervicale was defined as the highest point on the seventh cervical vertebra. For consistency with international standards, it is now the most prominent point on the seventh cervical vertebra.

(85) WAIST BACK LENGTH (OMPHALION)

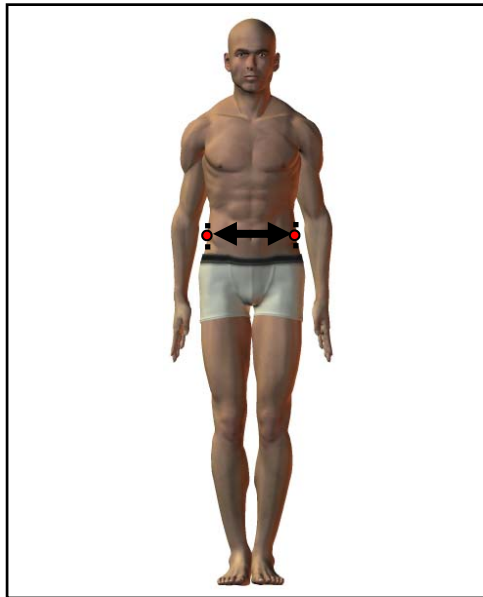
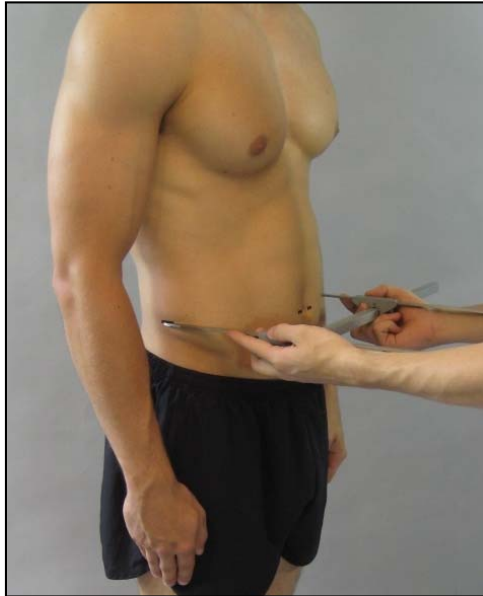
FEMALES		
<u>CM</u>		<u>IN</u>
42.94	MEAN	16.90
0.12	STD ERROR (MEAN)	0.05
2.46	STANDARD DEVIATION	0.97
0.09	STD ERROR (STD DEV)	0.03
35.30	MINIMUM	13.90
51.30	MAXIMUM	20.20
SKEWNESS		0.23
KURTOSIS		3.34
COEFFICIENT OF VARIATION		5.7%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
48.68	MEAN	19.17
0.08	STD ERROR (MEAN)	0.03
2.54	STANDARD DEVIATION	1.00
0.06	STD ERROR (STD DEV)	0.02
39.50	MINIMUM	15.55
57.20	MAXIMUM	22.52
SKEWNESS		0.04
KURTOSIS		3.34
COEFFICIENT OF VARIATION		5.2%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	35.25 - 35.75							
2	0.51	3	0.76	35.75 - 36.25							
1	0.25	4	1.01	36.25 - 36.75							
0	0.00	4	1.01	36.75 - 37.25							
2	0.51	6	1.52	37.25 - 37.75							
7	1.77	13	3.29	37.75 - 38.25							
8	2.03	21	5.32	38.25 - 38.75							
10	2.53	31	7.85	38.75 - 39.25							
15	3.80	46	11.65	39.25 - 39.75	2	0.20	2	0.20			
17	4.30	63	15.95	39.75 - 40.25	0	0.00	2	0.20			
23	5.82	86	21.77	40.25 - 40.75	0	0.00	2	0.20			
32	8.10	118	29.87	40.75 - 41.25	2	0.20	4	0.41			
27	6.84	145	36.71	41.25 - 41.75	3	0.31	7	0.72			
36	9.11	181	45.82	41.75 - 42.25	2	0.20	9	0.92			
24	6.08	205	51.90	42.25 - 42.75	4	0.41	13	1.33			
44	11.14	249	63.04	42.75 - 43.25	7	0.72	20	2.05			
23	5.82	272	68.86	43.25 - 43.75	15	1.54	35	3.58			
23	5.82	295	74.68	43.75 - 44.25	21	2.15	56	5.73			
16	4.05	311	78.73	44.25 - 44.75	19	1.94	75	7.68			
19	4.81	330	83.54	44.75 - 45.25	42	4.30	117	11.98			
22	5.57	352	89.11	45.25 - 45.75	43	4.40	160	16.38			
13	3.29	365	92.41	45.75 - 46.25	49	5.02	209	21.39			
11	2.78	376	95.19	46.25 - 46.75	59	6.04	268	27.43			
4	1.01	380	96.20	46.75 - 47.25	72	7.37	340	34.80			
3	0.76	383	96.96	47.25 - 47.75	76	7.78	416	42.58			
3	0.76	386	97.72	47.75 - 48.25	92	9.42	508	52.00			
5	1.27	391	98.99	48.25 - 48.75	73	7.47	581	59.47			
0	0.00	391	98.99	48.75 - 49.25	70	7.16	651	66.63			
1	0.25	392	99.24	49.25 - 49.75	66	6.76	717	73.39			
2	0.51	394	99.75	49.75 - 50.25	71	7.27	788	80.66			
0	0.00	394	99.75	50.25 - 50.75	49	5.02	837	85.67			
0	0.00	394	99.75	50.75 - 51.25	44	4.50	881	90.17			
1	0.25	395	100.00	51.25 - 51.75	21	2.15	902	92.32			
				51.75 - 52.25	25	2.56	927	94.88			
				52.25 - 52.75	10	1.02	937	95.91			
				52.75 - 53.25	15	1.54	952	97.44			
				53.25 - 53.75	13	1.33	965	98.77			
				53.75 - 54.25	4	0.41	969	99.18			
				54.25 - 54.75	2	0.20	971	99.39			
				54.75 - 55.25	3	0.31	974	99.69			
				55.25 - 55.75	0	0.00	974	99.69			
				55.75 - 56.25	2	0.20	976	99.90			
				56.25 - 56.75	0	0.00	976	99.90			
				56.75 - 57.25	1	0.10	977	100.00			

(86) WAIST BREADTH

The horizontal breadth of the waist at the level of omphalion is measured with a beam caliper. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
24.30	9.57	1ST	26.60	10.47
25.20	9.92	2ND	27.50	10.83
25.30	9.96	3RD	27.80	10.94
25.60	10.08	5TH	28.60	11.26
26.30	10.35	10TH	29.40	11.57
26.80	10.55	15TH	29.90	11.77
27.50	10.83	20TH	30.40	11.97
27.90	10.98	25TH	30.90	12.17
28.30	11.14	30TH	31.30	12.32
28.80	11.34	35TH	31.80	12.52
29.20	11.50	40TH	32.20	12.68
29.50	11.61	45TH	32.50	12.80
29.90	11.77	50TH	32.90	12.95
30.50	12.01	55TH	33.30	13.11
30.80	12.13	60TH	33.80	13.31
31.30	12.32	65TH	34.00	13.39
31.60	12.44	70TH	34.40	13.54
32.30	12.72	75TH	35.00	13.78
33.00	12.99	80TH	35.40	13.94
33.50	13.19	85TH	36.10	14.21
34.70	13.66	90TH	36.80	14.49
35.90	14.13	95TH	37.90	14.92
36.90	14.53	97TH	39.10	15.39
38.50	15.16	98TH	39.60	15.59
38.90	15.31	99TH	40.00	15.75

(86) WAIST BREADTH

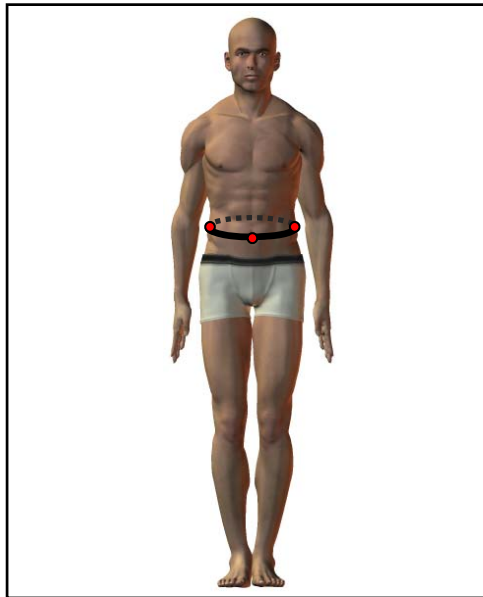
FEMALES		
<u>CM</u>		<u>IN</u>
30.26	MEAN	11.91
0.16	STD ERROR (MEAN)	0.06
3.19	STANDARD DEVIATION	1.26
0.11	STD ERROR (STD DEV)	0.04
23.50	MINIMUM	9.25
40.00	MAXIMUM	15.75
SKEWNESS		0.50
KURTOSIS		2.96
COEFFICIENT OF VARIATION		10.5%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
32.99	MEAN	12.99
0.09	STD ERROR (MEAN)	0.04
2.91	STANDARD DEVIATION	1.15
0.07	STD ERROR (STD DEV)	0.03
24.70	MINIMUM	9.72
41.60	MAXIMUM	16.38
SKEWNESS		0.18
KURTOSIS		2.84
COEFFICIENT OF VARIATION		8.8%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	23.25 - 23.75							
4	1.01	5	1.27	23.75 - 24.25							
5	1.27	10	2.53	24.25 - 24.75	1	0.10	1	0.10			
5	1.27	15	3.80	24.75 - 25.25	2	0.20	3	0.31			
16	4.05	31	7.85	25.25 - 25.75	3	0.31	6	0.61			
10	2.53	41	10.38	25.75 - 26.25	4	0.41	10	1.02			
23	5.82	64	16.20	26.25 - 26.75	7	0.72	17	1.74			
23	5.82	87	22.03	26.75 - 27.25	8	0.82	25	2.56			
15	3.80	102	25.82	27.25 - 27.75	23	2.35	48	4.91			
26	6.58	128	32.41	27.75 - 28.25	25	2.56	73	7.47			
23	5.82	151	38.23	28.25 - 28.75	20	2.05	93	9.52			
25	6.33	176	44.56	28.75 - 29.25	37	3.79	130	13.31			
26	6.58	202	51.14	29.25 - 29.75	58	5.94	188	19.24			
25	6.33	227	57.47	29.75 - 30.25	71	7.27	259	26.51			
24	6.08	251	63.54	30.25 - 30.75	44	4.50	303	31.01			
20	5.06	271	68.61	30.75 - 31.25	68	6.96	371	37.97			
19	4.81	290	73.42	31.25 - 31.75	58	5.94	429	43.91			
16	4.05	306	77.47	31.75 - 32.25	79	8.09	508	52.00			
17	4.30	323	81.77	32.25 - 32.75	62	6.35	570	58.34			
13	3.29	336	85.06	32.75 - 33.25	52	5.32	622	63.66			
18	4.56	354	89.62	33.25 - 33.75	51	5.22	673	68.88			
6	1.52	360	91.14	33.75 - 34.25	60	6.14	733	75.03			
4	1.01	364	92.15	34.25 - 34.75	47	4.81	780	79.84			
8	2.03	372	94.18	34.75 - 35.25	50	5.12	830	84.95			
5	1.27	377	95.44	35.25 - 35.75	30	3.07	860	88.02			
4	1.01	381	96.46	35.75 - 36.25	25	2.56	885	90.58			
2	0.51	383	96.96	36.25 - 36.75	24	2.46	909	93.04			
2	0.51	385	97.47	36.75 - 37.25	21	2.15	930	95.19			
1	0.25	386	97.72	37.25 - 37.75	19	1.94	949	97.13			
2	0.51	388	98.23	37.75 - 38.25	6	0.61	955	97.75			
3	0.76	391	98.99	38.25 - 38.75	7	0.72	962	98.46			
2	0.51	393	99.49	38.75 - 39.25	4	0.41	966	98.87			
1	0.25	394	99.75	39.25 - 39.75	2	0.20	968	99.08			
1	0.25	395	100.00	39.75 - 40.25	5	0.51	973	99.59			
				40.25 - 40.75	1	0.10	974	99.69			
				40.75 - 41.25	2	0.20	976	99.90			
				41.25 - 41.75	1	0.10	977	100.00			

(87) WAIST CIRCUMFERENCE (OMPHALION)

The horizontal circumference of the waist, passing over all omphalion landmarks, is measured with a tape. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
67.20	26.46	1ST	77.00	30.31
68.90	27.13	2ND	78.40	30.87
69.80	27.48	3RD	80.20	31.57
70.50	27.76	5TH	81.60	32.13
73.30	28.86	10TH	84.40	33.23
75.00	29.53	15TH	86.00	33.86
76.50	30.12	20TH	87.90	34.61
78.40	30.87	25TH	89.50	35.24
80.00	31.50	30TH	91.30	35.94
81.10	31.93	35TH	92.50	36.42
82.10	32.32	40TH	93.60	36.85
83.00	32.68	45TH	94.90	37.36
84.10	33.11	50TH	96.10	37.83
85.30	33.58	55TH	97.10	38.23
87.40	34.41	60TH	98.50	38.78
88.60	34.88	65TH	99.40	39.13
90.40	35.59	70TH	100.90	39.72
91.50	36.02	75TH	102.90	40.51
93.30	36.73	80TH	104.60	41.18
96.40	37.95	85TH	106.50	41.93
100.00	39.37	90TH	108.60	42.76
103.10	40.59	95TH	112.80	44.41
106.80	42.05	97TH	116.10	45.71
108.00	42.52	98TH	118.10	46.50
109.20	42.99	99TH	120.60	47.48

(87) WAIST CIRCUMFERENCE (OMPHALION)

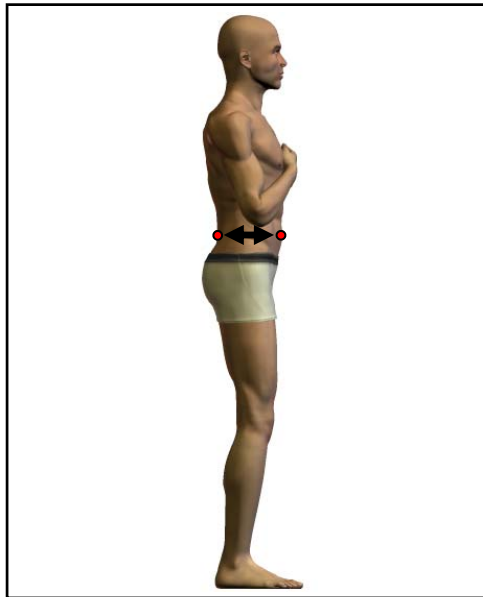
FEMALES		
<u>CM</u>		<u>IN</u>
85.50	MEAN	33.66
0.49	STD ERROR (MEAN)	0.19
9.78	STANDARD DEVIATION	3.85
0.35	STD ERROR (STD DEV)	0.14
66.00	MINIMUM	25.98
118.20	MAXIMUM	46.54
SKEWNESS		0.44
KURTOSIS		2.75
COEFFICIENT OF VARIATION		11.4%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
96.44	MEAN	37.97
0.31	STD ERROR (MEAN)	0.12
9.56	STANDARD DEVIATION	3.76
0.22	STD ERROR (STD DEV)	0.09
70.00	MINIMUM	27.56
126.40	MAXIMUM	49.76
SKEWNESS		0.28
KURTOSIS		2.93
COEFFICIENT OF VARIATION		9.9%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCY TABLE				MALES			
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct		
1	0.25	1	0.25	65.25	-	66.75					
5	1.27	6	1.52	66.75	-	68.25					
4	1.01	10	2.53	68.25	-	69.75					
10	2.53	20	5.06	69.75	-	71.25					
13	3.29	33	8.35	71.25	-	72.75	2	0.20	0.20		
17	4.30	50	12.66	72.75	-	74.25	3	0.31	0.51		
27	6.84	77	19.49	74.25	-	75.75	7	0.72	1.23		
10	2.53	87	22.03	75.75	-	77.25	12	1.23	2.46		
26	6.58	113	28.61	77.25	-	78.75	18	1.84	4.30		
23	5.82	136	34.43	78.75	-	80.25	13	1.33	5.63		
27	6.84	163	41.27	80.25	-	81.75	35	3.58	9.21		
31	7.85	194	49.11	81.75	-	83.25	28	2.87	118	12.08	
20	5.06	214	54.18	83.25	-	84.75	54	5.53	172	17.60	
20	5.06	234	59.24	84.75	-	86.25	55	5.63	227	23.23	
21	5.32	255	64.56	86.25	-	87.75	53	5.42	280	28.66	
17	4.30	272	68.86	87.75	-	89.25	61	6.24	341	34.90	
21	5.32	293	74.18	89.25	-	90.75	57	5.83	398	40.74	
14	3.54	307	77.72	90.75	-	92.25	57	5.83	455	46.57	
16	4.05	323	81.77	92.25	-	93.75	59	6.04	514	52.61	
12	3.04	335	84.81	93.75	-	95.25	61	6.24	575	58.85	
10	2.53	345	87.34	95.25	-	96.75	56	5.73	631	64.59	
10	2.53	355	89.87	96.75	-	98.25	56	5.73	687	70.32	
6	1.52	361	91.39	98.25	-	99.75	54	5.53	741	75.84	
10	2.53	371	93.92	99.75	-	101.25	37	3.79	778	79.63	
6	1.52	377	95.44	101.25	-	102.75	31	3.17	809	82.80	
5	1.27	382	96.71	102.75	-	104.25	35	3.58	844	86.39	
1	0.25	383	96.96	104.25	-	105.75	30	3.07	874	89.46	
2	0.51	385	97.47	105.75	-	107.25	22	2.25	896	91.71	
4	1.01	389	98.48	107.25	-	108.75	28	2.87	924	94.58	
1	0.25	390	98.73	108.75	-	110.25	15	1.54	939	96.11	
1	0.25	391	98.99	110.25	-	111.75	9	0.92	948	97.03	
1	0.25	392	99.24	111.75	-	113.25	7	0.72	955	97.75	
1	0.25	393	99.49	113.25	-	114.75	6	0.61	961	98.36	
1	0.25	394	99.75	114.75	-	116.25	4	0.41	965	98.77	
0	0.00	394	99.75	116.25	-	117.75	3	0.31	968	99.08	
1	0.25	395	100.00	117.75	-	119.25	3	0.31	971	99.39	
				119.25	-	120.75	2	0.20	973	99.59	
				120.75	-	122.25	0	0.00	973	99.59	
				122.25	-	123.75	2	0.20	975	99.80	
				123.75	-	125.25	1	0.10	976	99.90	
				125.25	-	126.75	1	0.10	977	100.00	

(88) WAIST DEPTH

The horizontal distance between the anterior and posterior omphalion landmarks is measured with a beam caliper. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
15.00	5.91	1ST	18.20	7.17
15.50	6.10	2ND	18.70	7.36
15.60	6.14	3RD	19.10	7.52
16.20	6.38	5TH	19.40	7.64
16.90	6.65	10TH	20.30	7.99
17.50	6.89	15TH	20.80	8.19
17.90	7.05	20TH	21.20	8.35
18.30	7.20	25TH	21.60	8.50
18.70	7.36	30TH	21.90	8.62
19.00	7.48	35TH	22.40	8.82
19.20	7.56	40TH	22.90	9.02
19.90	7.83	45TH	23.30	9.17
20.20	7.95	50TH	23.60	9.29
20.40	8.03	55TH	23.90	9.41
20.90	8.23	60TH	24.30	9.57
21.30	8.39	65TH	24.70	9.72
21.50	8.46	70TH	25.30	9.96
22.10	8.70	75TH	25.70	10.12
22.70	8.94	80TH	26.40	10.39
23.40	9.21	85TH	27.00	10.63
24.30	9.57	90TH	27.80	10.94
25.90	10.20	95TH	29.00	11.42
27.00	10.63	97TH	30.20	11.89
27.30	10.75	98TH	32.20	12.68
27.90	10.98	99TH	32.30	12.72

(88) WAIST DEPTH

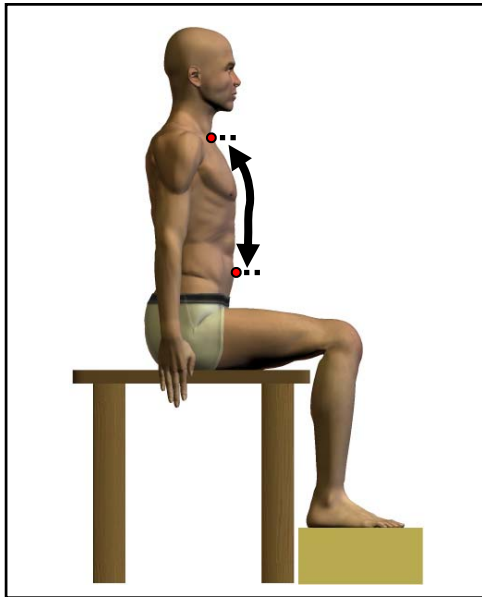
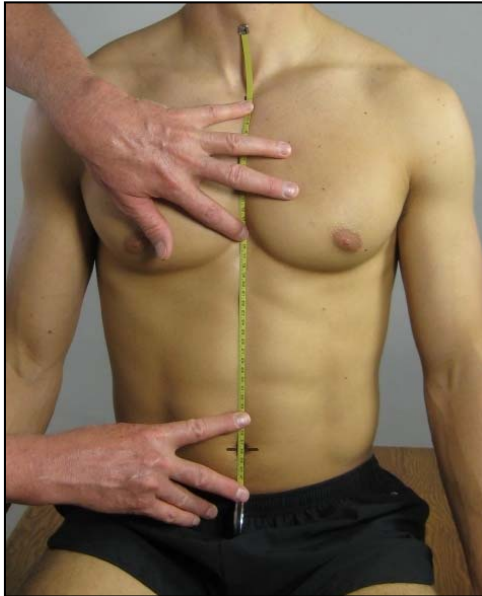
FEMALES		
CM		IN
20.40	MEAN	8.03
0.15	STD ERROR (MEAN)	0.06
2.91	STANDARD DEVIATION	1.15
0.10	STD ERROR (STD DEV)	0.04
14.50	MINIMUM	5.71
33.40	MAXIMUM	13.15
SKEWNESS		0.54
KURTOSIS		3.01
COEFFICIENT OF VARIATION		14.3%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
23.85	MEAN	9.39
0.10	STD ERROR (MEAN)	0.04
3.02	STANDARD DEVIATION	1.19
0.07	STD ERROR (STD DEV)	0.03
16.30	MINIMUM	6.42
33.80	MAXIMUM	13.31
SKEWNESS		0.53
KURTOSIS		3.25
COEFFICIENT OF VARIATION		12.7%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	CM	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	14.25 - 14.75							
2	0.51	3	0.76	14.75 - 15.25							
6	1.52	9	2.28	15.25 - 15.75							
7	1.77	16	4.05	15.75 - 16.25							
10	2.53	26	6.58	16.25 - 16.75	2	0.20	2	0.20			
17	4.30	43	10.89	16.75 - 17.25	5	0.51	7	0.72			
24	6.08	67	16.96	17.25 - 17.75	6	0.61	13	1.33			
22	5.57	89	22.53	17.75 - 18.25	9	0.92	22	2.25			
29	7.34	118	29.87	18.25 - 18.75	14	1.43	36	3.68			
34	8.61	152	38.48	18.75 - 19.25	32	3.28	68	6.96			
20	5.06	172	43.54	19.25 - 19.75	45	4.61	113	11.57			
36	9.11	208	52.66	19.75 - 20.25	46	4.71	159	16.27			
22	5.57	230	58.23	20.25 - 20.75	59	6.04	218	22.31			
20	5.06	250	63.29	20.75 - 21.25	75	7.68	293	29.99			
27	6.84	277	70.13	21.25 - 21.75	89	9.11	382	39.10			
19	4.81	296	74.94	21.75 - 22.25	78	7.98	460	47.08			
17	4.30	313	79.24	22.25 - 22.75	61	6.24	521	53.33			
7	1.77	320	81.01	22.75 - 23.25	51	5.22	572	58.55			
17	4.30	337	85.32	23.25 - 23.75	72	7.37	644	65.92			
12	3.04	349	88.35	23.75 - 24.25	63	6.45	707	72.36			
8	2.03	357	90.38	24.25 - 24.75	46	4.71	753	77.07			
4	1.01	361	91.39	24.75 - 25.25	29	2.97	782	80.04			
10	2.53	371	93.92	25.25 - 25.75	43	4.40	825	84.44			
3	0.76	374	94.68	25.75 - 26.25	27	2.76	852	87.21			
5	1.27	379	95.95	26.25 - 26.75	34	3.48	886	90.69			
6	1.52	385	97.47	26.75 - 27.25	18	1.84	904	92.53			
5	1.27	390	98.73	27.25 - 27.75	22	2.25	926	94.78			
1	0.25	391	98.99	27.75 - 28.25	16	1.64	942	96.42			
0	0.00	391	98.99	28.25 - 28.75	8	0.82	950	97.24			
2	0.51	393	99.49	28.75 - 29.25	11	1.13	961	98.36			
0	0.00	393	99.49	29.25 - 29.75	1	0.10	962	98.46			
0	0.00	393	99.49	29.75 - 30.25	3	0.31	965	98.77			
1	0.25	394	99.75	30.25 - 30.75	2	0.20	967	98.98			
0	0.00	394	99.75	30.75 - 31.25	3	0.31	970	99.28			
0	0.00	394	99.75	31.25 - 31.75	0	0.00	970	99.28			
0	0.00	394	99.75	31.75 - 32.25	2	0.20	972	99.49			
0	0.00	394	99.75	32.25 - 32.75	3	0.31	975	99.80			
0	0.00	394	99.75	32.75 - 33.25	1	0.10	976	99.90			
1	0.25	395	100.00	33.25 - 33.75	0	0.00	976	99.90			
				33.75 - 34.25	1	0.10	977	100.00			

(89) WAIST FRONT LENGTH, SITTING

The surface distance between the suprasternale landmark and the anterior omphalion landmark is measured with a tape. The participant is in the anthropometric sitting position with the head in the Frankfurt plane and the arms relaxed at the sides. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
31.00	12.20	1ST	33.10	13.03
31.50	12.40	2ND	33.80	13.31
31.70	12.48	3RD	34.20	13.46
31.80	12.52	5TH	34.70	13.66
32.50	12.80	10TH	35.50	13.98
33.20	13.07	15TH	36.20	14.25
33.70	13.27	20TH	36.50	14.37
34.00	13.39	25TH	36.90	14.53
34.40	13.54	30TH	37.40	14.72
34.90	13.74	35TH	37.70	14.84
35.30	13.90	40TH	38.10	15.00
35.60	14.02	45TH	38.50	15.16
35.80	14.09	50TH	38.80	15.28
36.20	14.25	55TH	39.20	15.43
36.40	14.33	60TH	39.50	15.55
36.60	14.41	65TH	39.70	15.63
36.80	14.49	70TH	40.30	15.87
37.00	14.57	75TH	40.70	16.02
37.50	14.76	80TH	41.20	16.22
38.30	15.08	85TH	41.50	16.34
38.80	15.28	90TH	42.10	16.57
39.70	15.63	95TH	43.40	17.09
39.90	15.71	97TH	44.00	17.32
40.10	15.79	98TH	44.60	17.56
41.00	16.14	99TH	44.90	17.68

(89) WAIST FRONT LENGTH, SITTING

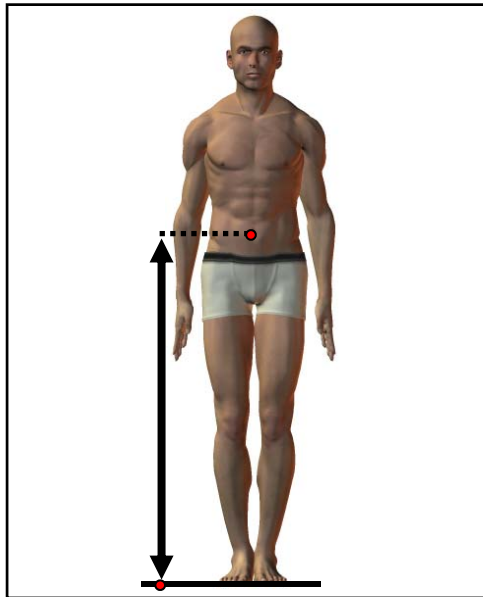
FEMALES		
CM		IN
35.76	MEAN	14.08
0.12	STD ERROR (MEAN)	0.05
2.32	STANDARD DEVIATION	0.91
0.08	STD ERROR (STD DEV)	0.03
29.10	MINIMUM	11.46
42.60	MAXIMUM	16.77
SKEWNESS		0.01
KURTOSIS		2.84
COEFFICIENT OF VARIATION		6.5%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
38.85	MEAN	15.29
0.08	STD ERROR (MEAN)	0.03
2.63	STANDARD DEVIATION	1.04
0.06	STD ERROR (STD DEV)	0.02
31.00	MINIMUM	12.20
47.80	MAXIMUM	18.82
SKEWNESS		0.17
KURTOSIS		2.97
COEFFICIENT OF VARIATION		6.8%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	CM	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	28.75	-	29.25					
0	0.00	1	0.25	29.25	-	29.75					
3	0.76	4	1.01	29.75	-	30.25					
0	0.00	4	1.01	30.25	-	30.75					
5	1.27	9	2.28	30.75	-	31.25	1	0.10			
10	2.53	19	4.81	31.25	-	31.75	1	0.10			
13	3.29	32	8.10	31.75	-	32.25	3	0.31			
18	4.56	50	12.66	32.25	-	32.75	6	0.61			
18	4.56	68	17.22	32.75	-	33.25	8	0.82			
24	6.08	92	23.29	33.25	-	33.75	11	1.13			
27	6.84	119	30.13	33.75	-	34.25	16	1.64			
26	6.58	145	36.71	34.25	-	34.75	26	2.66			
26	6.58	171	43.29	34.75	-	35.25	31	3.17			
37	9.37	208	52.66	35.25	-	35.75	48	4.91			
29	7.34	237	60.00	35.75	-	36.25	55	5.63			
47	11.90	284	71.90	36.25	-	36.75	74	7.57			
30	7.59	314	79.49	36.75	-	37.25	60	6.14			
23	5.82	337	85.32	37.25	-	37.75	82	8.39			
9	2.28	346	87.59	37.75	-	38.25	59	6.04			
13	3.29	359	90.89	38.25	-	38.75	83	8.50			
9	2.28	368	93.16	38.75	-	39.25	64	6.55			
11	2.78	379	95.95	39.25	-	39.75	68	6.96			
8	2.03	387	97.97	39.75	-	40.25	47	4.81			
3	0.76	390	98.73	40.25	-	40.75	55	5.63			
2	0.51	392	99.24	40.75	-	41.25	54	5.53			
2	0.51	394	99.75	41.25	-	41.75	34	3.48			
0	0.00	394	99.75	41.75	-	42.25	27	2.76			
1	0.25	395	100.00	42.25	-	42.75	18	1.84			
				42.75	-	43.25	11	1.13			
				43.25	-	43.75	14	1.43			
				43.75	-	44.25	9	0.92			
				44.25	-	44.75	6	0.61			
				44.75	-	45.25	2	0.20			
				45.25	-	45.75	1	0.10			
				45.75	-	46.25	1	0.10			
				46.25	-	46.75	0	0.00			
				46.75	-	47.25	1	0.10			
				47.25	-	47.75	0	0.00			
				47.75	-	48.25	1	0.10			

(90) WAIST HEIGHT (OMPHALION)

The vertical distance between a standing surface and the anterior omphalion landmark is measured with an anthropometer. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
91.20	35.91	1ST	95.20	37.48
91.70	36.10	2ND	96.90	38.15
92.40	36.38	3RD	97.30	38.31
93.10	36.65	5TH	99.20	39.06
94.30	37.13	10TH	100.80	39.69
95.00	37.40	15TH	102.00	40.16
95.70	37.68	20TH	102.90	40.51
96.20	37.87	25TH	103.80	40.87
96.90	38.15	30TH	104.40	41.10
97.20	38.27	35TH	104.90	41.30
97.60	38.43	40TH	105.70	41.61
98.30	38.70	45TH	106.30	41.85
99.20	39.06	50TH	106.90	42.09
100.00	39.37	55TH	107.30	42.24
100.60	39.61	60TH	107.80	42.44
101.10	39.80	65TH	108.40	42.68
101.60	40.00	70TH	109.40	43.07
102.10	40.20	75TH	110.30	43.43
103.10	40.59	80TH	111.00	43.70
104.10	40.98	85TH	112.00	44.09
105.20	41.42	90TH	113.40	44.65
107.20	42.20	95TH	115.10	45.31
107.80	42.44	97TH	115.90	45.63
108.90	42.87	98TH	116.70	45.94
109.50	43.11	99TH	118.00	46.46

(90) WAIST HEIGHT (OMPHALION)

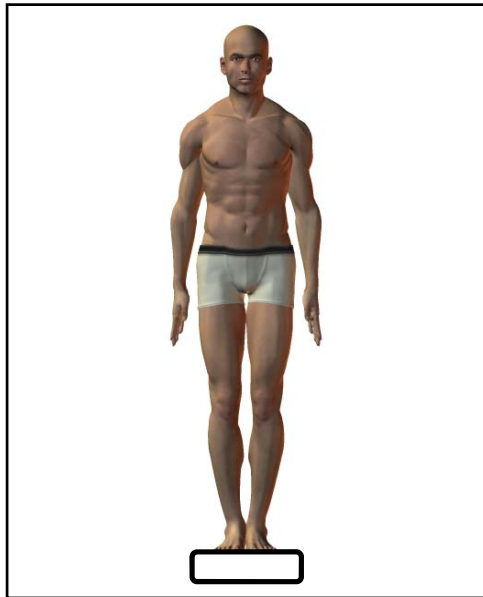
FEMALES		
CM		IN
99.47	MEAN	39.16
0.21	STD ERROR (MEAN)	0.08
4.24	STANDARD DEVIATION	1.67
0.15	STD ERROR (STD DEV)	0.06
90.00	MINIMUM	35.43
111.30	MAXIMUM	43.82
SKEWNESS		0.34
KURTOSIS		2.64
COEFFICIENT OF VARIATION		4.3%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
106.90	MEAN	42.09
0.16	STD ERROR (MEAN)	0.06
4.89	STANDARD DEVIATION	1.92
0.11	STD ERROR (STD DEV)	0.04
92.20	MINIMUM	36.30
125.80	MAXIMUM	49.53
SKEWNESS		0.04
KURTOSIS		3.25
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	CM	F	FPct	CumF	CumFPct			
				89.55	-						
1	0.25	1	0.25	90.55	-						
5	1.27	6	1.52	91.55	-						
7	1.77	13	3.29	92.55	-	2	0.20	2	0.20		
11	2.78	24	6.08	93.55	-	2	0.20	4	0.41		
23	5.82	47	11.90	94.55	-	3	0.31	7	0.72		
27	6.84	74	18.73	95.55	-	3	0.31	10	1.02		
39	9.87	113	28.61	96.55	-	3	0.31	13	1.33		
40	10.13	153	38.73	97.55	-	10	1.02	23	2.35		
31	7.85	184	46.58	98.55	-	9	0.92	32	3.28		
17	4.30	201	50.89	99.55	-	21	2.15	53	5.42		
32	8.10	233	58.99	100.55	-	26	2.66	79	8.09		
40	10.13	273	69.11	101.55	-	38	3.89	117	11.98		
30	7.59	303	76.71	102.55	-	39	3.99	156	15.97		
23	5.82	326	82.53	103.55	-	57	5.83	213	21.80		
17	4.30	343	86.84	104.55	-	76	7.78	289	29.58		
9	2.28	352	89.11	105.55	-	62	6.35	351	35.93		
12	3.04	364	92.15	106.55	-	79	8.09	430	44.01		
14	3.54	378	95.70	107.55	-	101	10.34	531	54.35		
7	1.77	385	97.47	108.55	-	85	8.70	616	63.05		
6	1.52	391	98.99	109.55	-	52	5.32	668	68.37		
2	0.51	393	99.49	109.55	-	73	7.47	741	75.84		
2	0.51	395	100.00	110.55	-	55	5.63	796	81.47		
				111.55	-	50	5.12	846	86.59		
				112.55	-	37	3.79	883	90.38		
				113.55	-	32	3.28	915	93.65		
				114.55	-	28	2.87	943	96.52		
				115.55	-	11	1.13	954	97.65		
				116.55	-	9	0.92	963	98.57		
				117.55	-	7	0.72	970	99.28		
				118.55	-	2	0.20	972	99.49		
				119.55	-	1	0.10	973	99.59		
				120.55	-	1	0.10	974	99.69		
				121.55	-	1	0.10	975	99.80		
				122.55	-	1	0.10	976	99.90		
				123.55	-	0	0.00	976	99.90		
				124.55	-	0	0.00	976	99.90		
				125.55	-	1	0.10	977	100.00		

(91) WEIGHT

The weight of the participant is taken to the nearest tenth of a kilogram. The participant stands on the platform of a scale with the weight distributed evenly on both feet.



PERCENTILES				
FEMALES			MALES	
<u>KG</u>	<u>PLB</u>		<u>KG</u>	<u>PLB</u>
50.00	110.23	1ST	63.60	140.21
50.80	111.99	2ND	65.00	143.30
51.00	112.43	3RD	66.10	145.72
52.40	115.52	5TH	69.10	152.34
56.10	123.68	10TH	73.20	161.38
57.70	127.21	15TH	75.40	166.23
58.90	129.85	20TH	77.10	169.97
59.90	132.06	25TH	79.40	175.05
62.00	136.69	30TH	81.10	178.79
63.10	139.11	35TH	82.40	181.66
64.10	141.31	40TH	83.90	184.97
65.30	143.96	45TH	85.80	189.15
66.60	146.83	50TH	87.20	192.24
67.60	149.03	55TH	88.90	195.99
69.70	153.66	60TH	90.90	200.40
71.20	156.97	65TH	91.70	202.16
73.00	160.94	70TH	93.80	206.79
74.00	163.14	75TH	96.20	212.08
76.30	168.21	80TH	98.80	217.81
78.30	172.62	85TH	101.90	224.65
79.80	175.93	90TH	105.00	231.48
84.20	185.63	95TH	110.70	244.05
88.90	195.99	97TH	112.90	248.90
93.10	205.25	98TH	116.10	255.95
99.80	220.02	99TH	122.10	269.18

(91) WEIGHT

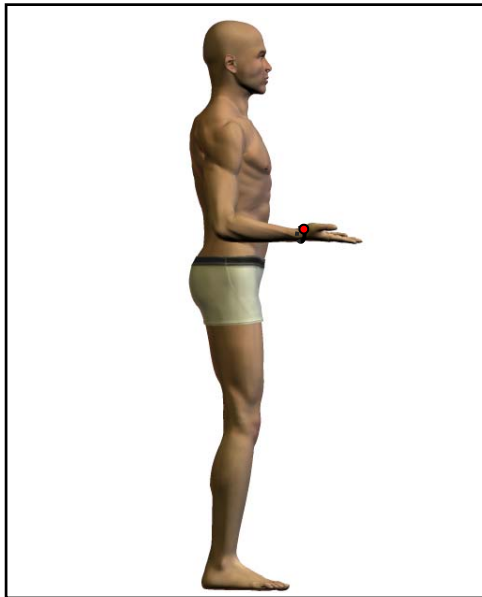
FEMALES		
<u>KG</u>		<u>PLB</u>
67.83	MEAN	149.53
0.52	STD ERROR (MEAN)	1.14
10.24	STANDARD DEVIATION	22.58
0.36	STD ERROR (STD DEV)	0.80
46.50	MINIMUM	102.51
108.20	MAXIMUM	238.54
SKEWNESS		0.76
KURTOSIS		4.24
COEFFICIENT OF VARIATION		15.1%
NUMBER OF PARTICIPANTS		395

MALES		
<u>KG</u>		<u>PLB</u>
88.22	MEAN	194.50
0.40	STD ERROR (MEAN)	0.89
12.61	STANDARD DEVIATION	27.81
0.29	STD ERROR (STD DEV)	0.63
51.80	MINIMUM	114.20
139.40	MAXIMUM	307.32
SKEWNESS		0.44
KURTOSIS		3.24
COEFFICIENT OF VARIATION		14.3%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>KG</u>	F	FPct	CumF	CumFPct			
1	0.25	1	0.25	44.55 - 46.55							
1	0.25	2	0.51	46.55 - 48.55							
3	0.76	5	1.27	48.55 - 50.55							
11	2.78	16	4.05	50.55 - 52.55	1	0.10	1	0.10			
10	2.53	26	6.58	52.55 - 54.55	0	0.00	1	0.10			
13	3.29	39	9.87	54.55 - 56.55	0	0.00	1	0.10			
28	7.09	67	16.96	56.55 - 58.55	1	0.10	2	0.20			
32	8.10	99	25.06	58.55 - 60.55	7	0.72	9	0.92			
33	8.35	132	33.42	60.55 - 62.55	4	0.41	13	1.33			
36	9.11	168	42.53	62.55 - 64.55	9	0.92	22	2.25			
30	7.59	198	50.13	64.55 - 66.55	22	2.25	44	4.50			
32	8.10	230	58.23	66.55 - 68.55	20	2.05	64	6.55			
22	5.57	252	63.80	68.55 - 70.55	22	2.25	86	8.80			
25	6.33	277	70.13	70.55 - 72.55	34	3.48	120	12.28			
25	6.33	302	76.46	72.55 - 74.55	40	4.09	160	16.38			
19	4.81	321	81.27	74.55 - 76.55	64	6.55	224	22.93			
24	6.08	345	87.34	76.55 - 78.55	57	5.83	281	28.76			
11	2.78	356	90.13	78.55 - 80.55	62	6.35	343	35.11			
9	2.28	365	92.41	80.55 - 82.55	70	7.16	413	42.27			
8	2.03	373	94.43	82.55 - 84.55	62	6.35	475	48.62			
4	1.01	377	95.44	84.55 - 86.55	61	6.24	536	54.86			
3	0.76	380	96.20	86.55 - 88.55	63	6.45	599	61.31			
4	1.01	384	97.22	88.55 - 90.55	54	5.53	653	66.84			
0	0.00	384	97.22	90.55 - 92.55	58	5.94	711	72.77			
5	1.27	389	98.48	92.55 - 94.55	40	4.09	751	76.87			
0	0.00	389	98.48	94.55 - 96.55	40	4.09	791	80.96			
0	0.00	389	98.48	96.55 - 98.55	35	3.58	826	84.54			
3	0.76	392	99.24	98.55 - 100.55	28	2.87	854	87.41			
0	0.00	392	99.24	100.55 - 102.55	30	3.07	884	90.48			
0	0.00	392	99.24	102.55 - 104.55	23	2.35	907	92.84			
1	0.25	393	99.49	104.55 - 106.55	12	1.23	919	94.06			
2	0.51	395	100.00	106.55 - 108.55	16	1.64	935	95.70			
				108.55 - 110.55	7	0.72	942	96.42			
				110.55 - 112.55	8	0.82	950	97.24			
				112.55 - 114.55	8	0.82	958	98.06			
				114.55 - 116.55	5	0.51	963	98.57			
				116.55 - 118.55	3	0.31	966	98.87			
				118.55 - 120.55	2	0.20	968	99.08			
				120.55 - 122.55	3	0.31	971	99.39			
				122.55 - 124.55	1	0.10	972	99.49			
				124.55 - 126.55	1	0.10	973	99.59			
				126.55 - 128.55	1	0.10	974	99.69			
				128.55 - 130.55	0	0.00	974	99.69			
				130.55 - 132.55	2	0.20	976	99.90			
				132.55 - 134.55	0	0.00	976	99.90			
				134.55 - 136.55	0	0.00	976	99.90			
				136.55 - 138.55	0	0.00	976	99.90			
				138.55 - 140.55	1	0.10	977	100.00			

(92) WRIST CIRCUMFERENCE

The circumference of the wrist, perpendicular to the long axis of the forearm, is measured with a tape passing over the stylium landmark. The participant extends the right arm forward with the palm up.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
14.00	5.51	1ST	16.00	6.30
14.10	5.55	2ND	16.20	6.38
14.20	5.59	3RD	16.30	6.42
14.20	5.59	5TH	16.40	6.46
14.50	5.71	10TH	16.70	6.57
14.70	5.79	15TH	16.90	6.65
14.80	5.83	20TH	17.00	6.69
15.00	5.91	25TH	17.10	6.73
15.00	5.91	30TH	17.20	6.77
15.20	5.98	35TH	17.40	6.85
15.30	6.02	40TH	17.50	6.89
15.40	6.06	45TH	17.50	6.89
15.40	6.06	50TH	17.70	6.97
15.50	6.10	55TH	17.80	7.01
15.60	6.14	60TH	17.90	7.05
15.70	6.18	65TH	18.00	7.09
15.80	6.22	70TH	18.10	7.13
15.90	6.26	75TH	18.30	7.20
16.10	6.34	80TH	18.50	7.28
16.30	6.42	85TH	18.70	7.36
16.50	6.50	90TH	18.90	7.44
16.70	6.57	95TH	19.30	7.60
16.90	6.65	97TH	19.50	7.68
17.10	6.73	98TH	19.60	7.72
17.20	6.77	99TH	19.60	7.72

(92) WRIST CIRCUMFERENCE

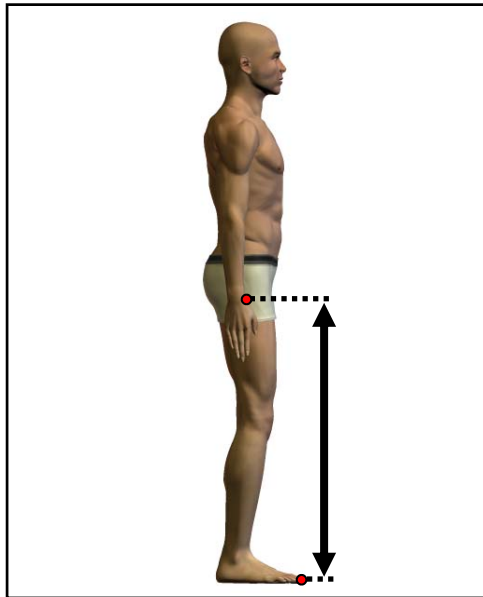
FEMALES		
<u>CM</u>		<u>IN</u>
15.46	MEAN	6.08
0.04	STD ERROR (MEAN)	0.01
0.75	STANDARD DEVIATION	0.30
0.03	STD ERROR (STD DEV)	0.01
13.80	MINIMUM	5.43
18.20	MAXIMUM	7.17
SKEWNESS		0.36
KURTOSIS		3.15
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
17.74	MEAN	6.98
0.03	STD ERROR (MEAN)	0.01
0.86	STANDARD DEVIATION	0.34
0.02	STD ERROR (STD DEV)	0.01
15.30	MINIMUM	6.02
20.60	MAXIMUM	8.11
SKEWNESS		0.30
KURTOSIS		2.71
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES						MALES					
F	FPct	CumF	CumFPct	<u>CM</u>		F	FPct	CumF	CumFPct		
1	0.25	1	0.25	13.75	-	13.95					
8	2.03	9	2.28	13.95	-	14.15					
17	4.30	26	6.58	14.15	-	14.35					
20	5.06	46	11.65	14.35	-	14.55					
23	5.82	69	17.47	14.55	-	14.75					
26	6.58	95	24.05	14.75	-	14.95					
49	12.41	144	36.46	14.95	-	15.15					
50	12.66	194	49.11	15.15	-	15.35	2	0.20	2	0.20	
51	12.91	245	62.03	15.35	-	15.55	1	0.10	3	0.31	
39	9.87	284	71.90	15.55	-	15.75	1	0.10	4	0.41	
30	7.59	314	79.49	15.75	-	15.95	8	0.82	12	1.23	
17	4.30	331	83.80	15.95	-	16.15	13	1.33	25	2.56	
18	4.56	349	88.35	16.15	-	16.35	17	1.74	42	4.30	
17	4.30	366	92.66	16.35	-	16.55	39	3.99	81	8.29	
11	2.78	377	95.44	16.55	-	16.75	59	6.04	140	14.33	
7	1.77	384	97.22	16.75	-	16.95	58	5.94	198	20.27	
3	0.76	387	97.97	16.95	-	17.15	93	9.52	291	29.79	
3	0.76	390	98.73	17.15	-	17.35	86	8.80	377	38.59	
0	0.00	390	98.73	17.35	-	17.55	113	11.57	490	50.15	
3	0.76	393	99.49	17.55	-	17.75	90	9.21	580	59.37	
1	0.25	394	99.75	17.75	-	17.95	77	7.88	657	67.25	
0	0.00	394	99.75	17.95	-	18.15	76	7.78	733	75.03	
1	0.25	395	100.00	18.15	-	18.35	60	6.14	793	81.17	
				18.35	-	18.55	47	4.81	840	85.98	
				18.55	-	18.75	37	3.79	877	89.76	
				18.75	-	18.95	32	3.28	909	93.04	
				18.95	-	19.15	21	2.15	930	95.19	
				19.15	-	19.35	20	2.05	950	97.24	
				19.35	-	19.55	13	1.33	963	98.57	
				19.55	-	19.75	11	1.13	974	99.69	
				19.75	-	19.95	0	0.00	974	99.69	
				19.95	-	20.15	1	0.10	975	99.80	
				20.15	-	20.35	0	0.00	975	99.80	
				20.35	-	20.55	1	0.10	976	99.90	
				20.55	-	20.75	1	0.10	977	100.00	

(93) WRIST HEIGHT

The vertical distance between a standing surface and the stylium landmark is measured with an anthropometer. The participant stands erect, looking straight ahead with the heels together and the weight distributed equally on both feet. The shoulders are relaxed, and the arms are extended downwards with the elbow, wrist, and fingers held rigidly straight. The arms lightly touch the sides. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
74.30	29.25	1ST	76.80	30.24
74.70	29.41	2ND	77.70	30.59
74.90	29.49	3RD	78.20	30.79
75.40	29.69	5TH	79.50	31.30
76.40	30.08	10TH	80.90	31.85
77.30	30.43	15TH	81.80	32.20
78.10	30.75	20TH	82.70	32.56
78.40	30.87	25TH	83.40	32.83
79.10	31.14	30TH	83.90	33.03
79.50	31.30	35TH	84.40	33.23
80.00	31.50	40TH	84.90	33.43
80.40	31.65	45TH	85.40	33.62
80.90	31.85	50TH	85.90	33.82
81.30	32.01	55TH	86.40	34.02
81.60	32.13	60TH	86.80	34.17
82.20	32.36	65TH	87.30	34.37
82.80	32.60	70TH	87.90	34.61
83.20	32.76	75TH	88.60	34.88
83.90	33.03	80TH	89.40	35.20
84.70	33.35	85TH	90.10	35.47
85.80	33.78	90TH	91.20	35.91
86.80	34.17	95TH	92.60	36.46
88.20	34.72	97TH	93.40	36.77
89.60	35.28	98TH	94.10	37.05
90.10	35.47	99TH	95.00	37.40

(93) WRIST HEIGHT

FEMALES		
<u>CM</u>		<u>IN</u>
81.01	MEAN	31.89
0.18	STD ERROR (MEAN)	0.07
3.51	STANDARD DEVIATION	1.38
0.12	STD ERROR (STD DEV)	0.05
70.60	MINIMUM	27.80
90.80	MAXIMUM	35.75
SKEWNESS		0.28
KURTOSIS		2.86
COEFFICIENT OF VARIATION		4.3%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
85.95	MEAN	33.84
0.13	STD ERROR (MEAN)	0.05
3.97	STANDARD DEVIATION	1.56
0.09	STD ERROR (STD DEV)	0.04
74.00	MINIMUM	29.13
100.10	MAXIMUM	39.41
SKEWNESS		0.02
KURTOSIS		3.00
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		977

FREQUENCY TABLE											
FEMALES				MALES							
F	FPct	CumF	CumFPct	<u>CM</u>	F	FPct	CumF	CumFPct			
2	0.51	2	0.51	70.55 - 71.55							
3	0.76	5	1.27	71.55 - 72.55							
5	1.27	10	2.53	72.55 - 73.55							
7	1.77	17	4.30	73.55 - 74.55	1	0.10	1	0.10			
21	5.32	38	9.62	74.55 - 75.55	4	0.41	5	0.51			
25	6.33	63	15.95	75.55 - 76.55	3	0.31	8	0.82			
27	6.84	90	22.78	76.55 - 77.55	10	1.02	18	1.84			
39	9.87	129	32.66	77.55 - 78.55	17	1.74	35	3.58			
46	11.65	175	44.30	78.55 - 79.55	27	2.76	62	6.35			
39	9.87	214	54.18	79.55 - 80.55	36	3.68	98	10.03			
44	11.14	258	65.32	80.55 - 81.55	42	4.30	140	14.33			
37	9.37	295	74.68	81.55 - 82.55	55	5.63	195	19.96			
26	6.58	321	81.27	82.55 - 83.55	69	7.06	264	27.02			
24	6.08	345	87.34	83.55 - 84.55	115	11.77	379	38.79			
16	4.05	361	91.39	84.55 - 85.55	92	9.42	471	48.21			
16	4.05	377	95.44	85.55 - 86.55	92	9.42	563	57.63			
8	2.03	385	97.47	86.55 - 87.55	106	10.85	669	68.47			
3	0.76	388	98.23	87.55 - 88.55	74	7.57	743	76.05			
2	0.51	390	98.73	88.55 - 89.55	71	7.27	814	83.32			
3	0.76	393	99.49	89.55 - 90.55	55	5.63	869	88.95			
2	0.51	395	100.00	90.55 - 91.55	36	3.68	905	92.63			
				91.55 - 92.55	30	3.07	935	95.70			
				92.55 - 93.55	20	2.05	955	97.75			
				93.55 - 94.55	11	1.13	966	98.87			
				94.55 - 95.55	4	0.41	970	99.28			
				95.55 - 96.55	3	0.31	973	99.59			
				96.55 - 97.55	2	0.20	975	99.80			
				97.55 - 98.55	1	0.10	976	99.90			
				98.55 - 99.55	0	0.00	976	99.90			
				99.55 - 100.55	1	0.10	977	100.00			

CHAPTER V

THE DERIVED DIMENSIONS

While time and cost demand a reasonable limit to the number of dimensions that can be measured in an anthropometric survey, many additional dimensions can be calculated from the measured data. Forty-one additional dimensions, concentrated in areas applicable to clothing, workspace, and analog design, were derived from the measured dimensions in this survey. These derived dimensions are intended to meet some of the more specialized needs of designers and engineers, though users should be cautioned that derived dimensions may not be as reliable as data obtained by direct measurement.

Generally, derived dimensions are calculated from directly measured dimensions, one at a time, for each individual. The summary statistics are calculated from those individual values. In some cases, particularly those involving functional reaches with different hand positions, a component dimension was not measured in this survey, but was measured previously in ANSUR. In those cases the ANSUR male and female mean values were used in the calculations of derived dimensions for each participant. For example, to calculate Index Finger Reach for males, 12.44 cm (the male ANSUR mean of Wrist-Thumbtip Length) was subtracted from each male participant's measured Thumbtip Reach, and 18.80 cm (the male ANSUR mean of Wrist-Index Finger Length) was added to that amount. All the ANSUR mean values used in these calculations are seen in Table 22.

TABLE 22

ANSUR Mean Values Used in Derived Dimensions
(values in cm)

Dimension	Males	Females
Hand Length	19.38	18.05
Wrist-Center of Grip Length	6.97	6.63
Wrist-Index Finger Length	18.08	16.92
Wrist-Thumbtip Length	12.44	11.76
Wrist-Wall Length	68.09	61.98

This approach is sound because the ANSUR II preliminary study (Paquette et al., 2009) showed that no secular change in Hand Length has occurred in the last two decades and there is no empirical evidence to suggest that current finger lengths are now different with respect to Hand Length.

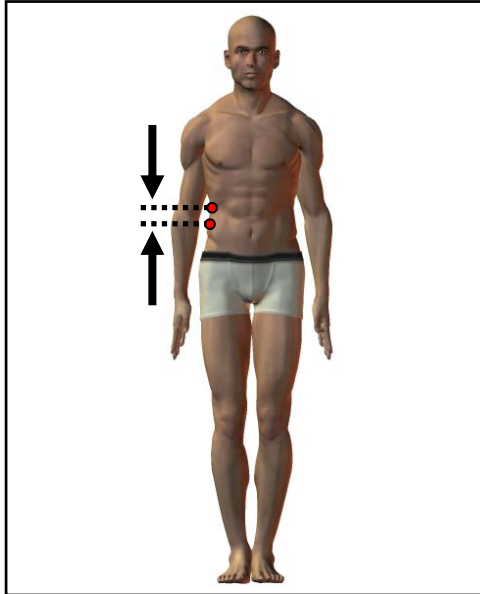
Two dimensions which were derived in ANSUR were directly measured in this survey. Forearm-Center of Grip (termed Elbow-Center of Grip in ANSUR) was measured with a modified beam caliper, as the intervening years since ANSUR had shown that it was an extremely useful dimension and thus would be better measured

than calculated. Thumbtip Reach was also measured directly, this time using it as the anchor dimension from which other reaches could be calculated.

A visual index, designed to assist the reader in locating particular derived dimensions whose names may be unfamiliar, appears in Appendix C. The numbers on the visual index correspond to the derived dimension number. Completing this section are the data pages, which include brief measurement descriptions, summary statistics, and percentile and frequency tables.

(D1) ABDOMINAL LINK

The vertical distance between the tenth rib landmark and the iliocristale landmark on the right side is calculated as follows: TENTH RIB HEIGHT minus ILIOCRISTALE HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
3.50	1.38	1ST	2.40	0.94
3.60	1.42	2ND	2.60	1.02
3.90	1.54	3RD	2.80	1.10
4.00	1.57	5TH	3.00	1.18
4.40	1.73	10TH	3.30	1.30
4.70	1.85	15TH	3.60	1.42
4.90	1.93	20TH	3.70	1.46
5.10	2.01	25TH	3.90	1.54
5.30	2.09	30TH	4.00	1.57
5.50	2.17	35TH	4.20	1.65
5.60	2.20	40TH	4.40	1.73
5.80	2.28	45TH	4.50	1.77
5.90	2.32	50TH	4.70	1.85
6.10	2.40	55TH	4.80	1.89
6.10	2.40	60TH	5.00	1.97
6.20	2.44	65TH	5.20	2.05
6.40	2.52	70TH	5.40	2.13
6.60	2.60	75TH	5.60	2.20
6.80	2.68	80TH	5.80	2.28
7.00	2.76	85TH	6.00	2.36
7.30	2.87	90TH	6.50	2.56
8.10	3.19	95TH	7.20	2.83
8.50	3.35	97TH	7.60	2.99
9.20	3.62	98TH	7.80	3.07
9.70	3.82	99TH	8.20	3.23

(D1) ABDOMINAL LINK

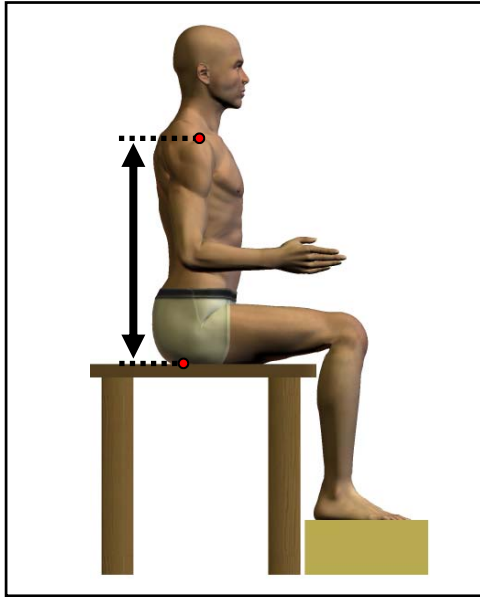
FEMALES		
<u>CM</u>		<u>IN</u>
5.92	MEAN	2.33
0.06	STD ERROR (MEAN)	0.02
1.26	STANDARD DEVIATION	0.49
0.04	STD ERROR (STD DEV)	0.02
2.90	MINIMUM	1.14
12.00	MAXIMUM	4.72
SKEWNESS		0.85
KURTOSIS		5.48
COEFFICIENT OF VARIATION		21.2%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
4.82	MEAN	1.90
0.04	STD ERROR (MEAN)	0.02
1.26	STANDARD DEVIATION	0.50
0.03	STD ERROR (STD DEV)	0.01
1.90	MINIMUM	0.75
10.00	MAXIMUM	3.94
SKEWNESS		0.57
KURTOSIS		3.28
COEFFICIENT OF VARIATION		26.2%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCIES		MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
				1.85	- 2.10	1	0.10	1	0.10
				2.10	- 2.35	2	0.20	3	0.31
				2.35	- 2.60	11	1.13	14	1.43
				2.60	- 2.85	11	1.13	25	2.56
2	0.51	2	0.51	2.85	- 3.10	24	2.46	49	5.02
3	0.76	5	1.27	3.10	- 3.35	40	4.09	89	9.11
3	0.76	8	2.03	3.35	- 3.60	31	3.17	120	12.28
5	1.27	13	3.29	3.60	- 3.85	97	9.93	217	22.21
8	2.03	21	5.32	3.85	- 4.10	48	4.91	265	27.12
16	4.05	37	9.37	4.10	- 4.35	92	9.42	357	36.54
11	2.78	48	12.15	4.35	- 4.60	77	7.88	434	44.42
20	5.06	68	17.22	4.60	- 4.85	88	9.01	522	53.43
24	6.08	92	23.29	4.85	- 5.10	69	7.06	591	60.49
28	7.09	120	30.38	5.10	- 5.35	76	7.78	667	68.27
18	4.56	138	34.94	5.35	- 5.60	46	4.71	713	72.98
52	13.16	190	48.10	5.60	- 5.85	72	7.37	785	80.35
24	6.08	214	54.18	5.85	- 6.10	45	4.61	830	84.95
51	12.91	265	67.09	6.10	- 6.35	33	3.38	863	88.33
28	7.09	293	74.18	6.35	- 6.60	17	1.74	880	90.07
27	6.84	320	81.01	6.60	- 6.85	27	2.76	907	92.84
17	4.30	337	85.32	6.85	- 7.10	13	1.33	920	94.17
14	3.54	351	88.86	7.10	- 7.35	24	2.46	944	96.62
7	1.77	358	90.63	7.35	- 7.60	6	0.61	950	97.24
17	4.30	375	94.94	7.60	- 7.85	10	1.02	960	98.26
3	0.76	378	95.70	7.85	- 8.10	5	0.51	965	98.77
5	1.27	383	96.96	8.10	- 8.35	6	0.61	971	99.39
3	0.76	386	97.72	8.35	- 8.60	2	0.20	973	99.59
2	0.51	388	98.23	8.60	- 8.85	2	0.20	975	99.80
2	0.51	390	98.73	8.85	- 9.10	1	0.10	976	99.90
2	0.51	392	99.24	9.10	- 9.35	0	0.00	976	99.90
0	0.00	392	99.24	9.35	- 9.60	0	0.00	976	99.90
1	0.25	393	99.49	9.60	- 9.85	0	0.00	976	99.90
0	0.00	393	99.49	9.85	- 10.10	1	0.10	977	100.00
0	0.00	393	99.49	10.10	- 10.35				
1	0.25	394	99.75	10.35	- 10.60				
0	0.00	394	99.75	10.60	- 10.85				
0	0.00	394	99.75	10.85	- 11.10				
0	0.00	394	99.75	11.10	- 11.35				
0	0.00	394	99.75	11.35	- 11.60				
0	0.00	394	99.75	11.60	- 11.85				
1	0.25	395	100.00	11.85	- 12.10				

(D2) ACROMIAL HEIGHT, SITTING

The vertical distance between a sitting surface and the right acromion landmark is calculated as follows: SITTING HEIGHT minus (STATURE minus ACROMIAL HEIGHT).



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
51.70	20.35	1ST	54.80	21.57
52.50	20.67	2ND	55.60	21.89
52.70	20.75	3RD	56.20	22.13
53.50	21.06	5TH	56.70	22.32
54.30	21.38	10TH	57.50	22.64
54.80	21.57	15TH	58.00	22.83
55.40	21.81	20TH	58.60	23.07
55.80	21.97	25TH	59.20	23.31
56.10	22.09	30TH	59.40	23.39
56.40	22.20	35TH	59.80	23.54
56.70	22.32	40TH	60.30	23.74
56.90	22.40	45TH	60.70	23.90
57.40	22.60	50TH	61.00	24.02
57.80	22.76	55TH	61.40	24.17
58.10	22.87	60TH	61.90	24.37
58.50	23.03	65TH	62.20	24.49
58.70	23.11	70TH	62.50	24.61
59.20	23.31	75TH	63.00	24.80
59.70	23.50	80TH	63.40	24.96
60.10	23.66	85TH	64.10	25.24
61.00	24.02	90TH	64.80	25.51
62.30	24.53	95TH	66.00	25.98
62.90	24.76	97TH	66.90	26.34
63.40	24.96	98TH	67.30	26.50
63.90	25.16	99TH	68.50	26.97

(D2) ACROMIAL HEIGHT, SITTING

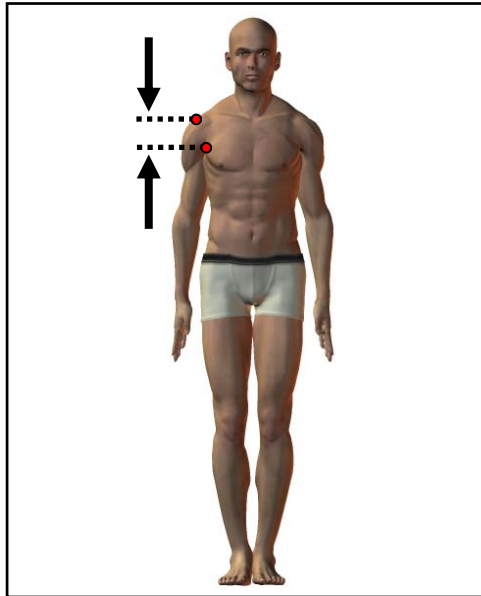
FEMALES		
<u>CM</u>		<u>IN</u>
57.53	MEAN	22.65
0.13	STD ERROR (MEAN)	0.05
2.61	STANDARD DEVIATION	1.03
0.09	STD ERROR (STD DEV)	0.04
49.50	MINIMUM	19.49
64.70	MAXIMUM	25.47
SKEWNESS		0.22
KURTOSIS		2.94
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
61.10	MEAN	24.06
0.09	STD ERROR (MEAN)	0.04
2.87	STANDARD DEVIATION	1.13
0.06	STD ERROR (STD DEV)	0.03
52.90	MINIMUM	20.83
70.30	MAXIMUM	27.68
SKEWNESS		0.18
KURTOSIS		2.95
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.25	1	0.25	49.25	-	49.75					
2	0.51	3	0.76	49.75	-	50.25					
0	0.00	3	0.76	50.25	-	50.75					
5	1.27	8	2.03	50.75	-	51.25					
6	1.52	14	3.54	51.25	-	51.75					
6	1.52	20	5.06	51.75	-	52.25					
11	2.78	31	7.85	52.25	-	52.75					
8	2.03	39	9.87	52.75	-	53.25		3	0.31	3	0.31
12	3.04	51	12.91	53.25	-	53.75		3	0.31	6	0.61
21	5.32	72	18.23	53.75	-	54.25		3	0.31	9	0.92
24	6.08	96	24.30	54.25	-	54.75		2	0.20	11	1.13
24	6.08	120	30.38	54.75	-	55.25		4	0.41	15	1.54
22	5.57	142	35.95	55.25	-	55.75		11	1.13	26	2.66
31	7.85	173	43.80	55.75	-	56.25		12	1.23	38	3.89
28	7.09	201	50.89	56.25	-	56.75		22	2.25	60	6.14
25	6.33	226	57.22	56.75	-	57.25		18	1.84	78	7.98
27	6.84	253	64.05	57.25	-	57.75		42	4.30	120	12.28
24	6.08	277	70.13	57.75	-	58.25		43	4.40	163	16.68
26	6.58	303	76.71	58.25	-	58.75		40	4.09	203	20.78
20	5.06	323	81.77	58.75	-	59.25		56	5.73	259	26.51
16	4.05	339	85.82	59.25	-	59.75		58	5.94	317	32.45
15	3.80	354	89.62	59.75	-	60.25		64	6.55	381	39.00
8	2.03	362	91.65	60.25	-	60.75		76	7.78	457	46.78
10	2.53	372	94.18	60.75	-	61.25		58	5.94	515	52.71
8	2.03	380	96.20	61.25	-	61.75		63	6.45	578	59.16
2	0.51	382	96.71	61.75	-	62.25		73	7.47	651	66.63
4	1.01	386	97.72	62.25	-	62.75		65	6.65	716	73.29
4	1.01	390	98.73	62.75	-	63.25		60	6.14	776	79.43
1	0.25	391	98.99	63.25	-	63.75		38	3.89	814	83.32
3	0.76	394	99.75	63.75	-	64.25		39	3.99	853	87.31
1	0.25	395	100.00	64.25	-	64.75		34	3.48	887	90.79
				64.75	-	65.25		26	2.66	913	93.45
				65.25	-	65.75		16	1.64	929	95.09
				65.75	-	66.25		15	1.54	944	96.62
				66.25	-	66.75		6	0.61	950	97.24
				66.75	-	67.25		10	1.02	960	98.26
				67.25	-	67.75		6	0.61	966	98.87
				67.75	-	68.25		4	0.41	970	99.28
				68.25	-	68.75		2	0.20	972	99.49
				68.75	-	69.25		2	0.20	974	99.69
				69.25	-	69.75		2	0.20	976	99.90
				69.75	-	70.25		0	0.00	976	99.90
				70.25	-	70.75		1	0.10	977	100.00

(D3) ACROMION-AXILLA LENGTH

The vertical distance between the acromion right landmark and the anterior-scye-on-the-torso landmark of a participant standing erect with the arms relaxed at the sides is calculated as follows: ACROMIAL HEIGHT minus AXILLA HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
7.30	2.87	1ST	8.80	3.46
7.50	2.95	2ND	9.20	3.62
7.60	2.99	3RD	9.40	3.70
7.90	3.11	5TH	9.60	3.78
8.30	3.27	10TH	10.00	3.94
8.50	3.35	15TH	10.20	4.02
8.80	3.46	20TH	10.40	4.09
8.90	3.50	25TH	10.60	4.17
9.10	3.58	30TH	10.70	4.21
9.20	3.62	35TH	10.90	4.29
9.40	3.70	40TH	11.00	4.33
9.50	3.74	45TH	11.10	4.37
9.60	3.78	50TH	11.20	4.41
9.80	3.86	55TH	11.40	4.49
10.00	3.94	60TH	11.50	4.53
10.20	4.02	65TH	11.60	4.57
10.30	4.06	70TH	11.70	4.61
10.50	4.13	75TH	12.00	4.72
10.70	4.21	80TH	12.20	4.80
10.90	4.29	85TH	12.40	4.88
11.20	4.41	90TH	12.70	5.00
11.50	4.53	95TH	13.20	5.20
11.90	4.69	97TH	13.30	5.24
12.10	4.76	98TH	13.60	5.35
12.50	4.92	99TH	14.00	5.51

(D3) ACROMION-AXILLA LENGTH

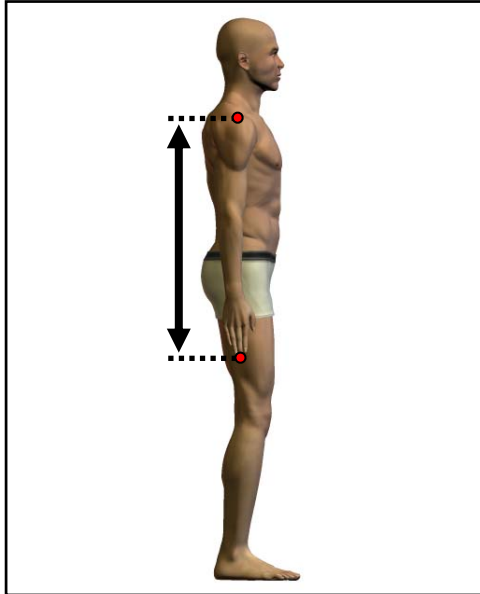
FEMALES		
<u>CM</u>		<u>IN</u>
9.72	MEAN	3.83
0.06	STD ERROR (MEAN)	0.02
1.12	STANDARD DEVIATION	0.44
0.04	STD ERROR (STD DEV)	0.02
6.80	MINIMUM	2.68
13.00	MAXIMUM	5.12
SKEWNESS		0.13
KURTOSIS		2.87
COEFFICIENT OF VARIATION		11.5%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
11.29	MEAN	4.45
0.03	STD ERROR (MEAN)	0.01
1.08	STANDARD DEVIATION	0.43
0.02	STD ERROR (STD DEV)	0.01
8.30	MINIMUM	3.27
16.00	MAXIMUM	6.30
SKEWNESS		0.39
KURTOSIS		3.76
COEFFICIENT OF VARIATION		9.6%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCIES		MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.25	1	0.25	6.75	-	6.95			
2	0.51	3	0.76	6.95	-	7.15			
1	0.25	4	1.01	7.15	-	7.35			
8	2.03	12	3.04	7.35	-	7.55			
5	1.27	17	4.30	7.55	-	7.75			
9	2.28	26	6.58	7.75	-	7.95			
16	4.05	42	10.63	7.95	-	8.15			
11	2.78	53	13.42	8.15	-	8.35	1	0.10	0.10
19	4.81	72	18.23	8.35	-	8.55	4	0.41	0.51
17	4.30	89	22.53	8.55	-	8.75	5	0.51	1.02
24	6.08	113	28.61	8.75	-	8.95	5	0.51	1.54
26	6.58	139	35.19	8.95	-	9.15	10	1.02	2.56
26	6.58	165	41.77	9.15	-	9.35	14	1.43	3.99
31	7.85	196	49.62	9.35	-	9.55	14	1.43	5.42
27	6.84	223	56.46	9.55	-	9.75	34	3.48	8.90
27	6.84	250	63.29	9.75	-	9.95	45	4.61	13.51
21	5.32	271	68.61	9.95	-	10.15	39	3.99	17.50
25	6.33	296	74.94	10.15	-	10.35	62	6.35	23.85
23	5.82	319	80.76	10.35	-	10.55	73	7.47	31.32
17	4.30	336	85.06	10.55	-	10.75	71	7.27	38.59
15	3.80	351	88.86	10.75	-	10.95	69	7.06	45.65
15	3.80	366	92.66	10.95	-	11.15	93	9.52	55.17
7	1.77	373	94.43	11.15	-	11.35	70	7.16	62.33
6	1.52	379	95.95	11.35	-	11.55	68	6.96	69.29
5	1.27	384	97.22	11.55	-	11.75	59	6.04	75.33
2	0.51	386	97.72	11.75	-	11.95	35	3.58	78.92
3	0.76	389	98.48	11.95	-	12.15	37	3.79	82.70
1	0.25	390	98.73	12.15	-	12.35	38	3.89	86.59
3	0.76	393	99.49	12.35	-	12.55	34	3.48	90.07
0	0.00	393	99.49	12.55	-	12.75	28	2.87	92.94
1	0.25	394	99.75	12.75	-	12.95	14	1.43	94.37
1	0.25	395	100.00	12.95	-	13.15	15	1.54	95.91
				13.15	-	13.35	18	1.84	97.75
				13.35	-	13.55	6	0.61	98.36
				13.55	-	13.75	4	0.41	98.77
				13.75	-	13.95	1	0.10	98.87
				13.95	-	14.15	2	0.20	99.08
				14.15	-	14.35	2	0.20	99.28
				14.35	-	14.55	1	0.10	99.39
				14.55	-	14.75	1	0.10	99.49
				14.75	-	14.95	0	0.00	99.49
				14.95	-	15.15	1	0.10	99.59
				15.15	-	15.35	2	0.20	99.80
				15.35	-	15.55	0	0.00	99.80
				15.55	-	15.75	0	0.00	99.80
				15.75	-	15.95	1	0.10	99.90
				15.95	-	16.15	1	0.10	100.00

(D4) ARM LENGTH

The vertical distance between the acromion right landmark and the dactylion III landmark of a participant standing erect with the arms straight at the sides is calculated as follows: ACROMIAL HEIGHT minus WRIST HEIGHT plus HAND LENGTH.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
66.30	26.10	1ST	70.40	27.72
67.10	26.42	2ND	71.70	28.23
67.40	26.54	3RD	72.40	28.50
68.10	26.81	5TH	73.00	28.74
68.80	27.09	10TH	74.40	29.29
69.20	27.24	15TH	75.30	29.65
69.70	27.44	20TH	76.10	29.96
70.00	27.56	25TH	76.70	30.20
70.50	27.76	30TH	77.20	30.39
71.10	27.99	35TH	77.70	30.59
71.40	28.11	40TH	78.10	30.75
71.70	28.23	45TH	78.40	30.87
72.10	28.39	50TH	78.90	31.06
72.50	28.54	55TH	79.30	31.22
73.00	28.74	60TH	80.00	31.50
73.50	28.94	65TH	80.40	31.65
74.10	29.17	70TH	80.70	31.77
74.50	29.33	75TH	81.10	31.93
75.10	29.57	80TH	81.80	32.20
75.90	29.88	85TH	82.60	32.52
76.80	30.24	90TH	83.50	32.87
78.40	30.87	95TH	85.00	33.46
79.20	31.18	97TH	85.70	33.74
79.50	31.30	98TH	86.20	33.94
80.30	31.61	99TH	86.80	34.17

(D4) ARM LENGTH

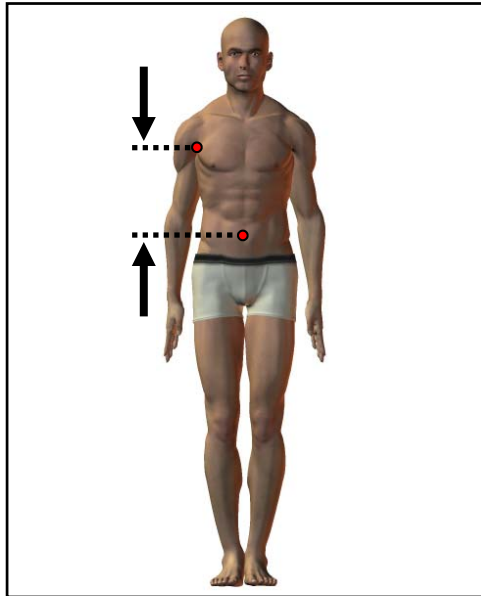
FEMALES		
<u>CM</u>		<u>IN</u>
72.46	MEAN	28.53
0.16	STD ERROR (MEAN)	0.06
3.14	STANDARD DEVIATION	1.24
0.11	STD ERROR (STD DEV)	0.04
65.40	MINIMUM	25.75
82.10	MAXIMUM	32.32
SKEWNESS		0.43
KURTOSIS		2.78
COEFFICIENT OF VARIATION		4.3%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
78.96	MEAN	31.09
0.11	STD ERROR (MEAN)	0.04
3.53	STANDARD DEVIATION	1.39
0.08	STD ERROR (STD DEV)	0.03
67.70	MINIMUM	26.65
89.80	MAXIMUM	35.35
SKEWNESS		-0.05
KURTOSIS		3.05
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCIES		MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.25	1	0.25	64.55	-	65.55			
2	0.51	3	0.76	65.55	-	66.55			
6	1.52	9	2.28	66.55	-	67.55			
13	3.29	22	5.57	67.55	-	68.55	3	0.31	3
36	9.11	58	14.68	68.55	-	69.55	1	0.10	4
47	11.90	105	26.58	69.55	-	70.55	9	0.92	13
48	12.15	153	38.73	70.55	-	71.55	7	0.72	20
43	10.89	196	49.62	71.55	-	72.55	13	1.33	33
34	8.61	230	58.23	72.55	-	73.55	32	3.28	65
44	11.14	274	69.37	73.55	-	74.55	40	4.09	105
30	7.59	304	76.96	74.55	-	75.55	58	5.94	163
31	7.85	335	84.81	75.55	-	76.55	77	7.88	240
24	6.08	359	90.89	76.55	-	77.55	93	9.52	333
13	3.29	372	94.18	77.55	-	78.55	107	10.95	440
9	2.28	381	96.46	78.55	-	79.55	113	11.57	553
8	2.03	389	98.48	79.55	-	80.55	113	11.57	666
4	1.01	393	99.49	80.55	-	81.55	92	9.42	758
2	0.51	395	100.00	81.55	-	82.55	66	6.76	824
				82.55	-	83.55	55	5.63	879
				83.55	-	84.55	34	3.48	913
				84.55	-	85.55	32	3.28	945
				85.55	-	86.55	18	1.84	963
				86.55	-	87.55	8	0.82	971
				87.55	-	88.55	3	0.31	974
				88.55	-	89.55	2	0.20	976
				89.55	-	90.55	1	0.10	977

(D5) AXILLA-WAIST LENGTH (OMPHALION)

The vertical distance between the anterior-scye-on-the-torso landmark and the anterior omphalion landmark is calculated as follows: AXILLA HEIGHT minus WAIST HEIGHT (OMPHALION).



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
21.50	8.46	1ST	22.60	8.90
22.20	8.74	2ND	23.00	9.06
22.60	8.90	3RD	23.60	9.29
23.00	9.06	5TH	24.10	9.49
23.60	9.29	10TH	24.90	9.80
24.10	9.49	15TH	25.40	10.00
24.50	9.65	20TH	25.80	10.16
24.80	9.76	25TH	26.20	10.31
25.20	9.92	30TH	26.40	10.39
25.40	10.00	35TH	26.60	10.47
25.70	10.12	40TH	26.90	10.59
26.00	10.24	45TH	27.20	10.71
26.20	10.31	50TH	27.60	10.87
26.50	10.43	55TH	27.90	10.98
26.60	10.47	60TH	28.20	11.10
26.90	10.59	65TH	28.40	11.18
27.20	10.71	70TH	28.70	11.30
27.50	10.83	75TH	29.00	11.42
27.90	10.98	80TH	29.30	11.54
28.30	11.14	85TH	29.70	11.69
28.90	11.38	90TH	30.20	11.89
29.70	11.69	95TH	30.80	12.13
30.40	11.97	97TH	31.50	12.40
30.40	11.97	98TH	31.90	12.56
31.30	12.32	99TH	32.20	12.68

(D5) AXILLA-WAIST LENGTH (OMPHALION)

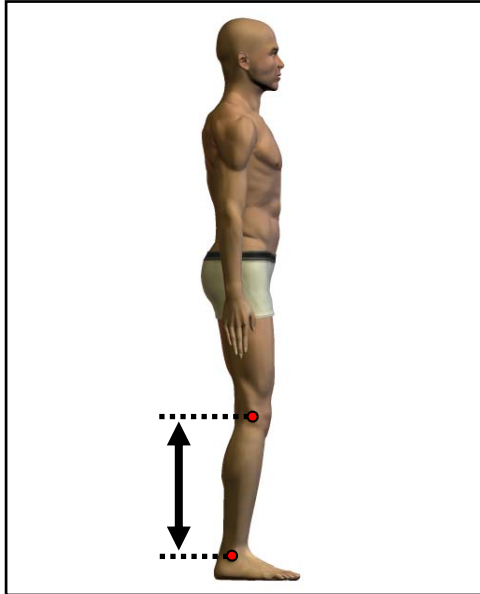
FEMALES		
<u>CM</u>		<u>IN</u>
26.23	MEAN	10.33
0.10	STD ERROR (MEAN)	0.04
2.05	STANDARD DEVIATION	0.81
0.07	STD ERROR (STD DEV)	0.03
19.50	MINIMUM	7.68
33.00	MAXIMUM	12.99
SKEWNESS		0.21
KURTOSIS		3.42
COEFFICIENT OF VARIATION		7.8%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
27.55	MEAN	10.84
0.07	STD ERROR (MEAN)	0.03
2.08	STANDARD DEVIATION	0.82
0.05	STD ERROR (STD DEV)	0.02
20.30	MINIMUM	7.99
33.50	MAXIMUM	13.19
SKEWNESS		-0.08
KURTOSIS		2.99
COEFFICIENT OF VARIATION		7.6%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES				MALES							
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
1	0.25	1	0.25	19.25	-	19.75					
1	0.25	2	0.51	19.75	-	20.25					
2	0.51	4	1.01	20.25	-	20.75	1	0.10	1	0.10	
1	0.25	5	1.27	20.75	-	21.25	2	0.20	3	0.31	
4	1.01	9	2.28	21.25	-	21.75	2	0.20	5	0.51	
5	1.27	14	3.54	21.75	-	22.25	3	0.31	8	0.82	
9	2.28	23	5.82	22.25	-	22.75	7	0.72	15	1.54	
16	4.05	39	9.87	22.75	-	23.25	10	1.02	25	2.56	
17	4.30	56	14.18	23.25	-	23.75	18	1.84	43	4.40	
21	5.32	77	19.49	23.75	-	24.25	30	3.07	73	7.47	
29	7.34	106	26.84	24.25	-	24.75	36	3.68	109	11.16	
34	8.61	140	35.44	24.75	-	25.25	48	4.91	157	16.07	
48	12.15	188	47.59	25.25	-	25.75	49	5.02	206	21.08	
38	9.62	226	57.22	25.75	-	26.25	84	8.60	290	29.68	
41	10.38	267	67.59	26.25	-	26.75	107	10.95	397	40.63	
35	8.86	302	76.46	26.75	-	27.25	86	8.80	483	49.44	
24	6.08	326	82.53	27.25	-	27.75	90	9.21	573	58.65	
20	5.06	346	87.59	27.75	-	28.25	88	9.01	661	67.66	
15	3.80	361	91.39	28.25	-	28.75	85	8.70	746	76.36	
11	2.78	372	94.18	28.75	-	29.25	69	7.06	815	83.42	
9	2.28	381	96.46	29.25	-	29.75	51	5.22	866	88.64	
2	0.51	383	96.96	29.75	-	30.25	36	3.68	902	92.32	
7	1.77	390	98.73	30.25	-	30.75	32	3.28	934	95.60	
2	0.51	392	99.24	30.75	-	31.25	11	1.13	945	96.72	
1	0.25	393	99.49	31.25	-	31.75	14	1.43	959	98.16	
0	0.00	393	99.49	31.75	-	32.25	10	1.02	969	99.18	
1	0.25	394	99.75	32.25	-	32.75	4	0.41	973	99.59	
1	0.25	395	100.00	32.75	-	33.25	2	0.20	975	99.80	
				33.25	-	33.75	2	0.20	977	100.00	

(D6) CALF LINK

The vertical distance between the lateral femoral epicondyle landmark and the lateral malleolus landmark is calculated as follows: LATERAL FEMORAL EPICONDYLE HEIGHT minus LATERAL MALLEOLUS HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
36.60	14.41	1ST	37.20	14.65
36.70	14.45	2ND	37.50	14.76
37.30	14.69	3RD	37.70	14.84
37.60	14.80	5TH	38.30	15.08
38.00	14.96	10TH	39.10	15.39
38.40	15.12	15TH	39.70	15.63
38.80	15.28	20TH	40.20	15.83
39.20	15.43	25TH	40.50	15.94
39.30	15.47	30TH	40.80	16.06
39.60	15.59	35TH	41.20	16.22
39.70	15.63	40TH	41.50	16.34
39.90	15.71	45TH	41.80	16.46
40.20	15.83	50TH	42.00	16.54
40.50	15.94	55TH	42.20	16.61
40.70	16.02	60TH	42.50	16.73
41.00	16.14	65TH	42.80	16.85
41.30	16.26	70TH	43.10	16.97
41.70	16.42	75TH	43.40	17.09
42.00	16.54	80TH	43.90	17.28
42.60	16.77	85TH	44.40	17.48
43.10	16.97	90TH	44.90	17.68
44.30	17.44	95TH	45.70	17.99
44.70	17.60	97TH	46.20	18.19
44.90	17.68	98TH	46.90	18.46
45.50	17.91	99TH	47.30	18.62

(D6) CALF LINK

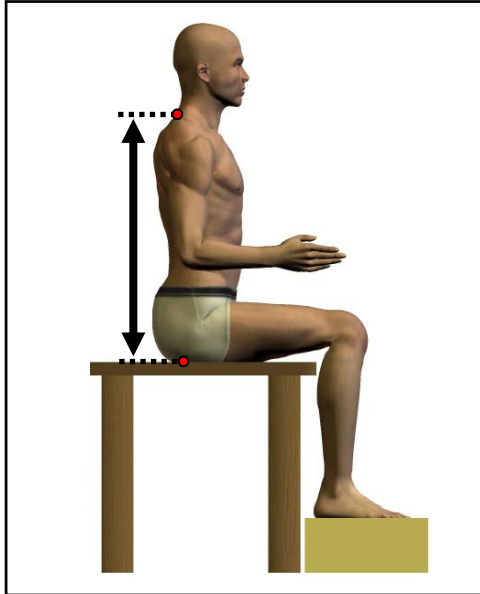
FEMALES		
<u>CM</u>		<u>IN</u>
40.46	MEAN	15.93
0.10	STD ERROR (MEAN)	0.04
2.03	STANDARD DEVIATION	0.80
0.07	STD ERROR (STD DEV)	0.03
35.70	MINIMUM	14.06
48.80	MAXIMUM	19.21
SKEWNESS		0.61
KURTOSIS		3.70
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
42.01	MEAN	16.54
0.07	STD ERROR (MEAN)	0.03
2.23	STANDARD DEVIATION	0.88
0.05	STD ERROR (STD DEV)	0.02
35.20	MINIMUM	13.86
50.00	MAXIMUM	19.69
SKEWNESS		0.09
KURTOSIS		3.08
COEFFICIENT OF VARIATION		5.3%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES								MALES			
<u>F</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>CM</u>	<u>F</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	
1	0.25	1	0.25	34.75	-	35.25	1	0.10	1	0.10	
3	0.76	4	1.01	35.25	-	35.75	2	0.20	3	0.31	
5	1.27	9	2.28	35.75	-	36.25	0	0.00	3	0.31	
2	0.51	11	2.78	36.25	-	36.75	3	0.31	6	0.61	
14	3.54	25	6.33	36.75	-	37.25	7	0.72	13	1.33	
23	5.82	48	12.15	37.25	-	37.75	10	1.02	23	2.35	
17	4.30	65	16.46	37.75	-	38.25	18	1.84	41	4.20	
30	7.59	95	24.05	38.25	-	38.75	28	2.87	69	7.06	
41	10.38	136	34.43	38.75	-	39.25	36	3.68	105	10.75	
40	10.13	176	44.56	39.25	-	39.75	41	4.20	146	14.94	
41	10.38	217	54.94	39.75	-	40.25	56	5.73	202	20.68	
25	6.33	242	61.27	40.25	-	40.75	78	7.98	280	28.66	
32	8.10	274	69.37	40.75	-	41.25	85	8.70	365	37.36	
24	6.08	298	75.44	41.25	-	41.75	69	7.06	434	44.42	
21	5.32	319	80.76	41.75	-	42.25	113	11.57	547	55.99	
23	5.82	342	86.58	42.25	-	42.75	81	8.29	628	64.28	
16	4.05	358	90.63	42.75	-	43.25	78	7.98	706	72.26	
11	2.78	369	93.42	43.25	-	43.75	69	7.06	775	79.32	
10	2.53	379	95.95	43.75	-	44.25	44	4.50	819	83.83	
6	1.52	385	97.47	44.25	-	44.75	48	4.91	867	88.74	
4	1.01	389	98.48	44.75	-	45.25	39	3.99	906	92.73	
3	0.76	392	99.24	45.25	-	45.75	27	2.76	933	95.50	
1	0.25	393	99.49	45.75	-	46.25	17	1.74	950	97.24	
0	0.00	393	99.49	46.25	-	46.75	6	0.61	956	97.85	
0	0.00	393	99.49	46.75	-	47.25	8	0.82	964	98.67	
1	0.25	394	99.75	47.25	-	47.75	6	0.61	970	99.28	
0	0.00	394	99.75	47.75	-	48.25	3	0.31	973	99.59	
1	0.25	395	100.00	48.25	-	48.75	2	0.20	975	99.80	
				48.75	-	49.25	1	0.10	976	99.90	
				49.25	-	49.75	0	0.00	976	99.90	
				49.75	-	50.25	1	0.10	977	100.00	

(D7) CERVICALE HEIGHT, SITTING*

The vertical distance between a sitting surface and the cervicale landmark is calculated as follows: SITTING HEIGHT minus (STATURE minus CERVICALE HEIGHT).



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
57.00	22.44	1ST	63.20	24.88
58.70	23.11	2ND	63.70	25.08
58.90	23.19	3RD	63.90	25.16
59.30	23.35	5TH	64.60	25.43
60.40	23.78	10TH	65.30	25.71
61.10	24.06	15TH	66.30	26.10
61.40	24.17	20TH	66.70	26.26
61.80	24.33	25TH	67.20	26.46
62.10	24.45	30TH	67.50	26.57
62.60	24.65	35TH	67.90	26.73
63.10	24.84	40TH	68.20	26.85
63.30	24.92	45TH	68.70	27.05
63.60	25.04	50TH	69.00	27.17
63.80	25.12	55TH	69.40	27.32
64.20	25.28	60TH	69.70	27.44
64.50	25.39	65TH	70.10	27.60
64.80	25.51	70TH	70.50	27.76
65.20	25.67	75TH	70.90	27.91
65.80	25.91	80TH	71.30	28.07
66.30	26.10	85TH	72.00	28.35
66.90	26.34	90TH	72.90	28.70
67.60	26.61	95TH	73.60	28.98
68.90	27.13	97TH	74.60	29.37
69.20	27.24	98TH	75.00	29.53
69.60	27.40	99TH	75.90	29.88

* In ANSUR cervicale was defined as the highest point on the seventh cervical vertebra. For consistency with international standards, it is now the most prominent point on the seventh cervical vertebra.

(D7) CERVICALE HEIGHT, SITTING

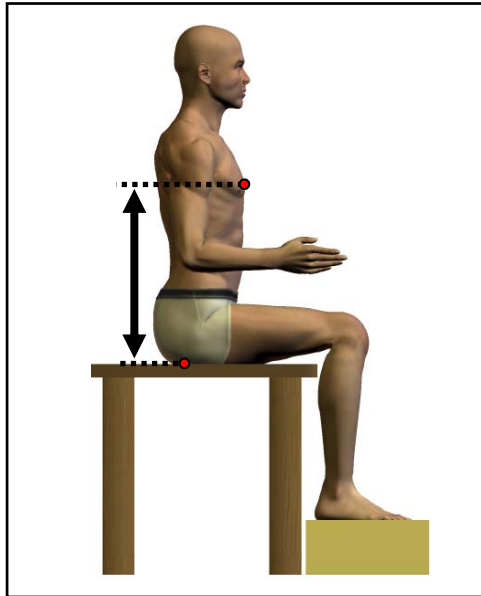
FEMALES		
<u>CM</u>		<u>IN</u>
63.59	MEAN	25.04
0.13	STD ERROR (MEAN)	0.05
2.58	STANDARD DEVIATION	1.01
0.09	STD ERROR (STD DEV)	0.04
55.40	MINIMUM	21.81
71.00	MAXIMUM	27.95
SKEWNESS		0.11
KURTOSIS		3.02
COEFFICIENT OF VARIATION		4.0%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
69.07	MEAN	27.19
0.09	STD ERROR (MEAN)	0.04
2.81	STANDARD DEVIATION	1.11
0.06	STD ERROR (STD DEV)	0.03
60.10	MINIMUM	23.66
78.80	MAXIMUM	31.02
SKEWNESS		0.16
KURTOSIS		3.06
COEFFICIENT OF VARIATION		4.1%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
1	0.25	1	0.25	55.25	-	55.75					
1	0.25	2	0.51	55.75	-	56.25					
1	0.25	3	0.76	56.25	-	56.75					
5	1.27	8	2.03	56.75	-	57.25					
2	0.51	10	2.53	57.25	-	57.75					
4	1.01	14	3.54	57.75	-	58.25					
13	3.29	27	6.84	58.25	-	58.75					
14	3.54	41	10.38	58.75	-	59.25					
18	4.56	59	14.94	59.25	-	59.75					
8	2.03	67	16.96	59.75	-	60.25	1	0.10	1	0.10	
17	4.30	84	21.27	60.25	-	60.75	0	0.00	1	0.10	
27	6.84	111	28.10	60.75	-	61.25	1	0.10	2	0.20	
27	6.84	138	34.94	61.25	-	61.75	3	0.31	5	0.51	
27	6.84	165	41.77	61.75	-	62.25	3	0.31	8	0.82	
30	7.59	195	49.37	62.25	-	62.75	2	0.20	10	1.02	
18	4.56	213	53.92	62.75	-	63.25	7	0.72	17	1.74	
32	8.10	245	62.03	63.25	-	63.75	13	1.33	30	3.07	
20	5.06	265	67.09	63.75	-	64.25	14	1.43	44	4.50	
30	7.59	295	74.68	64.25	-	64.75	18	1.84	62	6.35	
20	5.06	315	79.75	64.75	-	65.25	28	2.87	90	9.21	
15	3.80	330	83.54	65.25	-	65.75	33	3.38	123	12.59	
17	4.30	347	87.85	65.75	-	66.25	30	3.07	153	15.66	
16	4.05	363	91.90	66.25	-	66.75	51	5.22	204	20.88	
7	1.77	370	93.67	66.75	-	67.25	46	4.71	250	25.59	
8	2.03	378	95.70	67.25	-	67.75	62	6.35	312	31.93	
4	1.01	382	96.71	67.75	-	68.25	70	7.16	382	39.10	
3	0.76	385	97.47	68.25	-	68.75	65	6.65	447	45.75	
7	1.77	392	99.24	68.75	-	69.25	75	7.68	522	53.43	
1	0.25	393	99.49	69.25	-	69.75	72	7.37	594	60.80	
0	0.00	393	99.49	69.75	-	70.25	65	6.65	659	67.45	
0	0.00	393	99.49	70.25	-	70.75	61	6.24	720	73.69	
2	0.51	395	100.00	70.75	-	71.25	56	5.73	776	79.43	
				71.25	-	71.75	42	4.30	818	83.73	
				71.75	-	72.25	37	3.79	855	87.51	
				72.25	-	72.75	30	3.07	885	90.58	
				72.75	-	73.25	30	3.07	915	93.65	
				73.25	-	73.75	20	2.05	935	95.70	
				73.75	-	74.25	12	1.23	947	96.93	
				74.25	-	74.75	9	0.92	956	97.85	
				74.75	-	75.25	8	0.82	964	98.67	
				75.25	-	75.75	3	0.31	967	98.98	
				75.75	-	76.25	6	0.61	973	99.59	
				76.25	-	76.75	1	0.10	974	99.69	
				76.75	-	77.25	1	0.10	975	99.80	
				77.25	-	77.75	0	0.00	975	99.80	
				77.75	-	78.25	1	0.10	976	99.90	
				78.25	-	78.75	0	0.00	976	99.90	
				78.75	-	79.25	1	0.10	977	100.00	

(D8) CHEST HEIGHT, SITTING*

The vertical distance between a sitting surface and the chest point anterior landmark is calculated as follows: SITTING HEIGHT minus (STATURE minus CHEST HEIGHT).



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
34.50	13.58	1ST	41.30	16.26
35.30	13.90	2ND	41.80	16.46
36.20	14.25	3RD	42.10	16.57
36.50	14.37	5TH	42.60	16.77
37.50	14.76	10TH	43.60	17.17
38.10	15.00	15TH	44.10	17.36
38.50	15.16	20TH	44.70	17.60
38.80	15.28	25TH	45.00	17.72
39.10	15.39	30TH	45.30	17.83
39.40	15.51	35TH	45.70	17.99
39.70	15.63	40TH	46.00	18.11
40.00	15.75	45TH	46.40	18.27
40.50	15.94	50TH	46.60	18.35
40.70	16.02	55TH	46.90	18.46
41.10	16.18	60TH	47.20	18.58
41.40	16.30	65TH	47.60	18.74
41.80	16.46	70TH	48.00	18.90
42.30	16.65	75TH	48.30	19.02
42.80	16.85	80TH	48.80	19.21
43.40	17.09	85TH	49.20	19.37
44.20	17.40	90TH	49.90	19.65
45.40	17.87	95TH	50.90	20.04
46.10	18.15	97TH	51.70	20.35
46.60	18.35	98TH	52.40	20.63
47.10	18.54	99TH	52.80	20.79

*In ANSUR Chest Height was taken (in males) at the level of thelion (nipple). This change was made in order to capture the measurements of the chest at its maximum. The landmark is unchanged for females.

(D8) CHEST HEIGHT, SITTING

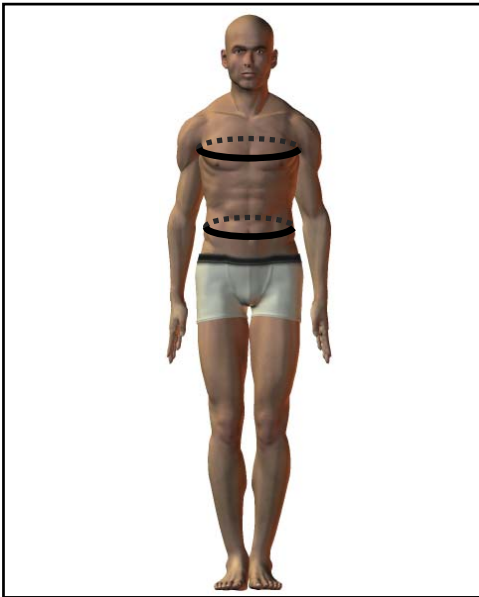
FEMALES		
<u>CM</u>		<u>IN</u>
40.62	MEAN	15.99
0.13	STD ERROR (MEAN)	0.05
2.68	STANDARD DEVIATION	1.05
0.10	STD ERROR (STD DEV)	0.04
31.50	MINIMUM	12.40
49.30	MAXIMUM	19.41
SKEWNESS		0.32
KURTOSIS		3.21
COEFFICIENT OF VARIATION		6.6%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
46.71	MEAN	18.39
0.08	STD ERROR (MEAN)	0.03
2.50	STANDARD DEVIATION	0.98
0.06	STD ERROR (STD DEV)	0.02
39.40	MINIMUM	15.51
55.30	MAXIMUM	21.77
SKEWNESS		0.17
KURTOSIS		3.00
COEFFICIENT OF VARIATION		5.3%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
2	0.51	2	0.51	31.25	-	31.75					
1	0.25	3	0.76	31.75	-	32.25					
2	0.51	5	1.27	32.25	-	32.75					
1	0.25	6	1.52	32.75	-	33.25					
3	0.76	9	2.28	33.25	-	33.75					
4	1.01	13	3.29	33.75	-	34.25					
4	1.01	17	4.30	34.25	-	34.75					
5	1.27	22	5.57	34.75	-	35.25					
3	0.76	25	6.33	35.25	-	35.75					
8	2.03	33	8.35	35.75	-	36.25					
15	3.80	48	12.15	36.25	-	36.75					
13	3.29	61	15.44	36.75	-	37.25					
16	4.05	77	19.49	37.25	-	37.75					
27	6.84	104	26.33	37.75	-	38.25					
25	6.33	129	32.66	38.25	-	38.75					
36	9.11	165	41.77	38.75	-	39.25					
25	6.33	190	48.10	39.25	-	39.75		1	0.10	1	0.10
23	5.82	213	53.92	39.75	-	40.25		1	0.10	2	0.20
32	8.10	245	62.03	40.25	-	40.75		5	0.51	7	0.72
24	6.08	269	68.10	40.75	-	41.25		4	0.41	11	1.13
20	5.06	289	73.16	41.25	-	41.75		5	0.51	16	1.64
22	5.57	311	78.73	41.75	-	42.25		14	1.43	30	3.07
17	4.30	328	83.04	42.25	-	42.75		17	1.74	47	4.81
17	4.30	345	87.34	42.75	-	43.25		24	2.46	71	7.27
9	2.28	354	89.62	43.25	-	43.75		26	2.66	97	9.93
7	1.77	361	91.39	43.75	-	44.25		51	5.22	148	15.15
8	2.03	369	93.42	44.25	-	44.75		41	4.20	189	19.34
7	1.77	376	95.19	44.75	-	45.25		75	7.68	264	27.02
7	1.77	383	96.96	45.25	-	45.75		58	5.94	322	32.96
4	1.01	387	97.97	45.75	-	46.25		89	9.11	411	42.07
3	0.76	390	98.73	46.25	-	46.75		79	8.09	490	50.15
3	0.76	393	99.49	46.75	-	47.25		73	7.47	563	57.63
0	0.00	393	99.49	47.25	-	47.75		70	7.16	633	64.79
0	0.00	393	99.49	47.75	-	48.25		69	7.06	702	71.85
0	0.00	393	99.49	48.25	-	48.75		63	6.45	765	78.30
1	0.25	394	99.75	48.75	-	49.25		59	6.04	824	84.34
1	0.25	395	100.00	49.25	-	49.75		46	4.71	870	89.05
				49.75	-	50.25		38	3.89	908	92.94
				50.25	-	50.75		18	1.84	926	94.78
				50.75	-	51.25		17	1.74	943	96.52
				51.25	-	51.75		11	1.13	954	97.65
				51.75	-	52.25		3	0.31	957	97.95
				52.25	-	52.75		8	0.82	965	98.77
				52.75	-	53.25		7	0.72	972	99.49
				53.25	-	53.75		2	0.20	974	99.69
				53.75	-	54.25		2	0.20	976	99.90
				54.25	-	54.75		0	0.00	976	99.90
				54.75	-	55.25		0	0.00	976	99.90
				55.25	-	55.75		1	0.10	977	100.00

(D9) CHEST-WAIST DROP (OMPHALION)*

The difference between the circumference of the chest and the circumference of the waist at omphalion is calculated as follows: CHEST CIRCUMFERENCE minus WAIST CIRCUMFERENCE (OMPHALION).



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
-3.00	-1.18	1ST	-1.20	-0.47
-2.70	-1.06	2ND	1.50	0.59
-1.50	-0.59	3RD	2.00	0.79
0.20	0.08	5TH	3.50	1.38
2.40	0.94	10TH	5.60	2.20
4.20	1.65	15TH	7.00	2.76
5.40	2.13	20TH	7.90	3.11
6.40	2.52	25TH	8.70	3.43
7.20	2.83	30TH	9.50	3.74
7.90	3.11	35TH	10.10	3.98
8.40	3.31	40TH	10.80	4.25
8.90	3.50	45TH	11.40	4.49
9.70	3.82	50TH	11.80	4.65
10.80	4.25	55TH	12.40	4.88
11.60	4.57	60TH	13.00	5.12
12.20	4.80	65TH	13.60	5.35
12.50	4.92	70TH	14.30	5.63
13.30	5.24	75TH	15.10	5.94
14.30	5.63	80TH	15.70	6.18
15.10	5.94	85TH	16.80	6.61
16.90	6.65	90TH	17.90	7.05
19.20	7.56	95TH	19.40	7.64
20.20	7.95	97TH	20.60	8.11
22.00	8.66	98TH	21.20	8.35
24.00	9.45	99TH	23.30	9.17

* In ANSUR Chest Circumference was taken (in males) at the level of the nipple. This change was made in order to capture the breadth of the chest at its maximum. The landmark is unchanged for females. This measurement also differs from ANSUR because the tissue is now compressed and the measurement is taken at maximum inspiration.

(D9) CHEST-WAIST DROP (OMPHALION)

FEMALES		
<u>CM</u>		<u>IN</u>
9.83	MEAN	3.87
0.29	STD ERROR (MEAN)	0.11
5.67	STANDARD DEVIATION	2.23
0.20	STD ERROR (STD DEV)	0.08
-10.60	MINIMUM	-4.17
25.60	MAXIMUM	10.08
SKEWNESS		-0.02
KURTOSIS		3.18
COEFFICIENT OF VARIATION		57.6%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
11.77	MEAN	4.63
0.16	STD ERROR (MEAN)	0.06
4.91	STANDARD DEVIATION	1.93
0.11	STD ERROR (STD DEV)	0.04
-8.10	MINIMUM	-3.19
26.40	MAXIMUM	10.39
SKEWNESS		-0.31
KURTOSIS		3.75
COEFFICIENT OF VARIATION		41.7%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES				MALES							
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>	<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>			
1	0.25	1	0.25	-11.55	-	-10.55					
0	0.00	1	0.25	-10.55	-	-9.55					
0	0.00	1	0.25	-9.55	-	-8.55					
0	0.00	1	0.25	-8.55	-	-7.55	1	0.10			
0	0.00	1	0.25	-7.55	-	-6.55	0	0.10			
1	0.25	2	0.51	-6.55	-	-5.55	0	0.10			
0	0.00	2	0.51	-5.55	-	-4.55	0	0.10			
1	0.25	3	0.76	-4.55	-	-3.55	0	0.10			
4	1.01	7	1.77	-3.55	-	-2.55	1	0.20			
1	0.25	8	2.03	-2.55	-	-1.55	0	0.20			
3	0.76	11	2.78	-1.55	-	-0.55	2	0.41			
7	1.77	18	4.56	-0.55	-	0.45	1	0.51			
8	2.03	26	6.58	0.45	-	1.45	3	0.82			
5	1.27	31	7.85	1.45	-	2.45	6	1.43			
9	2.28	40	10.13	2.45	-	3.45	11	2.56			
16	4.05	56	14.18	3.45	-	4.45	16	4.20			
17	4.30	73	18.48	4.45	-	5.45	17	5.94			
18	4.56	91	23.04	5.45	-	6.45	23	8.29			
28	7.09	119	30.13	6.45	-	7.45	44	12.79			
31	7.85	150	37.97	7.45	-	8.45	56	18.53			
34	8.61	184	46.58	8.45	-	9.45	56	24.26			
28	7.09	212	53.67	9.45	-	10.45	55	29.89			
17	4.30	229	57.97	10.45	-	11.45	74	37.46			
38	9.62	267	67.59	11.45	-	12.45	87	46.37			
29	7.34	296	74.94	12.45	-	13.45	89	55.48			
27	6.84	323	81.77	13.45	-	14.45	75	63.15			
22	5.57	345	87.34	14.45	-	15.45	78	71.14			
10	2.53	355	89.87	15.45	-	16.45	64	77.69			
13	3.29	368	93.16	16.45	-	17.45	68	84.65			
7	1.77	375	94.94	17.45	-	18.45	39	88.64			
7	1.77	382	96.71	18.45	-	19.45	37	92.43			
5	1.27	387	97.97	19.45	-	20.45	25	94.98			
2	0.51	389	98.48	20.45	-	21.45	14	96.42			
2	0.51	391	98.99	21.45	-	22.45	13	97.75			
1	0.25	392	99.24	22.45	-	23.45	9	98.67			
1	0.25	393	99.49	23.45	-	24.45	6	99.28			
1	0.25	394	99.75	24.45	-	25.45	0	99.28			
1	0.25	395	100.00	25.45	-	26.45	7	100.00			

(D10) CLAVICLE LINK

The distance between the midline of the body and the acromion right landmark is calculated as one-half of BIACROMIAL BREADTH.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
16.70	6.57	1ST	18.10	7.13
16.70	6.57	2ND	18.70	7.36
16.90	6.65	3RD	19.00	7.48
17.10	6.73	5TH	19.40	7.64
17.20	6.77	10TH	19.70	7.76
17.50	6.89	15TH	19.90	7.83
17.70	6.97	20TH	20.10	7.91
17.80	7.01	25TH	20.20	7.95
17.90	7.05	30TH	20.30	7.99
18.00	7.09	35TH	20.50	8.07
18.10	7.13	40TH	20.60	8.11
18.20	7.17	45TH	20.70	8.15
18.30	7.20	50TH	20.90	8.23
18.40	7.24	55TH	21.00	8.27
18.50	7.28	60TH	21.10	8.31
18.60	7.32	65TH	21.20	8.35
18.80	7.40	70TH	21.30	8.39
18.90	7.44	75TH	21.50	8.46
19.00	7.48	80TH	21.70	8.54
19.20	7.56	85TH	21.90	8.62
19.40	7.64	90TH	22.10	8.70
19.80	7.80	95TH	22.60	8.90
19.90	7.83	97TH	22.80	8.98
20.00	7.87	98TH	23.00	9.06
20.20	7.95	99TH	23.20	9.13

(D10) CLAVICLE LINK

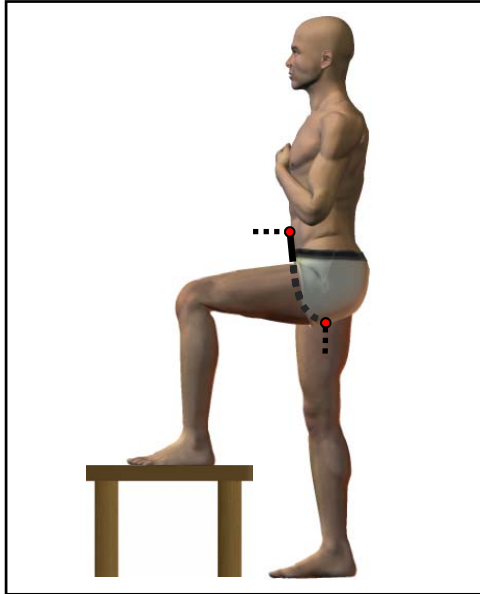
FEMALES		
<u>CM</u>		<u>IN</u>
18.34	MEAN	7.22
0.04	STD ERROR (MEAN)	0.02
0.82	STANDARD DEVIATION	0.32
0.03	STD ERROR (STD DEV)	0.01
15.30	MINIMUM	6.02
21.00	MAXIMUM	8.27
SKEWNESS		0.14
KURTOSIS		2.75
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
20.87	MEAN	8.22
0.03	STD ERROR (MEAN)	0.01
1.00	STANDARD DEVIATION	0.39
0.02	STD ERROR (STD DEV)	0.01
17.20	MINIMUM	6.77
25.20	MAXIMUM	9.92
SKEWNESS		-0.03
KURTOSIS		3.67
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
1	0.25	1	0.25	15.15	-	15.35					
0	0.00	1	0.25	15.35	-	15.55					
0	0.00	1	0.25	15.55	-	15.75					
0	0.00	1	0.25	15.75	-	15.95					
0	0.00	1	0.25	15.95	-	16.15					
0	0.00	1	0.25	16.15	-	16.35					
1	0.25	2	0.51	16.35	-	16.55					
7	1.77	9	2.28	16.55	-	16.75					
5	1.27	14	3.54	16.75	-	16.95					
9	2.28	23	5.82	16.95	-	17.15					
15	3.80	38	9.62	17.15	-	17.35					
17	4.30	55	13.92	17.35	-	17.55	2	0.20	2	0.20	
30	7.59	85	21.52	17.55	-	17.75	3	0.31	5	0.51	
33	8.35	118	29.87	17.75	-	17.95	2	0.20	7	0.72	
32	8.10	150	37.97	17.95	-	18.15	4	0.41	11	1.13	
43	10.89	193	48.86	18.15	-	18.35	2	0.20	13	1.33	
29	7.34	222	56.20	18.35	-	18.55	2	0.20	15	1.54	
31	7.85	253	64.05	18.55	-	18.75	10	1.02	25	2.56	
41	10.38	294	74.43	18.75	-	18.95	9	0.92	34	3.48	
30	7.59	324	82.03	18.95	-	19.15	12	1.23	46	4.71	
18	4.56	342	86.58	19.15	-	19.35	11	1.13	57	5.83	
15	3.80	357	90.38	19.35	-	19.55	24	2.46	81	8.29	
12	3.04	369	93.42	19.55	-	19.75	42	4.30	123	12.59	
12	3.04	381	96.46	19.75	-	19.95	61	6.24	184	18.83	
5	1.27	386	97.72	19.95	-	20.15	59	6.04	243	24.87	
5	1.27	391	98.99	20.15	-	20.35	74	7.57	317	32.45	
1	0.25	392	99.24	20.35	-	20.55	65	6.65	382	39.10	
1	0.25	393	99.49	20.55	-	20.75	79	8.09	461	47.19	
0	0.00	393	99.49	20.75	-	20.95	91	9.31	552	56.50	
2	0.51	395	100.00	20.95	-	21.15	84	8.60	636	65.10	
				21.15	-	21.35	68	6.96	704	72.06	
				21.35	-	21.55	58	5.94	762	77.99	
				21.55	-	21.75	61	6.24	823	84.24	
				21.75	-	21.95	40	4.09	863	88.33	
				21.95	-	22.15	29	2.97	892	91.30	
				22.15	-	22.35	28	2.87	920	94.17	
				22.35	-	22.55	15	1.54	935	95.70	
				22.55	-	22.75	13	1.33	948	97.03	
				22.75	-	22.95	12	1.23	960	98.26	
				22.95	-	23.15	8	0.82	968	99.08	
				23.15	-	23.35	6	0.61	974	99.69	
				23.35	-	23.55	1	0.10	975	99.80	
				23.55	-	23.75	1	0.10	976	99.90	
				23.75	-	23.95	0	0.00	976	99.90	
				23.95	-	24.15	0	0.00	976	99.90	
				24.15	-	24.35	0	0.00	976	99.90	
				24.35	-	24.55	0	0.00	976	99.90	
				24.55	-	24.75	0	0.00	976	99.90	
				24.75	-	24.95	0	0.00	976	99.90	
				24.95	-	25.15	0	0.00	976	99.90	
				25.15	-	25.35	1	0.10	977	100.00	

(D11) CROTCH LENGTH, ANTERIOR (OMPHALION)

The surface distance between the inner thigh landmark and the abdomen at the level of the waist at the navel (omphalion) of a participant standing with one leg on a step is calculated as follows: CROTCH LENGTH (OMPHALION) minus CROTCH LENGTH, POSTERIOR (OMPHALION).



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
22.60	8.90	1ST	20.40	8.03
22.80	8.98	2ND	20.90	8.23
23.40	9.21	3RD	21.40	8.43
24.00	9.45	5TH	22.40	8.82
24.90	9.80	10TH	23.70	9.33
25.50	10.04	15TH	24.40	9.61
25.80	10.16	20TH	25.10	9.88
26.30	10.35	25TH	25.60	10.08
26.90	10.59	30TH	26.10	10.28
27.30	10.75	35TH	26.60	10.47
27.50	10.83	40TH	26.90	10.59
27.80	10.94	45TH	27.20	10.71
28.40	11.18	50TH	27.60	10.87
28.60	11.26	55TH	28.00	11.02
29.40	11.57	60TH	28.30	11.14
29.70	11.69	65TH	28.80	11.34
30.10	11.85	70TH	29.10	11.46
30.50	12.01	75TH	29.60	11.65
30.90	12.17	80TH	30.10	11.85
31.70	12.48	85TH	30.80	12.13
32.20	12.68	90TH	31.80	12.52
33.50	13.19	95TH	33.10	13.03
33.70	13.27	97TH	33.50	13.19
34.40	13.54	98TH	34.40	13.54
35.30	13.90	99TH	36.20	14.25

(D11) CROTCH LENGTH, ANTERIOR (OMPHALION)

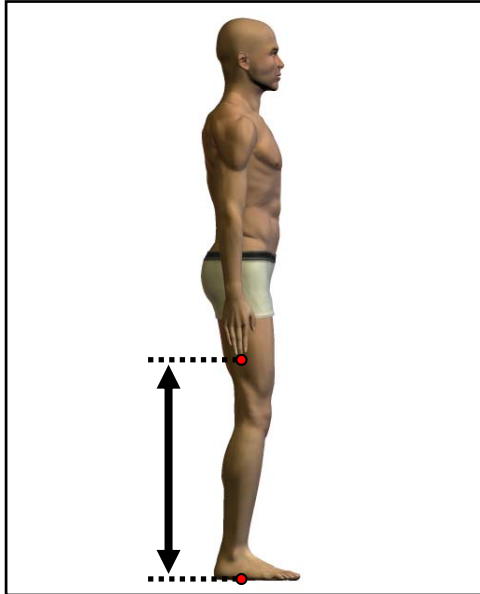
FEMALES		
<u>CM</u>		<u>IN</u>
28.48	MEAN	11.21
0.15	STD ERROR (MEAN)	0.06
2.89	STANDARD DEVIATION	1.14
0.10	STD ERROR (STD DEV)	0.04
21.20	MINIMUM	8.35
36.70	MAXIMUM	14.45
SKEWNESS		0.15
KURTOSIS		2.67
COEFFICIENT OF VARIATION		10.1%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
27.67	MEAN	10.89
0.10	STD ERROR (MEAN)	0.04
3.19	STANDARD DEVIATION	1.25
0.07	STD ERROR (STD DEV)	0.03
18.20	MINIMUM	7.17
37.90	MAXIMUM	14.92
SKEWNESS		0.13
KURTOSIS		3.18
COEFFICIENT OF VARIATION		11.5%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES				MALES							
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
				17.75	-	18.25	1	0.10	1	0.10	
				18.25	-	18.75	0	0.00	1	0.10	
				18.75	-	19.25	0	0.00	1	0.10	
				19.25	-	19.75	5	0.51	6	0.61	
				19.75	-	20.25	2	0.20	8	0.82	
				20.25	-	20.75	13	1.33	21	2.15	
				20.75	-	21.25	10	1.02	31	3.17	
1	0.25	1	0.25	21.25	-	21.75	7	0.72	38	3.89	
0	0.00	1	0.25	21.75	-	22.25	17	1.74	55	5.63	
2	0.51	3	0.76	22.25	-	22.75	22	2.25	77	7.88	
3	0.76	6	1.52	22.75	-	23.25	24	2.46	101	10.34	
6	1.52	12	3.04	23.25	-	23.75	32	3.28	133	13.61	
5	1.27	17	4.30	23.75	-	24.25	48	4.91	181	18.53	
11	2.78	28	7.09	24.25	-	24.75	41	4.20	222	22.72	
14	3.54	42	10.63	24.75	-	25.25	42	4.30	264	27.02	
16	4.05	58	14.68	25.25	-	25.75	41	4.20	305	31.22	
18	4.56	76	19.24	25.75	-	26.25	66	6.76	371	37.97	
24	6.08	100	25.32	26.25	-	26.75	63	6.45	434	44.42	
17	4.30	117	29.62	26.75	-	27.25	67	6.86	501	51.28	
31	7.85	148	37.47	27.25	-	27.75	62	6.35	563	57.63	
35	8.86	183	46.33	27.75	-	28.25	76	7.78	639	65.40	
22	5.57	205	51.90	28.25	-	28.75	51	5.22	690	70.62	
33	8.35	238	60.25	28.75	-	29.25	54	5.53	744	76.15	
11	2.78	249	63.04	29.25	-	29.75	49	5.02	793	81.17	
20	5.06	269	68.10	29.75	-	30.25	37	3.79	830	84.95	
27	6.84	296	74.94	30.25	-	30.75	29	2.97	859	87.92	
23	5.82	319	80.76	30.75	-	31.25	25	2.56	884	90.48	
21	5.32	340	86.08	31.25	-	31.75	21	2.15	905	92.63	
11	2.78	351	88.86	31.75	-	32.25	19	1.94	924	94.58	
12	3.04	363	91.90	32.25	-	32.75	13	1.33	937	95.91	
8	2.03	371	93.92	32.75	-	33.25	12	1.23	949	97.13	
6	1.52	377	95.44	33.25	-	33.75	7	0.72	956	97.85	
9	2.28	386	97.72	33.75	-	34.25	9	0.92	965	98.77	
1	0.25	387	97.97	34.25	-	34.75	2	0.20	967	98.98	
4	1.01	391	98.99	34.75	-	35.25	3	0.31	970	99.28	
1	0.25	392	99.24	35.25	-	35.75	0	0.00	970	99.28	
1	0.25	393	99.49	35.75	-	36.25	1	0.10	971	99.39	
1	0.25	394	99.75	36.25	-	36.75	1	0.10	972	99.49	
1	0.25	395	100.00	36.75	-	37.25	3	0.31	975	99.80	
				37.25	-	37.75	1	0.10	976	99.90	
				37.75	-	38.25	1	0.10	977	100.00	

(D12) DACTYLION HEIGHT

The vertical distance between a standing surface and the dactylon III landmark of a participant standing erect with the arms and hands straight at the sides is calculated as follows: WRIST HEIGHT minus HAND LENGTH.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
56.90	22.40	1ST	58.20	22.91
57.30	22.56	2ND	59.30	23.35
57.80	22.76	3RD	60.00	23.62
58.10	22.87	5TH	60.90	23.98
58.80	23.15	10TH	62.20	24.49
59.60	23.46	15TH	63.20	24.88
60.30	23.74	20TH	63.90	25.16
60.70	23.90	25TH	64.60	25.43
61.00	24.02	30TH	65.00	25.59
61.50	24.21	35TH	65.50	25.79
61.90	24.37	40TH	65.90	25.94
62.40	24.57	45TH	66.10	26.02
62.90	24.76	50TH	66.60	26.22
63.40	24.96	55TH	67.10	26.42
63.70	25.08	60TH	67.50	26.57
64.00	25.20	65TH	67.90	26.73
64.70	25.47	70TH	68.40	26.93
65.00	25.59	75TH	69.10	27.20
65.60	25.83	80TH	69.90	27.52
66.40	26.14	85TH	70.50	27.76
67.00	26.38	90TH	71.60	28.19
68.10	26.81	95TH	72.80	28.66
69.30	27.28	97TH	73.60	28.98
69.70	27.44	98TH	74.50	29.33
71.70	28.23	99TH	75.40	29.69

(D12) DACTYLION HEIGHT

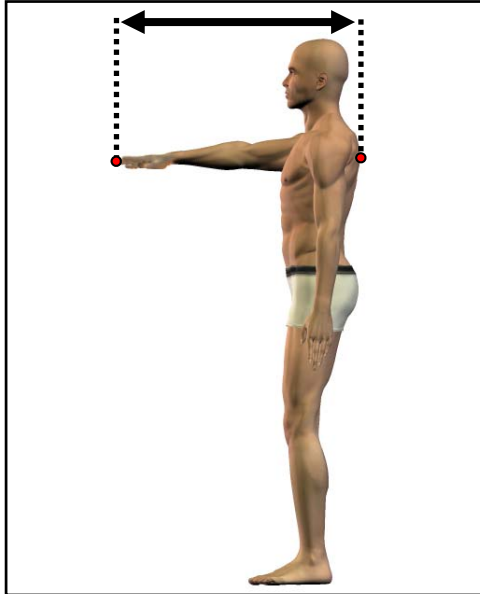
FEMALES		
<u>CM</u>		<u>IN</u>
62.95	MEAN	24.78
0.16	STD ERROR (MEAN)	0.06
3.14	STANDARD DEVIATION	1.23
0.11	STD ERROR (STD DEV)	0.04
52.20	MINIMUM	20.55
72.30	MAXIMUM	28.46
SKEWNESS		0.28
KURTOSIS		2.97
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
66.78	MEAN	26.29
0.12	STD ERROR (MEAN)	0.05
3.60	STANDARD DEVIATION	1.42
0.08	STD ERROR (STD DEV)	0.03
56.30	MINIMUM	22.17
79.30	MAXIMUM	31.22
SKEWNESS		0.04
KURTOSIS		3.11
COEFFICIENT OF VARIATION		5.4%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES								MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
2	0.51	2	0.51	51.55	-	52.55					
1	0.25	3	0.76	52.55	-	53.55					
1	0.25	4	1.01	53.55	-	54.55					
4	1.01	8	2.03	54.55	-	55.55					
6	1.52	14	3.54	55.55	-	56.55	2	0.20	2	0.20	
15	3.80	29	7.34	56.55	-	57.55	6	0.61	8	0.82	
27	6.84	56	14.18	57.55	-	58.55	5	0.51	13	1.33	
39	9.87	95	24.05	58.55	-	59.55	10	1.02	23	2.35	
37	9.37	132	33.42	59.55	-	60.55	23	2.35	46	4.71	
49	12.41	181	45.82	60.55	-	61.55	33	3.38	79	8.09	
43	10.89	224	56.71	61.55	-	62.55	42	4.30	121	12.38	
38	9.62	262	66.33	62.55	-	63.55	57	5.83	178	18.22	
39	9.87	301	76.20	63.55	-	64.55	70	7.16	248	25.38	
34	8.61	335	84.81	64.55	-	65.55	129	13.20	377	38.59	
21	5.32	356	90.13	65.55	-	66.55	118	12.08	495	50.67	
19	4.81	375	94.94	66.55	-	67.55	106	10.85	601	61.51	
10	2.53	385	97.47	67.55	-	68.55	103	10.54	704	72.06	
5	1.27	390	98.73	68.55	-	69.55	72	7.37	776	79.43	
1	0.25	391	98.99	69.55	-	70.55	72	7.37	848	86.80	
1	0.25	392	99.24	70.55	-	71.55	40	4.09	888	90.89	
3	0.76	395	100.00	71.55	-	72.55	38	3.89	926	94.78	
				72.55	-	73.55	23	2.35	949	97.13	
				73.55	-	74.55	14	1.43	963	98.57	
				74.55	-	75.55	7	0.72	970	99.28	
				75.55	-	76.55	5	0.51	975	99.80	
				76.55	-	77.55	1	0.10	976	99.90	
				77.55	-	78.55	0	0.00	976	99.90	
				78.55	-	79.55	1	0.10	977	100.00	

(D13) DACTYLION REACH FROM WALL

The horizontal distance between the plane of the back and the dactylion III landmark of a participant standing erect with the back against a wall and the arm, hand, and fingers extended forward horizontally is calculated as follows: THUMB TIP REACH plus (ANSUR mean of HAND LENGTH minus ANSUR mean of WRIST-THUMB TIP LENGTH).



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
71.80	28.27	1ST	79.00	31.10
73.00	28.74	2ND	79.80	31.42
73.70	29.02	3RD	80.30	31.61
74.10	29.17	5TH	81.40	32.05
75.50	29.72	10TH	82.50	32.48
76.90	30.28	15TH	83.20	32.76
77.50	30.51	20TH	84.00	33.07
77.80	30.63	25TH	84.60	33.31
78.40	30.87	30TH	85.40	33.62
78.90	31.06	35TH	86.10	33.90
79.20	31.18	40TH	86.40	34.02
79.70	31.38	45TH	87.00	34.25
80.40	31.65	50TH	87.40	34.41
80.90	31.85	55TH	87.90	34.61
81.20	31.97	60TH	88.30	34.76
81.80	32.20	65TH	88.70	34.92
82.30	32.40	70TH	89.30	35.16
82.90	32.64	75TH	89.90	35.39
83.60	32.91	80TH	90.70	35.71
84.30	33.19	85TH	91.80	36.14
85.70	33.74	90TH	92.90	36.57
87.60	34.49	95TH	94.70	37.28
88.40	34.80	97TH	96.00	37.80
90.40	35.59	98TH	96.70	38.07
91.40	35.98	99TH	97.60	38.43

(D13) DACTYLION REACH FROM WALL

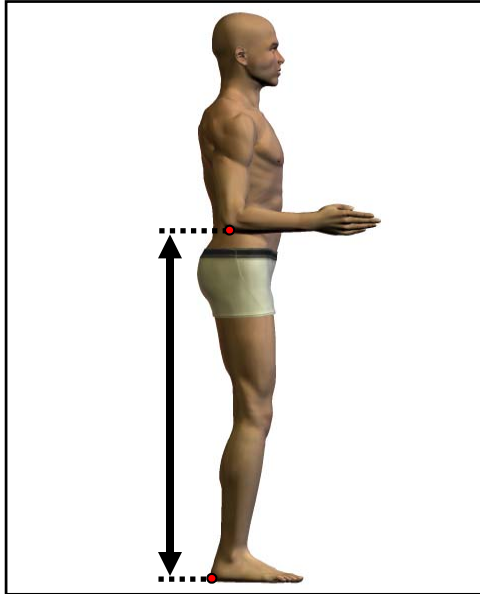
FEMALES		
<u>CM</u>		<u>IN</u>
80.50	MEAN	31.69
0.20	STD ERROR (MEAN)	0.08
3.94	STANDARD DEVIATION	1.55
0.14	STD ERROR (STD DEV)	0.06
70.50	MINIMUM	27.76
93.70	MAXIMUM	36.89
SKEWNESS		0.33
KURTOSIS		3.41
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
87.52	MEAN	34.46
0.13	STD ERROR (MEAN)	0.05
4.02	STANDARD DEVIATION	1.58
0.09	STD ERROR (STD DEV)	0.04
76.20	MINIMUM	30.00
99.20	MAXIMUM	39.06
SKEWNESS		0.25
KURTOSIS		2.92
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES								MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
1	0.25	1	0.25	69.55	-	70.55					
1	0.25	2	0.51	70.55	-	71.55					
2	0.51	4	1.01	71.55	-	72.55					
4	1.01	8	2.03	72.55	-	73.55					
9	2.28	17	4.30	73.55	-	74.55					
13	3.29	30	7.59	74.55	-	75.55					
9	2.28	39	9.87	75.55	-	76.55	1	0.10	1	0.10	
31	7.85	70	17.72	76.55	-	77.55	2	0.20	3	0.31	
43	10.89	113	28.61	77.55	-	78.55	3	0.31	6	0.61	
39	9.87	152	38.48	78.55	-	79.55	14	1.43	20	2.05	
40	10.13	192	48.61	79.55	-	80.55	23	2.35	43	4.40	
38	9.62	230	58.23	80.55	-	81.55	16	1.64	59	6.04	
37	9.37	267	67.59	81.55	-	82.55	45	4.61	104	10.64	
28	7.09	295	74.68	82.55	-	83.55	68	6.96	172	17.60	
28	7.09	323	81.77	83.55	-	84.55	68	6.96	240	24.56	
17	4.30	340	86.08	84.55	-	85.55	67	6.86	307	31.42	
19	4.81	359	90.89	85.55	-	86.55	101	10.34	408	41.76	
10	2.53	369	93.42	86.55	-	87.55	109	11.16	517	52.92	
11	2.78	380	96.20	87.55	-	88.55	109	11.16	626	64.07	
2	0.51	382	96.71	88.55	-	89.55	92	9.42	718	73.49	
6	1.52	388	98.23	89.55	-	90.55	70	7.16	788	80.66	
3	0.76	391	98.99	90.55	-	91.55	56	5.73	844	86.39	
3	0.76	394	99.75	91.55	-	92.55	33	3.38	877	89.76	
0	0.00	394	99.75	92.55	-	93.55	40	4.09	917	93.86	
1	0.25	395	100.00	93.55	-	94.55	21	2.15	938	96.01	
				94.55	-	95.55	12	1.23	950	97.24	
				95.55	-	96.55	13	1.33	963	98.57	
				96.55	-	97.55	6	0.61	969	99.18	
				97.55	-	98.55	4	0.41	973	99.59	
				98.55	-	99.55	4	0.41	977	100.00	

(D14) ELBOW REST HEIGHT, STANDING

The vertical distance between a standing surface and the olecranon bottom landmark of a participant standing erect with the forearm and hand held horizontally is calculated as follows: ELBOW REST HEIGHT plus STATURE minus SITTING HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
94.30	37.13	1ST	99.10	39.02
94.50	37.20	2ND	99.90	39.33
94.80	37.32	3RD	100.70	39.65
95.50	37.60	5TH	101.90	40.12
96.60	38.03	10TH	103.50	40.75
97.30	38.31	15TH	104.90	41.30
98.00	38.58	20TH	106.00	41.73
98.70	38.86	25TH	106.50	41.93
99.50	39.17	30TH	107.20	42.20
100.00	39.37	35TH	107.80	42.44
100.60	39.61	40TH	108.40	42.68
101.00	39.76	45TH	109.00	42.91
101.40	39.92	50TH	109.60	43.15
101.80	40.08	55TH	110.30	43.43
102.40	40.31	60TH	110.80	43.62
103.20	40.63	65TH	111.60	43.94
103.90	40.91	70TH	112.30	44.21
104.60	41.18	75TH	113.00	44.49
105.60	41.57	80TH	113.70	44.76
106.20	41.81	85TH	114.90	45.24
107.30	42.24	90TH	116.10	45.71
108.90	42.87	95TH	117.80	46.38
110.50	43.50	97TH	118.70	46.73
111.50	43.90	98TH	119.30	46.97
112.00	44.09	99TH	120.90	47.60

(D14) ELBOW REST HEIGHT, STANDING

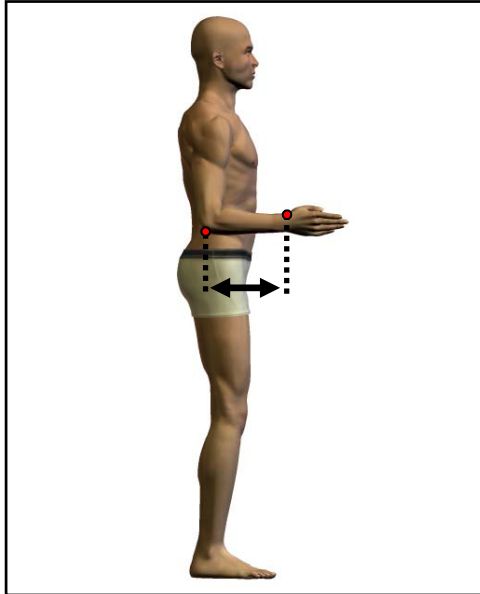
FEMALES		
<u>CM</u>		<u>IN</u>
101.78	MEAN	40.07
0.21	STD ERROR (MEAN)	0.08
4.12	STANDARD DEVIATION	1.62
0.15	STD ERROR (STD DEV)	0.06
91.60	MINIMUM	36.06
115.90	MAXIMUM	45.63
SKEWNESS		0.37
KURTOSIS		2.92
COEFFICIENT OF VARIATION		4.0%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
109.74	MEAN	43.20
0.15	STD ERROR (MEAN)	0.06
4.83	STANDARD DEVIATION	1.90
0.11	STD ERROR (STD DEV)	0.04
95.60	MINIMUM	37.64
128.10	MAXIMUM	50.43
SKEWNESS		0.05
KURTOSIS		2.92
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES								MALES			
<u>F</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>F</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
2	0.51	2	0.51	91.55	-	92.55					
2	0.51	4	1.01	92.55	-	93.55					
8	2.03	12	3.04	93.55	-	94.55					
15	3.80	27	6.84	94.55	-	95.55					
16	4.05	43	10.89	95.55	-	96.55	3	0.31	3	0.31	
31	7.85	74	18.73	96.55	-	97.55	1	0.10	4	0.41	
35	8.86	109	27.59	97.55	-	98.55	4	0.41	8	0.82	
34	8.61	143	36.20	98.55	-	99.55	14	1.43	22	2.25	
34	8.61	177	44.81	99.55	-	100.55	12	1.23	34	3.48	
38	9.62	215	54.43	100.55	-	101.55	17	1.74	51	5.22	
36	9.11	251	63.54	101.55	-	102.55	29	2.97	80	8.19	
31	7.85	282	71.39	102.55	-	103.55	29	2.97	109	11.16	
26	6.58	308	77.97	103.55	-	104.55	34	3.48	143	14.64	
16	4.05	324	82.03	104.55	-	105.55	55	5.63	198	20.27	
29	7.34	353	89.37	105.55	-	106.55	57	5.83	255	26.10	
14	3.54	367	92.91	106.55	-	107.55	66	6.76	321	32.86	
9	2.28	376	95.19	107.55	-	108.55	88	9.01	409	41.86	
9	2.28	385	97.47	108.55	-	109.55	78	7.98	487	49.85	
3	0.76	388	98.23	109.55	-	110.55	84	8.60	571	58.44	
3	0.76	391	98.99	110.55	-	111.55	71	7.27	642	65.71	
3	0.76	394	99.75	111.55	-	112.55	68	6.96	710	72.67	
0	0.00	394	99.75	112.55	-	113.55	64	6.55	774	79.22	
0	0.00	394	99.75	113.55	-	114.55	50	5.12	824	84.34	
0	0.00	394	99.75	114.55	-	115.55	41	4.20	865	88.54	
1	0.25	395	100.00	115.55	-	116.55	33	3.38	898	91.91	
				116.55	-	117.55	32	3.28	930	95.19	
				117.55	-	118.55	20	2.05	950	97.24	
				118.55	-	119.55	10	1.02	960	98.26	
				119.55	-	120.55	5	0.51	965	98.77	
				120.55	-	121.55	6	0.61	971	99.39	
				121.55	-	122.55	4	0.41	975	99.80	
				122.55	-	123.55	1	0.10	976	99.90	
				123.55	-	124.55	0	0.00	976	99.90	
				124.55	-	125.55	0	0.00	976	99.90	
				125.55	-	126.55	0	0.00	976	99.90	
				126.55	-	127.55	0	0.00	976	99.90	
				127.55	-	128.55	1	0.10	977	100.00	

(D15) ELBOW-WRIST LENGTH

The horizontal distance between the olecranon rear landmark and the styliion landmark of a participant standing with the forearm and hand held horizontally is calculated as follows: FOREARM-HAND LENGTH minus HAND LENGTH.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
23.50	9.25	1ST	26.20	10.31
23.70	9.33	2ND	26.40	10.39
23.70	9.33	3RD	26.60	10.47
24.00	9.45	5TH	27.00	10.63
24.30	9.57	10TH	27.30	10.75
24.60	9.69	15TH	27.70	10.91
24.80	9.76	20TH	27.90	10.98
24.90	9.80	25TH	28.20	11.10
25.10	9.88	30TH	28.40	11.18
25.30	9.96	35TH	28.50	11.22
25.40	10.00	40TH	28.70	11.30
25.50	10.04	45TH	29.00	11.42
25.70	10.12	50TH	29.10	11.46
26.00	10.24	55TH	29.30	11.54
26.10	10.28	60TH	29.50	11.61
26.30	10.35	65TH	29.70	11.69
26.40	10.39	70TH	29.90	11.77
26.60	10.47	75TH	30.00	11.81
26.90	10.59	80TH	30.30	11.93
27.10	10.67	85TH	30.60	12.05
27.60	10.87	90TH	30.90	12.17
28.00	11.02	95TH	31.40	12.36
28.30	11.14	97TH	31.70	12.48
28.50	11.22	98TH	32.00	12.60
29.00	11.42	99TH	32.40	12.76

(D15) ELBOW-WRIST LENGTH

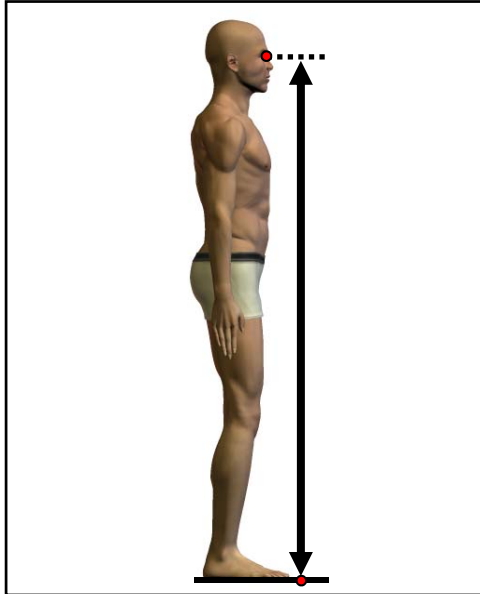
FEMALES		
<u>CM</u>		<u>IN</u>
25.83	MEAN	10.17
0.06	STD ERROR (MEAN)	0.02
1.22	STANDARD DEVIATION	0.48
0.04	STD ERROR (STD DEV)	0.02
23.30	MINIMUM	9.17
30.10	MAXIMUM	11.85
SKEWNESS		0.35
KURTOSIS		2.75
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
29.13	MEAN	11.47
0.04	STD ERROR (MEAN)	0.02
1.37	STANDARD DEVIATION	0.54
0.03	STD ERROR (STD DEV)	0.01
24.30	MINIMUM	9.57
33.20	MAXIMUM	13.07
SKEWNESS		0.05
KURTOSIS		2.84
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCIES		MALES			
<u>F</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>F</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
8	2.03	8	2.03	23.25	-	23.75			
19	4.81	27	6.84	23.75	-	24.25			
31	7.85	58	14.68	24.25	-	24.75	1	0.10	1
44	11.14	102	25.82	24.75	-	25.25	0	0.00	1
63	15.95	165	41.77	25.25	-	25.75	6	0.61	7
59	14.94	224	56.71	25.75	-	26.25	7	0.72	14
50	12.66	274	69.37	26.25	-	26.75	29	2.97	43
41	10.38	315	79.75	26.75	-	27.25	48	4.91	91
35	8.86	350	88.61	27.25	-	27.75	67	6.86	158
22	5.57	372	94.18	27.75	-	28.25	95	9.72	253
13	3.29	385	97.47	28.25	-	28.75	130	13.31	383
6	1.52	391	98.99	28.75	-	29.25	125	12.79	508
2	0.51	393	99.49	29.25	-	29.75	127	13.00	635
2	0.51	395	100.00	29.75	-	30.25	115	11.77	750
				30.25	-	30.75	94	9.62	844
				30.75	-	31.25	63	6.45	907
				31.25	-	31.75	39	3.99	946
				31.75	-	32.25	18	1.84	964
				32.25	-	32.75	10	1.02	974
				32.75	-	33.25	3	0.31	977

(D16) EYE HEIGHT

The vertical distance between a standing surface and the ectocanthus landmark of a participant standing erect with the head in the Frankfurt plane is calculated as follows: EYE HEIGHT SITTING plus STATURE minus SITTING HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
144.70	56.97	1ST	151.50	59.65
145.10	57.13	2ND	153.30	60.35
145.70	57.36	3RD	154.20	60.71
146.30	57.60	5TH	155.40	61.18
147.30	57.99	10TH	158.00	62.20
148.50	58.46	15TH	159.60	62.83
149.30	58.78	20TH	160.80	63.31
150.20	59.13	25TH	161.40	63.54
150.80	59.37	30TH	162.50	63.98
151.60	59.69	35TH	163.30	64.29
152.30	59.96	40TH	164.20	64.65
153.00	60.24	45TH	165.20	65.04
153.70	60.51	50TH	166.10	65.39
154.40	60.79	55TH	166.70	65.63
155.20	61.10	60TH	167.60	65.98
155.80	61.34	65TH	168.30	66.26
156.50	61.61	70TH	168.90	66.50
157.30	61.93	75TH	170.00	66.93
159.20	62.68	80TH	170.90	67.28
160.40	63.15	85TH	171.90	67.68
162.20	63.86	90TH	173.70	68.39
164.70	64.84	95TH	175.70	69.17
165.40	65.12	97TH	177.00	69.69
165.40	65.12	98TH	177.50	69.88
166.40	65.51	99TH	179.60	70.71

(D16) EYE HEIGHT

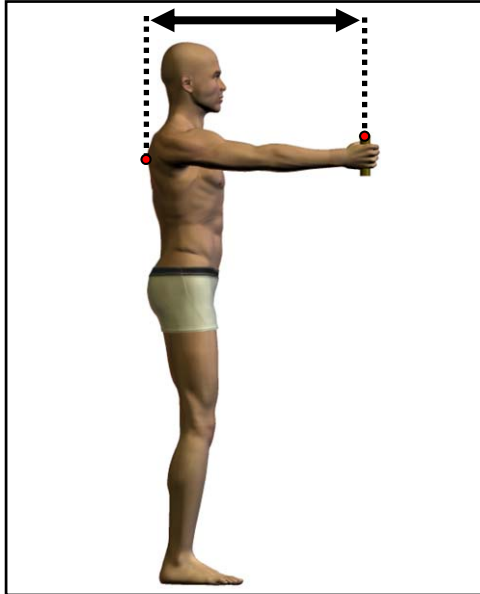
FEMALES		
<u>CM</u>		<u>IN</u>
154.21	MEAN	60.71
0.27	STD ERROR (MEAN)	0.11
5.43	STANDARD DEVIATION	2.14
0.19	STD ERROR (STD DEV)	0.08
139.90	MINIMUM	55.08
170.00	MAXIMUM	66.93
SKEWNESS		0.44
KURTOSIS		2.67
COEFFICIENT OF VARIATION		3.5%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
165.79	MEAN	65.27
0.19	STD ERROR (MEAN)	0.08
6.08	STANDARD DEVIATION	2.39
0.14	STD ERROR (STD DEV)	0.05
144.40	MINIMUM	56.85
188.30	MAXIMUM	74.13
SKEWNESS		-0.03
KURTOSIS		2.99
COEFFICIENT OF VARIATION		3.7%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES				MALES							
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>	<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>			
1	0.25	1	0.25	139.25	-	140.75					
0	0.00	1	0.25	140.75	-	142.25					
2	0.51	3	0.76	142.25	-	143.75					
10	2.53	13	3.29	143.75	-	145.25			1	0.10	0.10
22	5.57	35	8.86	145.25	-	146.75			0	0.00	0.10
27	6.84	62	15.70	146.75	-	148.25			0	0.00	0.10
39	9.87	101	25.57	148.25	-	149.75			2	0.20	0.31
40	10.13	141	35.70	149.75	-	151.25			4	0.41	0.72
38	9.62	179	45.32	151.25	-	152.75			10	1.02	1.74
41	10.38	220	55.70	152.75	-	154.25			14	1.43	3.17
44	11.14	264	66.84	154.25	-	155.75			21	2.15	5.32
37	9.37	301	76.20	155.75	-	157.25			33	3.38	8.70
18	4.56	319	80.76	157.25	-	158.75			39	3.99	12.69
16	4.05	335	84.81	158.75	-	160.25			55	5.63	18.32
21	5.32	356	90.13	160.25	-	161.75			74	7.57	25.90
18	4.56	374	94.68	161.75	-	163.25			92	9.42	35.31
8	2.03	382	96.71	163.25	-	164.75			81	8.29	43.60
9	2.28	391	98.99	164.75	-	166.25			84	8.60	52.20
1	0.25	392	99.24	166.25	-	167.75			94	9.62	61.82
2	0.51	394	99.75	167.75	-	169.25			88	9.01	70.83
1	0.25	395	100.00	169.25	-	170.75			77	7.88	78.71
				170.75	-	172.25			67	6.86	85.57
				172.25	-	173.75			46	4.71	90.28
				173.75	-	175.25			39	3.99	94.27
				175.25	-	176.75			24	2.46	96.72
				176.75	-	178.25			18	1.84	98.57
				178.25	-	179.75			5	0.51	99.08
				179.75	-	181.25			3	0.31	99.39
				181.25	-	182.75			3	0.31	99.69
				182.75	-	184.25			2	0.20	99.90
				184.25	-	185.75			0	0.00	99.90
				185.75	-	187.25			0	0.00	99.90
				187.25	-	188.75			1	0.10	100.00

(D17) FUNCTIONAL GRIP REACH

The horizontal distance between the vertical plane of the back and the center of a 1-1/4-in diameter dowel gripped in the right hand of a participant standing erect with the back against a wall and the arm and hand extended forward horizontally is calculated as follows: THUMB TIP REACH minus ANSUR mean of WRIST-THUMB TIP LENGTH plus ANSUR mean of WRIST-CENTER OF GRIP LENGTH.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
60.40	23.78	1ST	66.60	26.22
61.60	24.25	2ND	67.40	26.54
62.30	24.53	3RD	67.90	26.73
62.70	24.69	5TH	69.00	27.17
64.10	25.24	10TH	70.10	27.60
65.50	25.79	15TH	70.80	27.87
66.10	26.02	20TH	71.60	28.19
66.40	26.14	25TH	72.20	28.43
67.00	26.38	30TH	73.00	28.74
67.50	26.57	35TH	73.70	29.02
67.80	26.69	40TH	74.00	29.13
68.30	26.89	45TH	74.60	29.37
69.00	27.17	50TH	75.00	29.53
69.50	27.36	55TH	75.50	29.72
69.80	27.48	60TH	75.90	29.88
70.40	27.72	65TH	76.30	30.04
70.90	27.91	70TH	76.90	30.28
71.50	28.15	75TH	77.50	30.51
72.20	28.43	80TH	78.30	30.83
72.90	28.70	85TH	79.40	31.26
74.30	29.25	90TH	80.50	31.69
76.20	30.00	95TH	82.30	32.40
77.00	30.31	97TH	83.60	32.91
79.00	31.10	98TH	84.30	33.19
80.00	31.50	99TH	85.20	33.54

(D17) FUNCTIONAL GRIP REACH

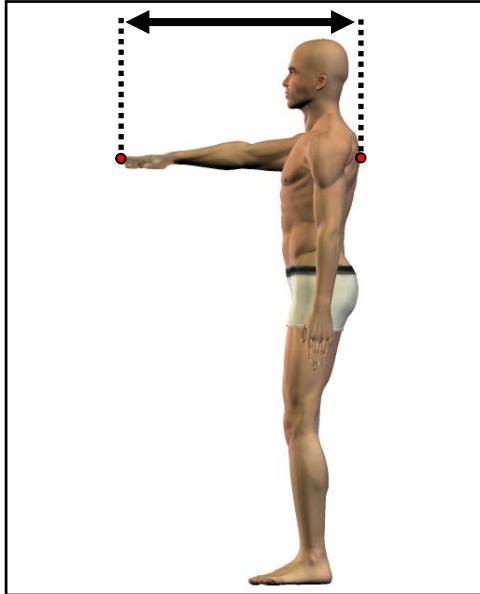
FEMALES		
<u>CM</u>		<u>IN</u>
69.10	MEAN	27.20
0.20	STD ERROR (MEAN)	0.08
3.94	STANDARD DEVIATION	1.55
0.14	STD ERROR (STD DEV)	0.06
59.10	MINIMUM	23.27
82.30	MAXIMUM	32.40
SKEWNESS		0.33
KURTOSIS		3.41
COEFFICIENT OF VARIATION		5.7%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
75.12	MEAN	29.57
0.13	STD ERROR (MEAN)	0.05
4.02	STANDARD DEVIATION	1.58
0.09	STD ERROR (STD DEV)	0.04
63.80	MINIMUM	25.12
86.80	MAXIMUM	34.17
SKEWNESS		0.25
KURTOSIS		2.92
COEFFICIENT OF VARIATION		5.4%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES								MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
2	0.51	2	0.51	58.55	-	59.55					
1	0.25	3	0.76	59.55	-	60.55					
1	0.25	4	1.01	60.55	-	61.55					
8	2.03	12	3.04	61.55	-	62.55					
9	2.28	21	5.32	62.55	-	63.55					
12	3.04	33	8.35	63.55	-	64.55	1	0.10	1	0.10	
14	3.54	47	11.90	64.55	-	65.55	2	0.20	3	0.31	
41	10.38	88	22.28	65.55	-	66.55	8	0.82	11	1.13	
40	10.13	128	32.41	66.55	-	67.55	19	1.94	30	3.07	
43	10.89	171	43.29	67.55	-	68.55	19	1.94	49	5.02	
32	8.10	203	51.39	68.55	-	69.55	23	2.35	72	7.37	
45	11.39	248	62.78	69.55	-	70.55	56	5.73	128	13.10	
30	7.59	278	70.38	70.55	-	71.55	64	6.55	192	19.65	
31	7.85	309	78.23	71.55	-	72.55	70	7.16	262	26.82	
19	4.81	328	83.04	72.55	-	73.55	82	8.39	344	35.21	
18	4.56	346	87.59	73.55	-	74.55	101	10.34	445	45.55	
20	5.06	366	92.66	74.55	-	75.55	113	11.57	558	57.11	
8	2.03	374	94.68	75.55	-	76.55	106	10.85	664	67.96	
6	1.52	380	96.20	76.55	-	77.55	87	8.90	751	76.87	
3	0.76	383	96.96	77.55	-	78.55	61	6.24	812	83.11	
6	1.52	389	98.48	78.55	-	79.55	42	4.30	854	87.41	
2	0.51	391	98.99	79.55	-	80.55	42	4.30	896	91.71	
3	0.76	394	99.75	80.55	-	81.55	33	3.38	929	95.09	
1	0.25	395	100.00	81.55	-	82.55	11	1.13	940	96.21	
				82.55	-	83.55	14	1.43	954	97.65	
				83.55	-	84.55	13	1.33	967	98.98	
				84.55	-	85.55	3	0.31	970	99.28	
				85.55	-	86.55	6	0.61	976	99.90	
				86.55	-	87.55	1	0.10	977	100.00	

(D18) INDEX FINGER REACH

The horizontal distance between the vertical plane of the back and the tip of the right index finger of a participant standing erect with the back against a wall and the arm, hand, and fingers extended forward horizontally is calculated as follows: THUMB TIP REACH minus ANSUR mean of WRIST-THUMB TIP LENGTH plus ANSUR mean of WRIST-INDEX FINGER LENGTH.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
70.70	27.83	1ST	77.70	30.59
71.90	28.31	2ND	78.50	30.91
72.60	28.58	3RD	79.00	31.10
73.00	28.74	5TH	80.10	31.54
74.40	29.29	10TH	81.20	31.97
75.80	29.84	15TH	81.90	32.24
76.40	30.08	20TH	82.70	32.56
76.70	30.20	25TH	83.30	32.80
77.30	30.43	30TH	84.10	33.11
77.80	30.63	35TH	84.80	33.39
78.10	30.75	40TH	85.10	33.50
78.60	30.94	45TH	85.70	33.74
79.30	31.22	50TH	86.10	33.90
79.80	31.42	55TH	86.60	34.09
80.10	31.54	60TH	87.00	34.25
80.70	31.77	65TH	87.40	34.41
81.20	31.97	70TH	88.00	34.65
81.80	32.20	75TH	88.60	34.88
82.50	32.48	80TH	89.40	35.20
83.20	32.76	85TH	90.50	35.63
84.60	33.31	90TH	91.60	36.06
86.50	34.06	95TH	93.40	36.77
87.30	34.37	97TH	94.70	37.28
89.30	35.16	98TH	95.40	37.56
90.30	35.55	99TH	96.30	37.91

(D18) INDEX FINGER REACH

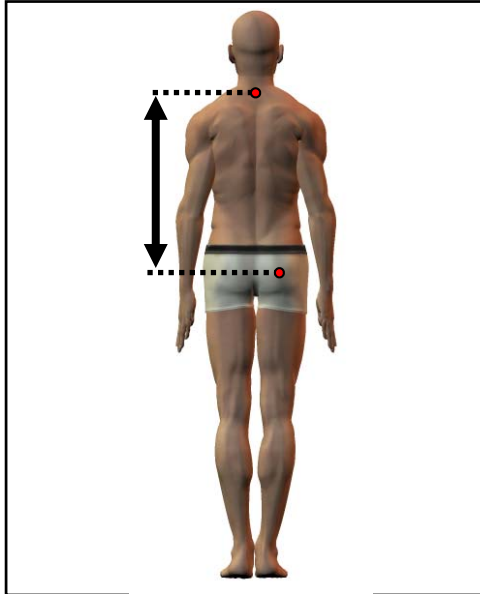
FEMALES		
<u>CM</u>		<u>IN</u>
79.40	MEAN	31.26
0.20	STD ERROR (MEAN)	0.08
3.94	STANDARD DEVIATION	1.55
0.14	STD ERROR (STD DEV)	0.06
69.40	MINIMUM	27.32
92.60	MAXIMUM	36.46
SKEWNESS		0.33
KURTOSIS		3.41
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
86.22	MEAN	33.94
0.13	STD ERROR (MEAN)	0.05
4.02	STANDARD DEVIATION	1.58
0.09	STD ERROR (STD DEV)	0.04
74.90	MINIMUM	29.49
97.90	MAXIMUM	38.54
SKEWNESS		0.25
KURTOSIS		2.92
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES								MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
1	0.25	1	0.25	68.55	-	69.55					
1	0.25	2	0.51	69.55	-	70.55					
2	0.51	4	1.01	70.55	-	71.55					
4	1.01	8	2.03	71.55	-	72.55					
10	2.53	18	4.56	72.55	-	73.55					
12	3.04	30	7.59	73.55	-	74.55					
11	2.78	41	10.38	74.55	-	75.55	1	0.10	1	0.10	
35	8.86	76	19.24	75.55	-	76.55	2	0.20	3	0.31	
40	10.13	116	29.37	76.55	-	77.55	7	0.72	10	1.02	
42	10.63	158	40.00	77.55	-	78.55	18	1.84	28	2.87	
38	9.62	196	49.62	78.55	-	79.55	20	2.05	48	4.91	
38	9.62	234	59.24	79.55	-	80.55	23	2.35	71	7.27	
36	9.11	270	68.35	80.55	-	81.55	50	5.12	121	12.38	
28	7.09	298	75.44	81.55	-	82.55	69	7.06	190	19.45	
25	6.33	323	81.77	82.55	-	83.55	69	7.06	259	26.51	
20	5.06	343	86.84	83.55	-	84.55	75	7.68	334	34.19	
17	4.30	360	91.14	84.55	-	85.55	104	10.64	438	44.83	
11	2.78	371	93.92	85.55	-	86.55	112	11.46	550	56.29	
9	2.28	380	96.20	86.55	-	87.55	105	10.75	655	67.04	
3	0.76	383	96.96	87.55	-	88.55	90	9.21	745	76.25	
5	1.27	388	98.23	88.55	-	89.55	63	6.45	808	82.70	
3	0.76	391	98.99	89.55	-	90.55	44	4.50	852	87.21	
3	0.76	394	99.75	90.55	-	91.55	34	3.48	886	90.69	
0	0.00	394	99.75	91.55	-	92.55	40	4.09	926	94.78	
1	0.25	395	100.00	92.55	-	93.55	14	1.43	940	96.21	
				93.55	-	94.55	13	1.33	953	97.54	
				94.55	-	95.55	13	1.33	966	98.87	
				95.55	-	96.55	4	0.41	970	99.28	
				96.55	-	97.55	6	0.61	976	99.90	
				97.55	-	98.55	1	0.10	977	100.00	

(D19) NECK-BUTTOCK LENGTH

The vertical distance between the cervicale landmark and the buttock point right landmark is calculated as follows: CERVICALE HEIGHT minus BUTTOCK HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
51.10	20.12	1ST	56.90	22.40
51.70	20.35	2ND	58.00	22.83
52.30	20.59	3RD	58.50	23.03
52.60	20.71	5TH	59.30	23.35
53.30	20.98	10TH	60.50	23.82
54.60	21.50	15TH	61.20	24.09
55.20	21.73	20TH	61.80	24.33
55.60	21.89	25TH	62.20	24.49
55.90	22.01	30TH	62.60	24.65
56.30	22.17	35TH	62.90	24.76
56.60	22.28	40TH	63.40	24.96
57.10	22.48	45TH	63.90	25.16
57.50	22.64	50TH	64.40	25.35
57.80	22.76	55TH	64.60	25.43
58.20	22.91	60TH	64.90	25.55
58.50	23.03	65TH	65.30	25.71
58.80	23.15	70TH	65.70	25.87
59.30	23.35	75TH	66.20	26.06
59.70	23.50	80TH	66.70	26.26
60.40	23.78	85TH	67.40	26.54
61.10	24.06	90TH	68.20	26.85
62.90	24.76	95TH	69.50	27.36
63.60	25.04	97TH	70.30	27.68
63.90	25.16	98TH	70.90	27.91
65.00	25.59	99TH	72.20	28.43

(D19) NECK-BUTTOCK LENGTH

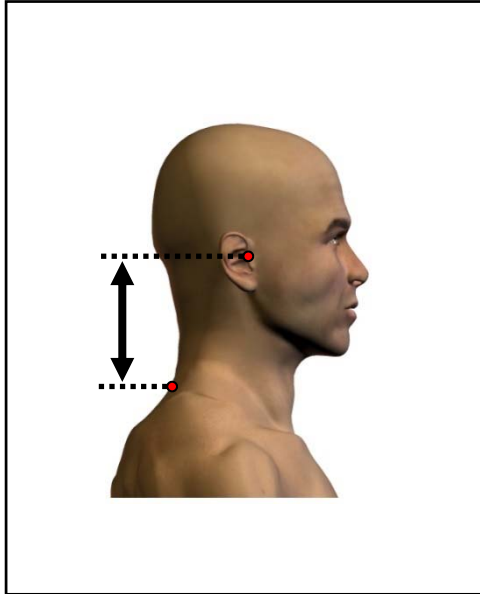
FEMALES		
<u>CM</u>		<u>IN</u>
57.46	MEAN	22.62
0.15	STD ERROR (MEAN)	0.06
2.93	STANDARD DEVIATION	1.16
0.10	STD ERROR (STD DEV)	0.04
49.50	MINIMUM	19.49
65.30	MAXIMUM	25.71
SKEWNESS		0.12
KURTOSIS		3.03
COEFFICIENT OF VARIATION		5.1%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
64.28	MEAN	25.31
0.10	STD ERROR (MEAN)	0.04
3.05	STANDARD DEVIATION	1.20
0.07	STD ERROR (STD DEV)	0.03
56.30	MINIMUM	22.17
74.80	MAXIMUM	29.45
SKEWNESS		0.15
KURTOSIS		3.11
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>	<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>			
2	0.51	2	0.51	49.25 - 49.75	8	0.82	8	0.82			
1	0.25	3	0.76	49.75 - 50.25	3	0.31	11	1.13			
6	1.52	9	2.28	50.25 - 50.75	3	0.31	14	1.43			
7	1.77	16	4.05	50.75 - 51.25	8	0.82	22	2.25			
6	1.52	22	5.57	51.25 - 51.75	17	1.74	39	3.99			
8	2.03	30	7.59	51.75 - 52.25	10	1.02	49	5.02			
18	4.56	48	12.15	52.25 - 52.75	13	1.33	62	6.35			
14	3.54	62	15.70	52.75 - 53.25	24	2.46	86	8.80			
11	2.78	73	18.48	53.25 - 53.75	30	3.07	116	11.87			
12	3.04	85	21.52	53.75 - 54.25	34	3.48	150	15.35			
10	2.53	95	24.05	54.25 - 54.75	31	3.17	181	18.53			
21	5.32	116	29.37	54.75 - 55.25	46	4.71	227	23.23			
30	7.59	146	36.96	55.25 - 55.75	57	5.83	284	29.07			
25	6.33	171	43.29	55.75 - 56.25	60	6.14	344	35.21			
27	6.84	198	50.13	56.25 - 56.75	56	5.73	400	40.94			
15	3.80	213	53.92	56.75 - 57.25	61	6.24	461	47.19			
28	7.09	241	61.01	57.25 - 57.75	73	7.47	534	54.66			
27	6.84	268	67.85	57.75 - 58.25	73	7.47	607	62.13			
28	7.09	296	74.94	58.25 - 58.75	61	6.24	668	68.37			
19	4.81	315	79.75	58.75 - 59.25	51	5.22	719	73.59			
22	5.57	337	85.32	59.25 - 59.75	49	5.02	768	78.61			
12	3.04	349	88.35	59.75 - 60.25	46	4.71	814	83.32			
10	2.53	359	90.89	60.25 - 60.75	39	3.99	853	87.31			
9	2.28	368	93.16	60.75 - 61.25	28	2.87	881	90.17			
5	1.27	373	94.43	61.25 - 61.75	25	2.56	906	92.73			
5	1.27	378	95.70	61.75 - 62.25	17	1.74	923	94.47			
3	0.76	381	96.46	62.25 - 62.75	17	1.74	940	96.21			
4	1.01	385	97.47	62.75 - 63.25	10	1.02	950	97.24			
2	0.51	387	97.97	63.25 - 63.75	11	1.13	961	98.36			
4	1.01	391	98.99	63.75 - 64.25	4	0.41	965	98.77			
1	0.25	392	99.24	64.25 - 64.75	3	0.31	968	99.08			
2	0.51	394	99.75	64.75 - 65.25	2	0.20	970	99.28			
1	0.25	395	100.00	65.25 - 65.75	3	0.31	973	99.59			
				65.75 - 66.25	2	0.20	975	99.80			
				66.25 - 66.75	0	0.00	975	99.80			
				66.75 - 67.25	1	0.10	976	99.90			
				67.25 - 67.75	0	0.00	976	99.90			
				67.75 - 68.25	1	0.10	977	100.00			
				68.25 - 68.75							
				68.75 - 69.25							
				69.25 - 69.75							
				69.75 - 70.25							
				70.25 - 70.75							
				70.75 - 71.25							
				71.25 - 71.75							
				71.75 - 72.25							
				72.25 - 72.75							
				72.75 - 73.25							
				73.25 - 73.75							
				73.75 - 74.25							
				74.25 - 74.75							
				74.75 - 75.25							

(D20) NECK LINK

The vertical distance between the cervicale landmark and the tracion landmark is calculated as follows: STATURE minus TRACION-TOP OF HEAD minus CERVICALE HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
8.20	3.23	1ST	7.80	3.07
8.60	3.39	2ND	8.30	3.27
9.10	3.58	3RD	8.40	3.31
9.20	3.62	5TH	8.60	3.39
9.60	3.78	10TH	9.10	3.58
9.80	3.86	15TH	9.40	3.70
10.00	3.94	20TH	9.60	3.78
10.20	4.02	25TH	9.80	3.86
10.40	4.09	30TH	9.90	3.90
10.60	4.17	35TH	10.10	3.98
10.80	4.25	40TH	10.20	4.02
11.00	4.33	45TH	10.40	4.09
11.20	4.41	50TH	10.50	4.13
11.30	4.45	55TH	10.70	4.21
11.40	4.49	60TH	10.80	4.25
11.50	4.53	65TH	11.00	4.33
11.60	4.57	70TH	11.10	4.37
11.80	4.65	75TH	11.30	4.45
12.00	4.72	80TH	11.50	4.53
12.30	4.84	85TH	11.80	4.65
12.40	4.88	90TH	12.10	4.76
12.80	5.04	95TH	12.60	4.96
13.10	5.16	97TH	12.90	5.08
13.10	5.16	98TH	13.20	5.20
13.50	5.31	99TH	13.50	5.31

(D20) NECK LINK

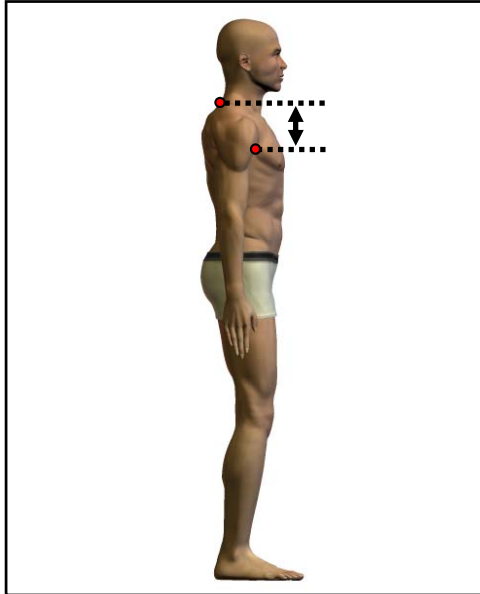
FEMALES		
<u>CM</u>		<u>IN</u>
11.05	MEAN	4.35
0.06	STD ERROR (MEAN)	0.02
1.14	STANDARD DEVIATION	0.45
0.04	STD ERROR (STD DEV)	0.02
7.90	MINIMUM	3.11
14.50	MAXIMUM	5.71
SKEWNESS		-0.16
KURTOSIS		2.90
COEFFICIENT OF VARIATION		10.3%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
10.56	MEAN	4.16
0.04	STD ERROR (MEAN)	0.02
1.19	STANDARD DEVIATION	0.47
0.03	STD ERROR (STD DEV)	0.01
6.60	MINIMUM	2.60
14.80	MAXIMUM	5.83
SKEWNESS		0.14
KURTOSIS		3.14
COEFFICIENT OF VARIATION		11.3%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCIES		MALES				
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	
				6.55	-	6.75	1	0.10	1	0.10
				6.75	-	6.95	0	0.00	1	0.10
				6.95	-	7.15	1	0.10	2	0.20
				7.15	-	7.35	0	0.00	2	0.20
				7.35	-	7.55	2	0.20	4	0.41
				7.55	-	7.75	3	0.31	7	0.72
2	0.51	2	0.51	7.75	-	7.95	2	0.20	9	0.92
3	0.76	5	1.27	7.95	-	8.15	3	0.31	12	1.23
2	0.51	7	1.77	8.15	-	8.35	7	0.72	19	1.94
4	1.01	11	2.78	8.35	-	8.55	13	1.33	32	3.28
6	1.52	17	4.30	8.55	-	8.75	15	1.54	47	4.81
3	0.76	20	5.06	8.75	-	8.95	22	2.25	69	7.06
6	1.52	26	6.58	8.95	-	9.15	15	1.54	84	8.60
10	2.53	36	9.11	9.15	-	9.35	30	3.07	114	11.67
14	3.54	50	12.66	9.35	-	9.55	30	3.07	144	14.74
21	5.32	71	17.97	9.55	-	9.75	50	5.12	194	19.86
18	4.56	89	22.53	9.75	-	9.95	65	6.65	259	26.51
23	5.82	112	28.35	9.95	-	10.15	62	6.35	321	32.86
28	7.09	140	35.44	10.15	-	10.35	55	5.63	376	38.49
22	5.57	162	41.01	10.35	-	10.55	68	6.96	444	45.45
22	5.57	184	46.58	10.55	-	10.75	64	6.55	508	52.00
25	6.33	209	52.91	10.75	-	10.95	70	7.16	578	59.16
25	6.33	234	59.24	10.95	-	11.15	71	7.27	649	66.43
29	7.34	263	66.58	11.15	-	11.35	48	4.91	697	71.34
27	6.84	290	73.42	11.35	-	11.55	48	4.91	745	76.25
25	6.33	315	79.75	11.55	-	11.75	45	4.61	790	80.86
18	4.56	333	84.30	11.75	-	11.95	35	3.58	825	84.44
11	2.78	344	87.09	11.95	-	12.15	32	3.28	857	87.72
11	2.78	355	89.87	12.15	-	12.35	39	3.99	896	91.71
13	3.29	368	93.16	12.35	-	12.55	22	2.25	918	93.96
7	1.77	375	94.94	12.55	-	12.75	11	1.13	929	95.09
8	2.03	383	96.96	12.75	-	12.95	15	1.54	944	96.62
8	2.03	391	98.99	12.95	-	13.15	11	1.13	955	97.75
1	0.25	392	99.24	13.15	-	13.35	7	0.72	962	98.46
1	0.25	393	99.49	13.35	-	13.55	8	0.82	970	99.28
0	0.00	393	99.49	13.55	-	13.75	2	0.20	972	99.49
1	0.25	394	99.75	13.75	-	13.95	2	0.20	974	99.69
0	0.00	394	99.75	13.95	-	14.15	0	0.00	974	99.69
0	0.00	394	99.75	14.15	-	14.35	2	0.20	976	99.90
1	0.25	395	100.00	14.35	-	14.55	0	0.00	976	99.90
				14.55	-	14.75	0	0.00	976	99.90
				14.75	-	14.95	1	0.10	977	100.00

(D21) NECK-SCYE LENGTH

The vertical distance between the cervicale landmark and the anterior scye landmark is calculated as follows: CERVICALE HEIGHT minus AXILLA HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
12.80	5.04	1ST	16.20	6.38
13.10	5.16	2ND	16.60	6.54
13.20	5.20	3RD	16.80	6.61
13.40	5.28	5TH	17.20	6.77
14.00	5.51	10TH	17.60	6.93
14.50	5.71	15TH	17.90	7.05
14.80	5.83	20TH	18.10	7.13
15.00	5.91	25TH	18.30	7.20
15.10	5.94	30TH	18.50	7.28
15.30	6.02	35TH	18.70	7.36
15.50	6.10	40TH	18.80	7.40
15.70	6.18	45TH	19.00	7.48
15.80	6.22	50TH	19.20	7.56
16.00	6.30	55TH	19.30	7.60
16.10	6.34	60TH	19.50	7.68
16.30	6.42	65TH	19.70	7.76
16.40	6.46	70TH	19.90	7.83
16.60	6.54	75TH	20.10	7.91
16.80	6.61	80TH	20.40	8.03
17.20	6.77	85TH	20.80	8.19
17.50	6.89	90TH	21.10	8.31
17.80	7.01	95TH	21.70	8.54
18.20	7.17	97TH	22.00	8.66
18.40	7.24	98TH	22.30	8.78
19.20	7.56	99TH	22.60	8.90

(D21) NECK-SCYE LENGTH

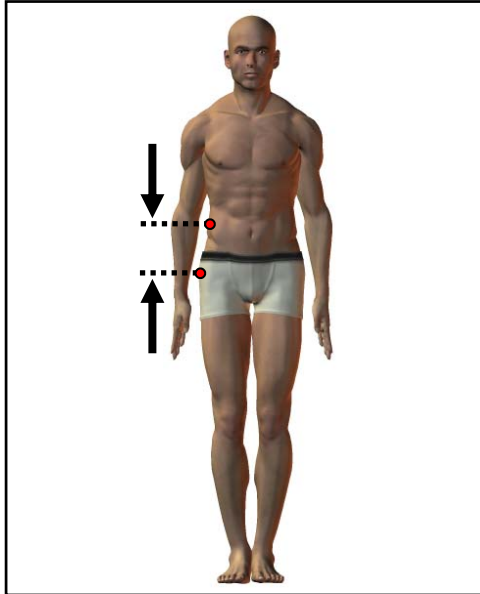
FEMALES		
<u>CM</u>		<u>IN</u>
15.78	MEAN	6.21
0.07	STD ERROR (MEAN)	0.03
1.33	STANDARD DEVIATION	0.52
0.05	STD ERROR (STD DEV)	0.02
12.20	MINIMUM	4.80
20.00	MAXIMUM	7.87
SKEWNESS		-0.02
KURTOSIS		3.25
COEFFICIENT OF VARIATION		8.4%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
19.26	MEAN	7.58
0.04	STD ERROR (MEAN)	0.02
1.37	STANDARD DEVIATION	0.54
0.03	STD ERROR (STD DEV)	0.01
14.60	MINIMUM	5.75
24.00	MAXIMUM	9.45
SKEWNESS		0.22
KURTOSIS		3.01
COEFFICIENT OF VARIATION		7.1%
NUMBER OF PARTICIPANTS		977

FREQUENCIES												
FEMALES				MALES								
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>	<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>				
2	0.51	2	0.51	0	11.75	-	12.25	0	0	0.00	0	0.00
1	0.25	3	0.76	0	12.25	-	12.75	0	0	0.00	0	0.00
12	3.04	15	3.80	0	12.75	-	13.25	0	0	0.00	0	0.00
19	4.81	34	8.61	0	13.25	-	13.75	0	0	0.00	0	0.00
16	4.05	50	12.66	0	13.75	-	14.25	0	0	0.00	0	0.00
32	8.10	82	20.76	0	14.25	-	14.75	0	1	0.10	1	0.10
61	15.44	143	36.20	0	14.75	-	15.25	0	1	0.10	2	0.20
56	14.18	199	50.38	0	15.25	-	15.75	0	3	0.31	5	0.51
60	15.19	259	65.57	0	15.75	-	16.25	0	11	1.13	16	1.64
52	13.16	311	78.73	0	16.25	-	16.75	0	23	2.35	39	3.99
33	8.35	344	87.09	0	16.75	-	17.25	0	42	4.30	81	8.29
23	5.82	367	92.91	0	17.25	-	17.75	0	64	6.55	145	14.84
17	4.30	384	97.22	0	17.75	-	18.25	0	111	11.36	256	26.20
4	1.01	388	98.23	0	18.25	-	18.75	0	152	15.56	408	41.76
5	1.27	393	99.49	0	18.75	-	19.25	0	150	15.35	558	57.11
1	0.25	394	99.75	0	19.25	-	19.75	0	122	12.49	680	69.60
1	0.25	395	100.00	0	19.75	-	20.25	0	115	11.77	795	81.37
0	0.00	0	0.00	0	20.25	-	20.75	0	64	6.55	859	87.92
0	0.00	0	0.00	0	20.75	-	21.25	0	58	5.94	917	93.86
0	0.00	0	0.00	0	21.25	-	21.75	0	29	2.97	946	96.83
0	0.00	0	0.00	0	21.75	-	22.25	0	15	1.54	961	98.36
0	0.00	0	0.00	0	22.25	-	22.75	0	11	1.13	972	99.49
0	0.00	0	0.00	0	22.75	-	23.25	0	4	0.41	976	99.90
0	0.00	0	0.00	0	23.25	-	23.75	0	0	0.00	976	99.90
0	0.00	0	0.00	0	23.75	-	24.25	0	1	0.10	977	100.00

(D22) PELVIC LINK

The vertical distance between the iliocristale right landmark and the level of the trochanterion landmark is calculated as follows: ILIOCRISTALE HEIGHT minus TROCHANTERION HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
11.40	4.49	1ST	11.80	4.65
11.60	4.57	2ND	12.40	4.88
12.20	4.80	3RD	12.90	5.08
12.50	4.92	5TH	13.50	5.31
13.20	5.20	10TH	14.20	5.59
13.60	5.35	15TH	14.70	5.79
14.00	5.51	20TH	15.10	5.94
14.30	5.63	25TH	15.30	6.02
14.60	5.75	30TH	15.60	6.14
14.80	5.83	35TH	15.90	6.26
15.00	5.91	40TH	16.10	6.34
15.20	5.98	45TH	16.40	6.46
15.40	6.06	50TH	16.70	6.57
15.70	6.18	55TH	16.90	6.65
15.90	6.26	60TH	17.10	6.73
16.20	6.38	65TH	17.30	6.81
16.40	6.46	70TH	17.60	6.93
16.70	6.57	75TH	17.80	7.01
17.00	6.69	80TH	18.10	7.13
17.40	6.85	85TH	18.40	7.24
17.60	6.93	90TH	18.90	7.44
18.20	7.17	95TH	19.70	7.76
18.30	7.20	97TH	20.00	7.87
18.70	7.36	98TH	20.30	7.99
19.00	7.48	99TH	20.80	8.19

(D22) PELVIC LINK

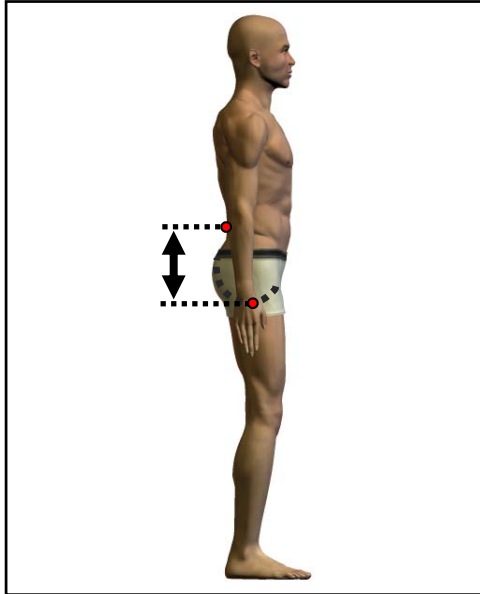
FEMALES		
<u>CM</u>		<u>IN</u>
15.45	MEAN	6.08
0.09	STD ERROR (MEAN)	0.03
1.72	STANDARD DEVIATION	0.68
0.06	STD ERROR (STD DEV)	0.02
9.10	MINIMUM	3.58
19.90	MAXIMUM	7.83
SKEWNESS		-0.19
KURTOSIS		2.84
COEFFICIENT OF VARIATION		11.2%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
16.59	MEAN	6.53
0.06	STD ERROR (MEAN)	0.02
1.86	STANDARD DEVIATION	0.73
0.04	STD ERROR (STD DEV)	0.02
11.40	MINIMUM	4.49
23.80	MAXIMUM	9.37
SKEWNESS		-0.10
KURTOSIS		3.05
COEFFICIENT OF VARIATION		11.2%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES				MALES							
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
1	0.25	1	0.25	8.75	-	9.25					
1	0.25	2	0.51	9.25	-	9.75					
1	0.25	3	0.76	9.75	-	10.25					
1	0.25	4	1.01	10.25	-	10.75					
2	0.51	6	1.52	10.75	-	11.25					
6	1.52	12	3.04	11.25	-	11.75	3	0.31	3	0.31	
5	1.27	17	4.30	11.75	-	12.25	4	0.41	7	0.72	
9	2.28	26	6.58	12.25	-	12.75	9	0.92	16	1.64	
23	5.82	49	12.41	12.75	-	13.25	19	1.94	35	3.58	
27	6.84	76	19.24	13.25	-	13.75	27	2.76	62	6.35	
36	9.11	112	28.35	13.75	-	14.25	35	3.58	97	9.93	
35	8.86	147	37.22	14.25	-	14.75	51	5.22	148	15.15	
52	13.16	199	50.38	14.75	-	15.25	70	7.16	218	22.31	
32	8.10	231	58.48	15.25	-	15.75	99	10.13	317	32.45	
44	11.14	275	69.62	15.75	-	16.25	104	10.64	421	43.09	
37	9.37	312	78.99	16.25	-	16.75	100	10.24	521	53.33	
30	7.59	342	86.58	16.75	-	17.25	97	9.93	618	63.25	
28	7.09	370	93.67	17.25	-	17.75	85	8.70	703	71.95	
13	3.29	383	96.96	17.75	-	18.25	94	9.62	797	81.58	
7	1.77	390	98.73	18.25	-	18.75	53	5.42	850	87.00	
2	0.51	392	99.24	18.75	-	19.25	41	4.20	891	91.20	
2	0.51	394	99.75	19.25	-	19.75	39	3.99	930	95.19	
1	0.25	395	100.00	19.75	-	20.25	21	2.15	951	97.34	
				20.25	-	20.75	16	1.64	967	98.98	
				20.75	-	21.25	6	0.61	973	99.59	
				21.25	-	21.75	2	0.20	975	99.80	
				21.75	-	22.25	0	0.00	975	99.80	
				22.25	-	22.75	0	0.00	975	99.80	
				22.75	-	23.25	1	0.10	976	99.90	
				23.25	-	23.75	0	0.00	976	99.90	
				23.75	-	24.25	1	0.10	977	100.00	

(D23) RISE (OMPHALION)

The vertical distance between the level of the waist at the navel (omphalion) and the crotch of a participant standing erect is calculated as follows: WAIST HEIGHT (OMPHALION) minus CROTCH HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
16.20	6.38	1ST	16.30	6.42
16.70	6.57	2ND	16.70	6.57
16.90	6.65	3RD	17.20	6.77
17.70	6.97	5TH	17.60	6.93
18.00	7.09	10TH	18.40	7.24
18.60	7.32	15TH	18.70	7.36
18.90	7.44	20TH	19.10	7.52
19.40	7.64	25TH	19.50	7.68
19.60	7.72	30TH	19.70	7.76
19.80	7.80	35TH	20.00	7.87
20.10	7.91	40TH	20.40	8.03
20.40	8.03	45TH	20.60	8.11
20.70	8.15	50TH	20.90	8.23
20.90	8.23	55TH	21.00	8.27
21.00	8.27	60TH	21.30	8.39
21.40	8.43	65TH	21.70	8.54
21.60	8.50	70TH	22.00	8.66
22.00	8.66	75TH	22.30	8.78
22.20	8.74	80TH	22.60	8.90
22.50	8.86	85TH	22.90	9.02
23.00	9.06	90TH	23.40	9.21
23.50	9.25	95TH	24.20	9.53
24.20	9.53	97TH	24.60	9.69
24.40	9.61	98TH	25.00	9.84
24.90	9.80	99TH	25.80	10.16

(D23) RISE (OMPHALION)

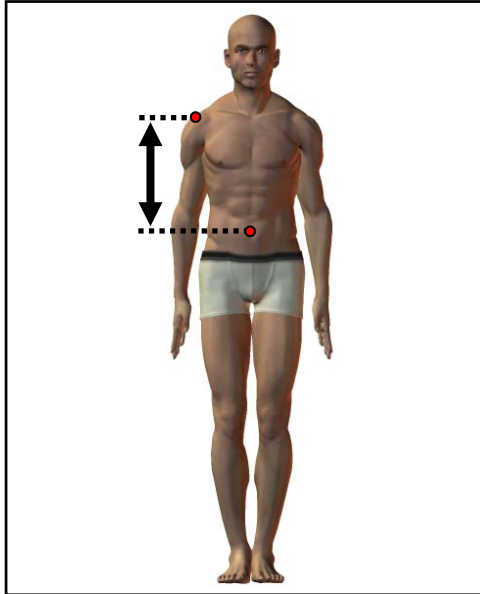
FEMALES		
<u>CM</u>		<u>IN</u>
20.59	MEAN	8.11
0.10	STD ERROR (MEAN)	0.04
1.90	STANDARD DEVIATION	0.75
0.07	STD ERROR (STD DEV)	0.03
12.80	MINIMUM	5.04
26.60	MAXIMUM	10.47
SKEWNESS		0.00
KURTOSIS		3.01
COEFFICIENT OF VARIATION		9.2%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
20.87	MEAN	8.22
0.06	STD ERROR (MEAN)	0.03
2.01	STANDARD DEVIATION	0.79
0.05	STD ERROR (STD DEV)	0.02
15.50	MINIMUM	6.10
27.40	MAXIMUM	10.79
SKEWNESS		0.11
KURTOSIS		2.89
COEFFICIENT OF VARIATION		9.6%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES								MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
1	0.25	1	0.25	12.75	-	13.25					
0	0.00	1	0.25	13.25	-	13.75					
1	0.25	2	0.51	13.75	-	14.25					
0	0.00	2	0.51	14.25	-	14.75					
0	0.00	2	0.51	14.75	-	15.25					
5	1.27	7	1.77	15.25	-	15.75					
1	0.25	8	2.03	15.75	-	16.25	2	0.20	2	0.20	
7	1.77	15	3.80	16.25	-	16.75	6	0.61	8	0.82	
12	3.04	27	6.84	16.75	-	17.25	8	0.82	16	1.64	
14	3.54	41	10.38	17.25	-	17.75	11	1.13	27	2.76	
27	6.84	68	17.22	17.75	-	18.25	15	1.54	42	4.30	
29	7.34	97	24.56	18.25	-	18.75	19	1.94	61	6.24	
20	5.06	117	29.62	18.75	-	19.25	46	4.71	107	10.95	
41	10.38	158	40.00	19.25	-	19.75	61	6.24	168	17.20	
36	9.11	194	49.11	19.75	-	20.25	78	7.98	246	25.18	
34	8.61	228	57.72	20.25	-	20.75	85	8.70	331	33.88	
41	10.38	269	68.10	20.75	-	21.25	96	9.83	427	43.71	
32	8.10	301	76.20	21.25	-	21.75	113	11.57	540	55.27	
30	7.59	331	83.80	21.75	-	22.25	91	9.31	631	64.59	
29	7.34	360	91.14	22.25	-	22.75	95	9.72	726	74.31	
14	3.54	374	94.68	22.75	-	23.25	88	9.01	814	83.32	
8	2.03	382	96.71	23.25	-	23.75	57	5.83	871	89.15	
5	1.27	387	97.97	23.75	-	24.25	38	3.89	909	93.04	
5	1.27	392	99.24	24.25	-	24.75	24	2.46	933	95.50	
2	0.51	394	99.75	24.75	-	25.25	17	1.74	950	97.24	
0	0.00	394	99.75	25.25	-	25.75	13	1.33	963	98.57	
0	0.00	394	99.75	25.75	-	26.25	6	0.61	969	99.18	
1	0.25	395	100.00	26.25	-	26.75	3	0.31	972	99.49	
				26.75	-	27.25	3	0.31	975	99.80	
				27.25	-	27.75	1	0.10	976	99.90	
							1	0.10	977	100.00	

(D24) SHOULDER-WAIST LENGTH (OMPHALION)

The vertical distance between the acromion right landmark and the level of the waist at the navel (omphalion) of a participant standing erect is calculated as follows: ACROMIAL HEIGHT minus WAIST HEIGHT (OMPHALION).



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
30.40	11.97	1ST	33.30	13.11
31.00	12.20	2ND	33.70	13.27
31.70	12.48	3RD	34.10	13.43
32.20	12.68	5TH	34.60	13.62
33.00	12.99	10TH	35.70	14.06
33.50	13.19	15TH	36.30	14.29
34.00	13.39	20TH	36.80	14.49
34.30	13.50	25TH	37.10	14.61
34.60	13.62	30TH	37.40	14.72
35.10	13.82	35TH	37.70	14.84
35.40	13.94	40TH	38.10	15.00
35.60	14.02	45TH	38.50	15.16
35.90	14.13	50TH	38.80	15.28
36.10	14.21	55TH	39.20	15.43
36.40	14.33	60TH	39.50	15.55
36.80	14.49	65TH	39.90	15.71
37.10	14.61	70TH	40.30	15.87
37.40	14.72	75TH	40.70	16.02
37.80	14.88	80TH	41.10	16.18
38.10	15.00	85TH	41.50	16.34
38.90	15.31	90TH	42.00	16.54
40.10	15.79	95TH	42.90	16.89
40.70	16.02	97TH	43.50	17.13
42.20	16.61	98TH	43.90	17.28
42.60	16.77	99TH	44.80	17.64

(D24) SHOULDER-WAIST LENGTH (OMPHALION)

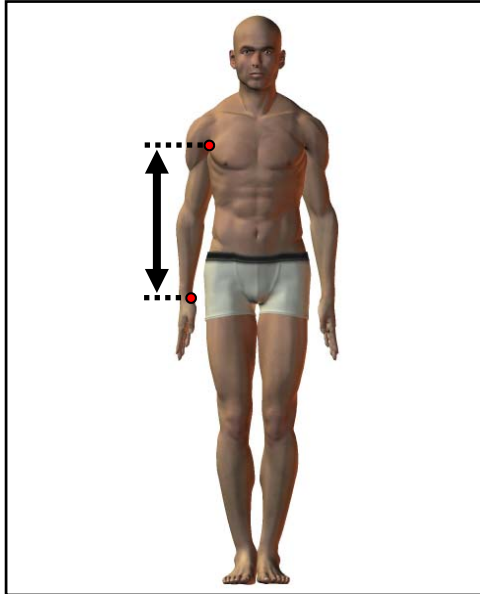
FEMALES		
<u>CM</u>		<u>IN</u>
35.95	MEAN	14.15
0.12	STD ERROR (MEAN)	0.05
2.39	STANDARD DEVIATION	0.94
0.08	STD ERROR (STD DEV)	0.03
29.00	MINIMUM	11.42
43.00	MAXIMUM	16.93
SKEWNESS		0.29
KURTOSIS		3.39
COEFFICIENT OF VARIATION		6.6%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
38.84	MEAN	15.29
0.08	STD ERROR (MEAN)	0.03
2.51	STANDARD DEVIATION	0.99
0.06	STD ERROR (STD DEV)	0.02
31.50	MINIMUM	12.40
48.10	MAXIMUM	18.94
SKEWNESS		0.01
KURTOSIS		2.88
COEFFICIENT OF VARIATION		6.5%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES				MALES							
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
1	0.25	1	0.25	28.75	-	29.25					
1	0.25	2	0.51	29.25	-	29.75					
1	0.25	3	0.76	29.75	-	30.25					
6	1.52	9	2.28	30.25	-	30.75					
4	1.01	13	3.29	30.75	-	31.25					
8	2.03	21	5.32	31.25	-	31.75	2	0.20	2	0.20	
11	2.78	32	8.10	31.75	-	32.25	4	0.41	6	0.61	
12	3.04	44	11.14	32.25	-	32.75	3	0.31	9	0.92	
18	4.56	62	15.70	32.75	-	33.25	4	0.41	13	1.33	
26	6.58	88	22.28	33.25	-	33.75	15	1.54	28	2.87	
29	7.34	117	29.62	33.75	-	34.25	21	2.15	49	5.02	
36	9.11	153	38.73	34.25	-	34.75	23	2.35	72	7.37	
22	5.57	175	44.30	34.75	-	35.25	26	2.66	98	10.03	
41	10.38	216	54.68	35.25	-	35.75	35	3.58	133	13.61	
41	10.38	257	65.06	35.75	-	36.25	46	4.71	179	18.32	
24	6.08	281	71.14	36.25	-	36.75	55	5.63	234	23.95	
25	6.33	306	77.47	36.75	-	37.25	77	7.88	311	31.83	
25	6.33	331	83.80	37.25	-	37.75	92	9.42	403	41.25	
22	5.57	353	89.37	37.75	-	38.25	74	7.57	477	48.82	
11	2.78	364	92.15	38.25	-	38.75	80	8.19	557	57.01	
8	2.03	372	94.18	38.75	-	39.25	81	8.29	638	65.30	
3	0.76	375	94.94	39.25	-	39.75	65	6.65	703	71.95	
8	2.03	383	96.96	39.75	-	40.25	46	4.71	749	76.66	
5	1.27	388	98.23	40.25	-	40.75	53	5.42	802	82.09	
2	0.51	390	98.73	40.75	-	41.25	50	5.12	852	87.21	
0	0.00	390	98.73	41.25	-	41.75	28	2.87	880	90.07	
1	0.25	391	98.99	41.75	-	42.25	41	4.20	921	94.27	
2	0.51	393	99.49	42.25	-	42.75	17	1.74	938	96.01	
2	0.51	395	100.00	42.75	-	43.25	12	1.23	950	97.24	
				43.25	-	43.75	9	0.92	959	98.16	
				43.75	-	44.25	8	0.82	967	98.98	
				44.25	-	44.75	3	0.31	970	99.28	
				44.75	-	45.25	4	0.41	974	99.69	
				45.25	-	45.75	1	0.10	975	99.80	
				45.75	-	46.25	1	0.10	976	99.90	
				46.25	-	46.75	0	0.00	976	99.90	
				46.75	-	47.25	0	0.00	976	99.90	
				47.25	-	47.75	0	0.00	976	99.90	
				47.75	-	48.25	1	0.10	977	100.00	

(D25) SLEEVE INSEAM

The vertical distance between the anterior-scapula-on-the-torso landmark and the stylium landmark of a participant standing erect with the arms straight at the sides is calculated as follows: AXILLA HEIGHT minus WRIST HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
39.60	15.59	1ST	41.80	16.46
39.90	15.71	2ND	42.20	16.61
40.30	15.87	3RD	42.80	16.85
40.80	16.06	5TH	43.80	17.24
41.60	16.38	10TH	44.70	17.60
42.00	16.54	15TH	45.50	17.91
42.60	16.77	20TH	46.10	18.15
42.80	16.85	25TH	46.70	18.39
43.20	17.01	30TH	47.10	18.54
43.50	17.13	35TH	47.50	18.70
43.70	17.20	40TH	47.80	18.82
44.10	17.36	45TH	48.30	19.02
44.40	17.48	50TH	48.60	19.13
44.70	17.60	55TH	49.00	19.29
45.30	17.83	60TH	49.30	19.41
45.60	17.95	65TH	49.60	19.53
46.00	18.11	70TH	49.90	19.65
46.40	18.27	75TH	50.30	19.80
46.80	18.43	80TH	50.60	19.92
47.50	18.70	85TH	51.30	20.20
47.90	18.86	90TH	52.30	20.59
49.20	19.37	95TH	53.20	20.94
49.70	19.57	97TH	53.80	21.18
50.70	19.96	98TH	54.60	21.50
51.00	20.08	99TH	55.10	21.69

(D25) SLEEVE INSEAM

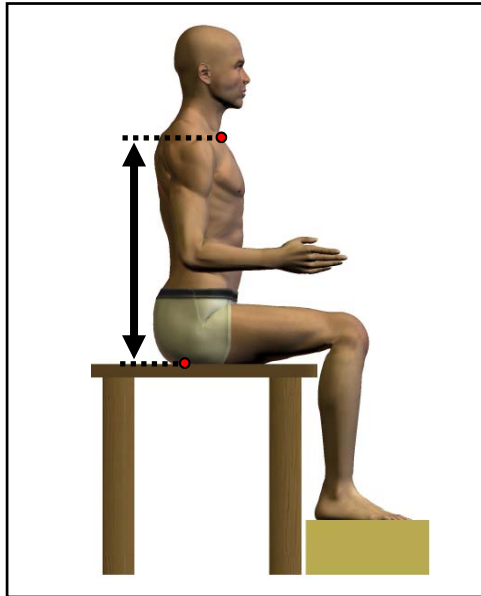
FEMALES		
<u>CM</u>		<u>IN</u>
44.69	MEAN	17.60
0.13	STD ERROR (MEAN)	0.05
2.59	STANDARD DEVIATION	1.02
0.09	STD ERROR (STD DEV)	0.04
37.50	MINIMUM	14.76
53.20	MAXIMUM	20.94
SKEWNESS		0.33
KURTOSIS		3.09
COEFFICIENT OF VARIATION		5.8%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
48.50	MEAN	19.09
0.09	STD ERROR (MEAN)	0.04
2.86	STANDARD DEVIATION	1.13
0.06	STD ERROR (STD DEV)	0.03
40.00	MINIMUM	15.75
57.80	MAXIMUM	22.76
SKEWNESS		-0.06
KURTOSIS		3.19
COEFFICIENT OF VARIATION		5.9%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES				MALES							
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>	<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>			
1	0.25	1	0.25	37.25	-	37.75					
0	0.00	1	0.25	37.75	-	38.25					
0	0.00	1	0.25	38.25	-	38.75					
0	0.00	1	0.25	38.75	-	39.25					
2	0.51	3	0.76	39.25	-	39.75					
3	0.76	6	1.52	39.75	-	40.25	1	0.10			
5	1.27	11	2.78	40.25	-	40.75	4	0.41			
12	3.04	23	5.82	40.75	-	41.25	0	0.00			
13	3.29	36	9.11	41.25	-	41.75	1	0.10			
14	3.54	50	12.66	41.75	-	42.25	9	0.92			
24	6.08	74	18.73	42.25	-	42.75	6	0.61			
22	5.57	96	24.30	42.75	-	43.25	6	0.61			
37	9.37	133	33.67	43.25	-	43.75	8	0.82			
28	7.09	161	40.76	43.75	-	44.25	20	2.05			
29	7.34	190	48.10	44.25	-	44.75	26	2.66			
21	5.32	211	53.42	44.75	-	45.25	27	2.76			
26	6.58	237	60.00	45.25	-	45.75	39	3.99			
22	5.57	259	65.57	45.75	-	46.25	36	3.68			
23	5.82	282	71.39	46.25	-	46.75	40	4.09			
28	7.09	310	78.48	46.75	-	47.25	71	7.27			
20	5.06	330	83.54	47.25	-	47.75	55	5.63			
12	3.04	342	86.58	47.75	-	48.25	60	6.14			
13	3.29	355	89.87	48.25	-	48.75	71	7.27			
10	2.53	365	92.41	48.75	-	49.25	80	8.19			
9	2.28	374	94.68	49.25	-	49.75	79	8.09			
3	0.76	377	95.44	49.75	-	50.25	64	6.55			
7	1.77	384	97.22	50.25	-	50.75	56	5.73			
4	1.01	388	98.23	50.75	-	51.25	35	3.58			
3	0.76	391	98.99	51.25	-	51.75	43	4.40			
2	0.51	393	99.49	51.75	-	52.25	28	2.87			
1	0.25	394	99.75	52.25	-	52.75	32	3.28			
1	0.25	395	100.00	52.75	-	53.25	26	2.66			
				53.25	-	53.75	15	1.54			
				53.75	-	54.25	10	1.02			
				54.25	-	54.75	12	1.23			
				54.75	-	55.25	6	0.61			
				55.25	-	55.75	4	0.41			
				55.75	-	56.25	2	0.20			
				56.25	-	56.75	3	0.31			
				56.75	-	57.25	0	0.00			
				57.25	-	57.75	1	0.10			
				57.75	-	58.25	1	0.10			

(D26) SUPRASTERNALE HEIGHT, SITTING

The vertical distance between a sitting surface and the suprasternale landmark of a participant sitting erect is calculated as follows: SUPRASTERNALE HEIGHT minus (STATURE minus SITTING HEIGHT).



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
49.50	19.49	1ST	55.00	21.65
51.80	20.39	2ND	55.80	21.97
52.10	20.51	3RD	56.20	22.13
52.90	20.83	5TH	56.70	22.32
54.10	21.30	10TH	57.60	22.68
54.60	21.50	15TH	58.10	22.87
54.80	21.57	20TH	58.50	23.03
55.20	21.73	25TH	59.10	23.27
55.60	21.89	30TH	59.50	23.43
56.00	22.05	35TH	59.80	23.54
56.20	22.13	40TH	60.10	23.66
56.40	22.20	45TH	60.50	23.82
56.80	22.36	50TH	61.00	24.02
57.30	22.56	55TH	61.20	24.09
57.50	22.64	60TH	61.50	24.21
57.80	22.76	65TH	61.90	24.37
57.90	22.80	70TH	62.30	24.53
58.60	23.07	75TH	62.60	24.65
58.90	23.19	80TH	63.00	24.80
59.40	23.39	85TH	63.40	24.96
60.00	23.62	90TH	64.30	25.31
61.20	24.09	95TH	65.40	25.75
61.70	24.29	97TH	65.90	25.94
61.90	24.37	98TH	66.60	26.22
62.40	24.57	99TH	67.30	26.50

(D26) SUPRATERNALE HEIGHT, SITTING

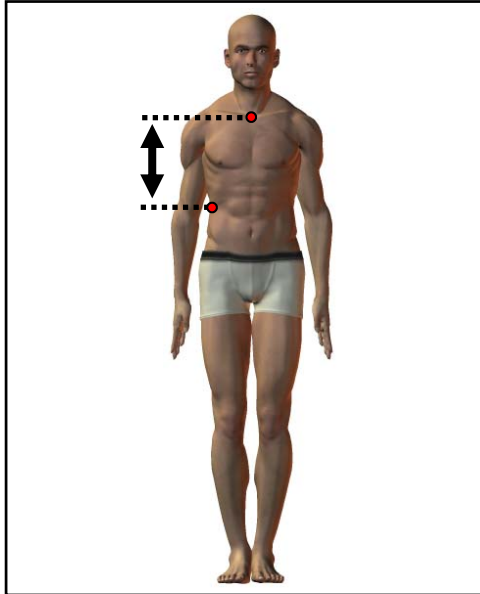
FEMALES		
<u>CM</u>		<u>IN</u>
56.87	MEAN	22.39
0.12	STD ERROR (MEAN)	0.05
2.46	STANDARD DEVIATION	0.97
0.09	STD ERROR (STD DEV)	0.03
49.20	MINIMUM	19.37
63.50	MAXIMUM	25.00
SKEWNESS		-0.13
KURTOSIS		3.42
COEFFICIENT OF VARIATION		4.3%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
60.88	MEAN	23.97
0.08	STD ERROR (MEAN)	0.03
2.63	STANDARD DEVIATION	1.03
0.06	STD ERROR (STD DEV)	0.02
52.70	MINIMUM	20.75
69.30	MAXIMUM	27.28
SKEWNESS		0.12
KURTOSIS		3.08
COEFFICIENT OF VARIATION		4.3%
NUMBER OF PARTICIPANTS		977

FREQUENCIES															
FEMALES												MALES			
<u>F</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>F</u>	<u>FPct</u>	<u>CumF</u>			<u>CumFPct</u>				
1	0.25	1	0.25	48.75	-	49.25									
2	0.51	3	0.76	49.25	-	49.75									
0	0.00	3	0.76	49.75	-	50.25									
3	0.76	6	1.52	50.25	-	50.75									
2	0.51	8	2.03	50.75	-	51.25									
2	0.51	10	2.53	51.25	-	51.75									
12	3.04	22	5.57	51.75	-	52.25									
12	3.04	34	8.61	52.25	-	52.75	1	0.10	1		0.10				
13	3.29	47	11.90	52.75	-	53.25	3	0.31	4		0.41				
15	3.80	62	15.70	53.25	-	53.75	2	0.20	6		0.61				
25	6.33	87	22.03	53.75	-	54.25	3	0.31	9		0.92				
24	6.08	111	28.10	54.25	-	54.75	1	0.10	10		1.02				
27	6.84	138	34.94	54.75	-	55.25	4	0.41	14		1.43				
24	6.08	162	41.01	55.25	-	55.75	9	0.92	23		2.35				
37	9.37	199	50.38	55.75	-	56.25	12	1.23	35		3.58				
30	7.59	229	57.97	56.25	-	56.75	20	2.05	55		5.63				
21	5.32	250	63.29	56.75	-	57.25	23	2.35	78		7.98				
34	8.61	284	71.90	57.25	-	57.75	35	3.58	113		11.57				
24	6.08	308	77.97	57.75	-	58.25	51	5.22	164		16.79				
18	4.56	326	82.53	58.25	-	58.75	62	6.35	226		23.13				
15	3.80	341	86.33	58.75	-	59.25	56	5.73	282		28.86				
17	4.30	358	90.63	59.25	-	59.75	56	5.73	338		34.60				
9	2.28	367	92.91	59.75	-	60.25	77	7.88	415		42.48				
11	2.78	378	95.70	60.25	-	60.75	53	5.42	468		47.90				
5	1.27	383	96.96	60.75	-	61.25	80	8.19	548		56.09				
5	1.27	388	98.23	61.25	-	61.75	65	6.65	613		62.74				
3	0.76	391	98.99	61.75	-	62.25	68	6.96	681		69.70				
2	0.51	393	99.49	62.25	-	62.75	70	7.16	751		76.87				
1	0.25	394	99.75	62.75	-	63.25	65	6.65	816		83.52				
1	0.25	395	100.00	63.25	-	63.75	44	4.50	860		88.02				
				63.75	-	64.25	25	2.56	885		90.58				
				64.25	-	64.75	21	2.15	906		92.73				
				64.75	-	65.25	24	2.46	930		95.19				
				65.25	-	65.75	19	1.94	949		97.13				
				65.75	-	66.25	6	0.61	955		97.75				
				66.25	-	66.75	5	0.51	960		98.26				
				66.75	-	67.25	6	0.61	966		98.87				
				67.25	-	67.75	8	0.82	974		99.69				
				67.75	-	68.25	0	0.00	974		99.69				
				68.25	-	68.75	0	0.00	974		99.69				
				68.75	-	69.25	2	0.20	976		99.90				
				69.25	-	69.75	1	0.10	977		100.00				

(D27) SUPRASTERNALE-TENTH RIB LENGTH

The vertical distance between the suprasternale landmark and the tenth rib landmark is calculated as follows: SUPRASTERNALE HEIGHT minus TENTH RIB HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
24.20	9.53	1ST	28.70	11.30
24.60	9.69	2ND	29.30	11.54
24.90	9.80	3RD	29.60	11.65
25.40	10.00	5TH	30.00	11.81
26.10	10.28	10TH	30.50	12.01
26.50	10.43	15TH	31.00	12.20
26.80	10.55	20TH	31.30	12.32
27.00	10.63	25TH	31.60	12.44
27.30	10.75	30TH	31.80	12.52
27.60	10.87	35TH	32.00	12.60
27.80	10.94	40TH	32.20	12.68
28.00	11.02	45TH	32.40	12.76
28.20	11.10	50TH	32.70	12.87
28.40	11.18	55TH	32.90	12.95
28.60	11.26	60TH	33.10	13.03
28.80	11.34	65TH	33.30	13.11
29.00	11.42	70TH	33.50	13.19
29.30	11.54	75TH	33.80	13.31
29.60	11.65	80TH	34.20	13.46
30.00	11.81	85TH	34.50	13.58
30.30	11.93	90TH	34.90	13.74
30.80	12.13	95TH	35.50	13.98
30.90	12.17	97TH	36.00	14.17
31.40	12.36	98TH	36.30	14.29
32.30	12.72	99TH	36.90	14.53

(D27) SUPRASTERNALE-TENTH RIB LENGTH

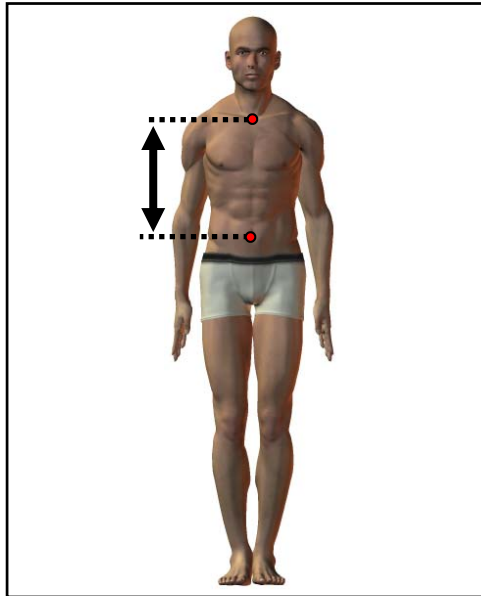
FEMALES		
<u>CM</u>		<u>IN</u>
28.16	MEAN	11.09
0.08	STD ERROR (MEAN)	0.03
1.68	STANDARD DEVIATION	0.66
0.06	STD ERROR (STD DEV)	0.02
20.90	MINIMUM	8.23
33.10	MAXIMUM	13.03
SKEWNESS		-0.15
KURTOSIS		3.48
COEFFICIENT OF VARIATION		6.0%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
32.70	MEAN	12.88
0.06	STD ERROR (MEAN)	0.02
1.72	STANDARD DEVIATION	0.68
0.04	STD ERROR (STD DEV)	0.02
27.10	MINIMUM	10.67
38.50	MAXIMUM	15.16
SKEWNESS		0.11
KURTOSIS		3.17
COEFFICIENT OF VARIATION		5.3%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES				MALES							
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>	<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>			
1	0.25	1	0.25	20.75	-	21.25					
0	0.00	1	0.25	21.25	-	21.75					
0	0.00	1	0.25	21.75	-	22.25					
1	0.25	2	0.51	22.25	-	22.75					
0	0.00	2	0.51	22.75	-	23.25					
0	0.00	2	0.51	23.25	-	23.75					
8	2.03	10	2.53	23.75	-	24.25					
6	1.52	16	4.05	24.25	-	24.75					
11	2.78	27	6.84	24.75	-	25.25					
21	5.32	48	12.15	25.25	-	25.75					
18	4.56	66	16.71	25.75	-	26.25					
40	10.13	106	26.84	26.25	-	26.75					
45	11.39	151	38.23	26.75	-	27.25					
36	9.11	187	47.34	27.25	-	27.75	1	0.10			
44	11.14	231	58.48	27.75	-	28.25	1	0.10			
52	13.16	283	71.65	28.25	-	28.75	2	0.20			
38	9.62	321	81.27	28.75	-	29.25	5	0.72			
26	6.58	347	87.85	29.25	-	29.75	4	1.13			
19	4.81	366	92.66	29.75	-	30.25	8	1.94			
14	3.54	380	96.20	30.25	-	30.75	15	3.48			
7	1.77	387	97.97	30.75	-	31.25	36	7.16			
4	1.01	391	98.99	31.25	-	31.75	51	12.38			
1	0.25	392	99.24	31.75	-	32.25	75	20.06			
1	0.25	393	99.49	32.25	-	32.75	98	30.09			
2	0.51	395	100.00	32.75	-	33.25	111	41.45			
				33.25	-	33.75	105	52.20			
				33.75	-	34.25	106	63.05			
				34.25	-	34.75	105	73.80			
				34.75	-	35.25	76	81.58			
				35.25	-	35.75	68	88.54			
				35.75	-	36.25	44	93.04			
				36.25	-	36.75	36	96.72			
				36.75	-	37.25	16	98.36			
				37.25	-	37.75	5	98.87			
				37.75	-	38.25	6	99.49			
				38.25	-	38.75	1	99.59			
							3	99.90			
							1	100.00			

(D28) SUPRASTERNALE-WAIST LENGTH (OMPHALION)

The vertical distance between the suprasternale landmark and the waist (omphalion) landmark is calculated as follows: SUPRASTERNALE HEIGHT minus WAIST HEIGHT (OMPHALION).



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
30.50	12.01	1ST	33.30	13.11
30.70	12.09	2ND	33.90	13.35
31.10	12.24	3RD	34.30	13.50
31.70	12.48	5TH	34.90	13.74
32.70	12.87	10TH	35.70	14.06
33.10	13.03	15TH	36.20	14.25
33.50	13.19	20TH	36.70	14.45
33.90	13.35	25TH	37.10	14.61
34.20	13.46	30TH	37.30	14.69
34.50	13.58	35TH	37.60	14.80
34.90	13.74	40TH	37.90	14.92
35.00	13.78	45TH	38.30	15.08
35.20	13.86	50TH	38.60	15.20
35.40	13.94	55TH	38.90	15.31
35.70	14.06	60TH	39.20	15.43
36.00	14.17	65TH	39.50	15.55
36.30	14.29	70TH	39.80	15.67
36.70	14.45	75TH	40.20	15.83
37.10	14.61	80TH	40.60	15.98
37.50	14.76	85TH	41.10	16.18
38.10	15.00	90TH	41.60	16.38
39.00	15.35	95TH	42.50	16.73
39.40	15.51	97TH	43.00	16.93
39.70	15.63	98TH	43.50	17.13
40.60	15.98	99TH	44.30	17.44

(D28) SUPRASTERNALE-WAIST LENGTH (OMPHALION)

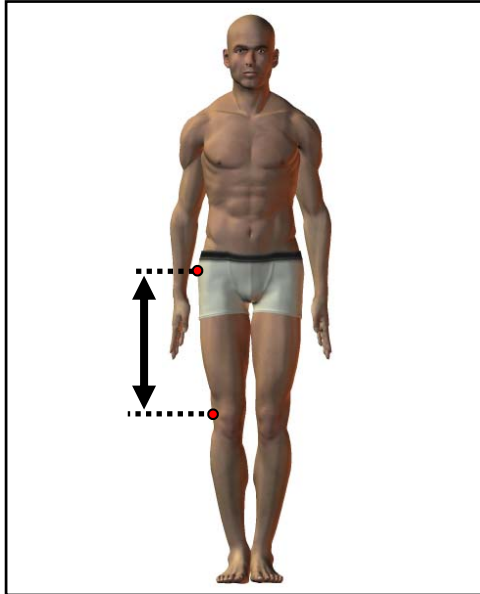
FEMALES		
<u>CM</u>		<u>IN</u>
35.30	MEAN	13.90
0.11	STD ERROR (MEAN)	0.04
2.14	STANDARD DEVIATION	0.84
0.08	STD ERROR (STD DEV)	0.03
29.70	MINIMUM	11.69
40.80	MAXIMUM	16.06
SKEWNESS		0.08
KURTOSIS		2.85
COEFFICIENT OF VARIATION		6.1%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
38.61	MEAN	15.20
0.08	STD ERROR (MEAN)	0.03
2.35	STANDARD DEVIATION	0.93
0.05	STD ERROR (STD DEV)	0.02
31.40	MINIMUM	12.36
46.60	MAXIMUM	18.35
SKEWNESS		0.11
KURTOSIS		3.07
COEFFICIENT OF VARIATION		6.1%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES								MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.25	1	0.25	29.25	-	29.75					
2	0.51	3	0.76	29.75	-	30.25		2	0.20	2	0.20
6	1.52	9	2.28	30.25	-	30.75		2	0.20	4	0.41
4	1.01	13	3.29	30.75	-	31.25		5	0.51	9	0.92
10	2.53	23	5.82	31.25	-	31.75		3	0.31	12	1.23
10	2.53	33	8.35	31.75	-	32.25		14	1.43	26	2.66
17	4.30	50	12.66	32.25	-	32.75		15	1.54	41	4.20
22	5.57	72	18.23	32.75	-	33.25		20	2.05	61	6.24
40	10.13	112	28.35	33.25	-	33.75		28	2.87	89	9.11
31	7.85	143	36.20	33.75	-	34.25		42	4.30	131	13.41
37	9.37	180	45.57	34.25	-	34.75		67	6.86	198	20.27
42	10.63	222	56.20	34.75	-	35.25		65	6.65	263	26.92
41	10.38	263	66.58	35.25	-	35.75		89	9.11	352	36.03
21	5.32	284	71.90	35.75	-	36.25		89	9.11	448	45.85
31	7.85	315	79.75	36.25	-	36.75		66	6.76	514	52.61
19	4.81	334	84.56	36.75	-	37.25		71	7.27	585	59.88
18	4.56	352	89.11	37.25	-	37.75		89	9.11	674	68.99
11	2.78	363	91.90	37.75	-	38.25		59	6.04	733	75.03
7	1.77	370	93.67	38.25	-	38.75		54	5.53	787	80.55
11	2.78	381	96.46	38.75	-	39.25		51	5.22	838	85.77
7	1.77	388	98.23	39.25	-	39.75		50	5.12	888	90.89
2	0.51	390	98.73	39.75	-	40.25		29	2.97	917	93.86
4	1.01	394	99.75	40.25	-	40.75		19	1.94	936	95.80
1	0.25	395	100.00	40.75	-	41.25		15	1.54	951	97.34
				41.25	-	41.75		11	1.13	962	98.46
				41.75	-	42.25		6	0.61	968	99.08
				42.25	-	42.75		2	0.20	970	99.28
				42.75	-	43.25		1	0.10	971	99.39
				43.25	-	43.75		3	0.31	974	99.69
				43.75	-	44.25		0	0.00	974	99.69
				44.25	-	44.75		2	0.20	976	99.90
				44.75	-	45.25		1	0.10	977	100.00
				45.25	-	45.75					
				45.75	-	46.25					
				46.25	-	46.75					

(D29) THIGH LINK

The vertical distance between the trochanterion landmark and the lateral femoral epicondyle landmark is calculated as follows: TROCHANTERION HEIGHT minus LATERAL FEMORAL EPICONDYLE HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
33.80	13.31	1ST	35.90	14.13
34.00	13.39	2ND	36.30	14.29
34.10	13.43	3RD	36.70	14.45
34.50	13.58	5TH	37.20	14.65
35.40	13.94	10TH	38.30	15.08
35.80	14.09	15TH	38.90	15.31
36.20	14.25	20TH	39.60	15.59
36.50	14.37	25TH	40.20	15.83
37.00	14.57	30TH	40.70	16.02
37.40	14.72	35TH	41.10	16.18
37.80	14.88	40TH	41.40	16.30
38.10	15.00	45TH	41.80	16.46
38.50	15.16	50TH	42.00	16.54
38.80	15.28	55TH	42.40	16.69
39.10	15.39	60TH	42.70	16.81
39.40	15.51	65TH	42.90	16.89
39.60	15.59	70TH	43.30	17.05
40.00	15.75	75TH	43.60	17.17
40.20	15.83	80TH	44.00	17.32
40.70	16.02	85TH	44.40	17.48
41.10	16.18	90TH	45.00	17.72
41.70	16.42	95TH	46.20	18.19
42.70	16.81	97TH	46.50	18.31
43.20	17.01	98TH	46.80	18.43
43.60	17.17	99TH	47.20	18.58

(D29) THIGH LINK

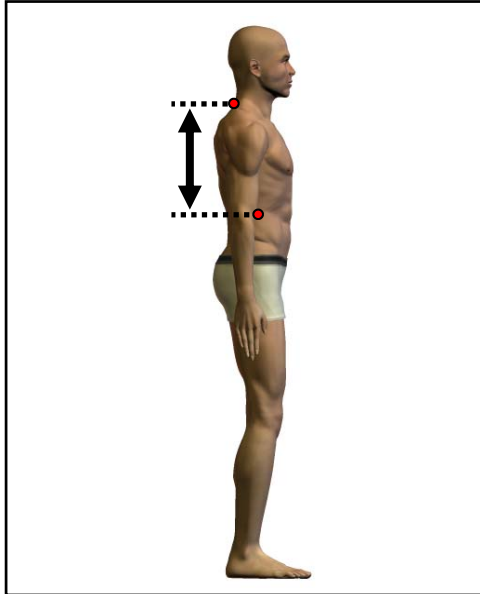
FEMALES		
CM		IN
38.35	MEAN	15.10
0.11	STD ERROR (MEAN)	0.04
2.26	STANDARD DEVIATION	0.89
0.08	STD ERROR (STD DEV)	0.03
33.40	MINIMUM	13.15
45.20	MAXIMUM	17.80
SKEWNESS		0.07
KURTOSIS		2.66
COEFFICIENT OF VARIATION		5.9%
NUMBER OF PARTICIPANTS		395

MALES		
CM		IN
41.86	MEAN	16.48
0.08	STD ERROR (MEAN)	0.03
2.62	STANDARD DEVIATION	1.03
0.06	STD ERROR (STD DEV)	0.02
33.20	MINIMUM	13.07
53.80	MAXIMUM	21.18
SKEWNESS		-0.06
KURTOSIS		3.44
COEFFICIENT OF VARIATION		6.3%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES				MALES							
E	FPct	CumF	CumFPct	CM		E	FPct	CumF	CumFPct		
				32.75	-	33.25	1	0.10	1	0.10	
2	0.51	2	0.51	33.25	-	33.75	0	0.00	1	0.10	
10	2.53	12	3.04	33.75	-	34.25	0	0.00	1	0.10	
6	1.52	18	4.56	34.25	-	34.75	2	0.20	3	0.31	
12	3.04	30	7.59	34.75	-	35.25	2	0.20	5	0.51	
17	4.30	47	11.90	35.25	-	35.75	3	0.31	8	0.82	
22	5.57	69	17.47	35.75	-	36.25	12	1.23	20	2.05	
24	6.08	93	23.54	36.25	-	36.75	15	1.54	35	3.58	
22	5.57	115	29.11	36.75	-	37.25	18	1.84	53	5.42	
30	7.59	145	36.71	37.25	-	37.75	22	2.25	75	7.68	
36	9.11	181	45.82	37.75	-	38.25	26	2.66	101	10.34	
28	7.09	209	52.91	38.25	-	38.75	46	4.71	147	15.05	
34	8.61	243	61.52	38.75	-	39.25	38	3.89	185	18.94	
39	9.87	282	71.39	39.25	-	39.75	43	4.40	228	23.34	
31	7.85	313	79.24	39.75	-	40.25	49	5.02	277	28.35	
20	5.06	333	84.30	40.25	-	40.75	66	6.76	343	35.11	
20	5.06	353	89.37	40.75	-	41.25	68	6.96	411	42.07	
19	4.81	372	94.18	41.25	-	41.75	70	7.16	481	49.23	
7	1.77	379	95.95	41.75	-	42.25	84	8.60	565	57.83	
5	1.27	384	97.22	42.25	-	42.75	82	8.39	647	66.22	
2	0.51	386	97.72	42.75	-	43.25	64	6.55	711	72.77	
4	1.01	390	98.73	43.25	-	43.75	67	6.86	778	79.63	
2	0.51	392	99.24	43.75	-	44.25	47	4.81	825	84.44	
1	0.25	393	99.49	44.25	-	44.75	47	4.81	872	89.25	
2	0.51	395	100.00	44.75	-	45.25	35	3.58	907	92.84	
				45.25	-	45.75	15	1.54	922	94.37	
				45.75	-	46.25	16	1.64	938	96.01	
				46.25	-	46.75	16	1.64	954	97.65	
				46.75	-	47.25	12	1.23	966	98.87	
				47.25	-	47.75	2	0.20	968	99.08	
				47.75	-	48.25	2	0.20	970	99.28	
				48.25	-	48.75	4	0.41	974	99.69	
				48.75	-	49.25	1	0.10	975	99.80	
				49.25	-	49.75	0	0.00	975	99.80	
				49.75	-	50.25	0	0.00	975	99.80	
				50.25	-	50.75	0	0.00	975	99.80	
				50.75	-	51.25	0	0.00	975	99.80	
				51.25	-	51.75	0	0.00	975	99.80	
				51.75	-	52.25	0	0.00	975	99.80	
				52.25	-	52.75	0	0.00	975	99.80	
				52.75	-	53.25	1	0.10	976	99.90	
				53.25	-	53.75	0	0.00	976	99.90	
				53.75	-	54.25	1	0.10	977	100.00	

(D30) THORAX LINK

The vertical distance between the cervicale landmark and tenth rib landmark is calculated as follows: CERVICALE HEIGHT minus TENTH RIB HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
30.80	12.13	1ST	36.90	14.53
31.40	12.36	2ND	37.20	14.65
31.60	12.44	3RD	37.50	14.76
32.00	12.60	5TH	37.80	14.88
32.70	12.87	10TH	38.50	15.16
33.10	13.03	15TH	39.10	15.39
33.30	13.11	20TH	39.30	15.47
33.70	13.27	25TH	39.60	15.59
33.90	13.35	30TH	39.80	15.67
34.20	13.46	35TH	40.10	15.79
34.40	13.54	40TH	40.30	15.87
34.60	13.62	45TH	40.60	15.98
34.80	13.70	50TH	40.80	16.06
35.10	13.82	55TH	41.00	16.14
35.30	13.90	60TH	41.30	16.26
35.40	13.94	65TH	41.50	16.34
35.80	14.09	70TH	41.80	16.46
36.20	14.25	75TH	42.20	16.61
36.50	14.37	80TH	42.60	16.77
36.80	14.49	85TH	43.00	16.93
37.30	14.69	90TH	43.40	17.09
38.00	14.96	95TH	44.00	17.32
38.40	15.12	97TH	44.40	17.48
38.70	15.24	98TH	44.80	17.64
38.90	15.31	99TH	45.20	17.80

(D30) THORAX LINK

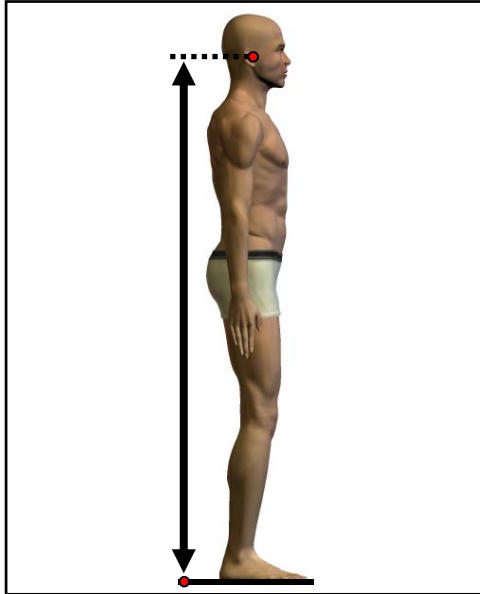
FEMALES		
<u>CM</u>		<u>IN</u>
34.88	MEAN	13.73
0.09	STD ERROR (MEAN)	0.04
1.80	STANDARD DEVIATION	0.71
0.06	STD ERROR (STD DEV)	0.03
29.20	MINIMUM	11.50
40.10	MAXIMUM	15.79
SKEWNESS		0.07
KURTOSIS		2.90
COEFFICIENT OF VARIATION		5.2%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
40.90	MEAN	16.10
0.06	STD ERROR (MEAN)	0.02
1.87	STANDARD DEVIATION	0.74
0.04	STD ERROR (STD DEV)	0.02
35.30	MINIMUM	13.90
46.70	MAXIMUM	18.39
SKEWNESS		0.13
KURTOSIS		2.84
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES				MALES							
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>	<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>			
1	0.25	1	0.25	28.75	-	29.25					
3	0.76	4	1.01	29.25	-	29.75					
2	0.51	6	1.52	29.75	-	30.25					
3	0.76	9	2.28	30.25	-	30.75					
7	1.77	16	4.05	30.75	-	31.25					
14	3.54	30	7.59	31.25	-	31.75					
23	5.82	53	13.42	31.75	-	32.25					
24	6.08	77	19.49	32.25	-	32.75					
25	6.33	102	25.82	32.75	-	33.25					
36	9.11	138	34.94	33.25	-	33.75					
48	12.15	186	47.09	33.75	-	34.25					
45	11.39	231	58.48	34.25	-	34.75					
38	9.62	269	68.10	34.75	-	35.25					
33	8.35	302	76.46	35.25	-	35.75					
19	4.81	321	81.27	35.75	-	36.25	2	0.20	2	0.20	
24	6.08	345	87.34	36.25	-	36.75	3	0.31	5	0.51	
18	4.56	363	91.90	36.75	-	37.25	4	0.41	9	0.92	
16	4.05	379	95.95	37.25	-	37.75	14	1.43	23	2.35	
8	2.03	387	97.97	37.75	-	38.25	19	1.94	42	4.30	
4	1.01	391	98.99	38.25	-	38.75	25	2.56	67	6.86	
3	0.76	394	99.75	38.75	-	39.25	51	5.22	118	12.08	
0	0.00	394	99.75	38.75	-	39.25	65	6.65	183	18.73	
1	0.25	395	100.00	39.25	-	39.75	88	9.01	271	27.74	
				39.75	-	40.25	97	9.93	368	37.67	
				40.25	-	40.75	98	10.03	466	47.70	
				40.75	-	41.25	106	10.85	572	58.55	
				41.25	-	41.75	98	10.03	670	68.58	
				41.75	-	42.25	82	8.39	752	76.97	
				42.25	-	42.75	65	6.65	817	83.62	
				42.75	-	43.25	57	5.83	874	89.46	
				43.25	-	43.75	50	5.12	924	94.58	
				43.75	-	44.25	20	2.05	944	96.62	
				44.25	-	44.75	17	1.74	961	98.36	
				44.75	-	45.25	9	0.92	970	99.28	
				45.25	-	45.75	3	0.31	973	99.59	
				45.75	-	46.25	1	0.10	974	99.69	
				46.25	-	46.75	3	0.31	977	100.00	

(D31) TRAGION HEIGHT

The vertical distance between a standing surface and the tragon landmark of a participant standing erect with the head in the Frankfurt plane is calculated as follows: STATURE minus TRAGION-TOP OF HEAD.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
142.60	56.14	1ST	148.90	58.62
143.20	56.38	2ND	150.80	59.37
143.80	56.61	3RD	151.60	59.69
144.40	56.85	5TH	153.40	60.39
145.60	57.32	10TH	156.10	61.46
146.70	57.76	15TH	157.80	62.13
147.30	57.99	20TH	158.90	62.56
148.20	58.35	25TH	159.80	62.91
149.00	58.66	30TH	160.90	63.35
150.00	59.06	35TH	161.60	63.62
150.60	59.29	40TH	162.60	64.02
151.00	59.45	45TH	163.60	64.41
152.00	59.84	50TH	164.50	64.76
152.90	60.20	55TH	165.20	65.04
153.50	60.43	60TH	166.00	65.35
154.20	60.71	65TH	166.90	65.71
154.60	60.87	70TH	167.50	65.94
155.90	61.38	75TH	168.50	66.34
157.40	61.97	80TH	169.60	66.77
159.20	62.68	85TH	170.80	67.24
160.60	63.23	90TH	172.70	67.99
163.10	64.21	95TH	174.90	68.86
164.00	64.57	97TH	176.00	69.29
164.50	64.76	98TH	176.80	69.61
166.80	65.67	99TH	179.50	70.67

(D31) TRAGION HEIGHT

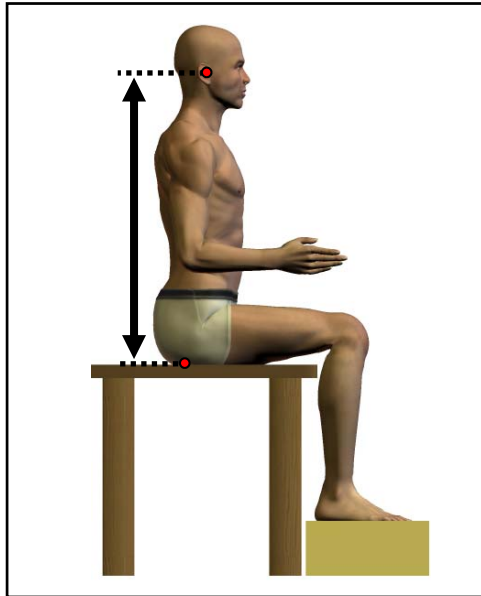
FEMALES		
<u>CM</u>		<u>IN</u>
152.53	MEAN	60.05
0.28	STD ERROR (MEAN)	0.11
5.62	STANDARD DEVIATION	2.21
0.20	STD ERROR (STD DEV)	0.08
138.40	MINIMUM	54.49
170.30	MAXIMUM	67.05
SKEWNESS		0.50
KURTOSIS		2.81
COEFFICIENT OF VARIATION		3.7%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
164.27	MEAN	64.67
0.21	STD ERROR (MEAN)	0.08
6.46	STANDARD DEVIATION	2.54
0.15	STD ERROR (STD DEV)	0.06
141.40	MINIMUM	55.67
188.10	MAXIMUM	74.06
SKEWNESS		-0.02
KURTOSIS		3.04
COEFFICIENT OF VARIATION		3.9%
NUMBER OF PARTICIPANTS		977

FREQUENCIES										
FEMALES							MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	
1	0.25	1	0.25	138.25	-	139.75				
1	0.25	2	0.51	139.75	-	141.25				
6	1.52	8	2.03	141.25	-	142.75	1	0.10	1	0.10
16	4.05	24	6.08	142.75	-	144.25	0	0.00	1	0.10
26	6.58	50	12.66	144.25	-	145.75	0	0.00	1	0.10
39	9.87	89	22.53	145.75	-	147.25	2	0.20	3	0.31
40	10.13	129	32.66	147.25	-	148.75	3	0.31	6	0.61
28	7.09	157	39.75	148.75	-	150.25	10	1.02	16	1.64
42	10.63	199	50.38	150.25	-	151.75	12	1.23	28	2.87
41	10.38	240	60.76	151.75	-	153.25	17	1.74	45	4.61
42	10.63	282	71.39	153.25	-	154.75	26	2.66	71	7.27
26	6.58	308	77.97	154.75	-	156.25	34	3.48	105	10.75
19	4.81	327	82.78	156.25	-	157.75	47	4.81	152	15.56
16	4.05	343	86.84	157.75	-	159.25	66	6.76	218	22.31
24	6.08	367	92.91	159.25	-	160.75	70	7.16	288	29.48
7	1.77	374	94.68	160.75	-	162.25	90	9.21	378	38.69
11	2.78	385	97.47	162.25	-	163.75	75	7.68	453	46.37
4	1.01	389	98.48	163.75	-	165.25	87	8.90	540	55.27
3	0.76	392	99.24	165.25	-	166.75	83	8.50	623	63.77
1	0.25	393	99.49	166.75	-	168.25	83	8.50	706	72.26
1	0.25	394	99.75	168.25	-	169.75	71	7.27	777	79.53
1	0.25	395	100.00	169.75	-	171.25	66	6.76	843	86.28
				171.25	-	172.75	39	3.99	882	90.28
				172.75	-	174.25	30	3.07	912	93.35
				174.25	-	175.75	31	3.17	943	96.52
				175.75	-	177.25	18	1.84	961	98.36
				177.25	-	178.75	4	0.41	965	98.77
				178.75	-	180.25	6	0.61	971	99.39
				180.25	-	181.75	4	0.41	975	99.80
				181.75	-	183.25	0	0.00	975	99.80
				183.25	-	184.75	1	0.10	976	99.90
				184.75	-	186.25	0	0.00	976	99.90
				186.25	-	187.75	0	0.00	976	99.90
				187.75	-	189.25	1	0.10	977	100.00

(D32) TRAGION HEIGHT, SITTING

The vertical distance between a sitting surface and the tracion landmark of a participant sitting erect with the head in the Frankfurt plane is calculated as follows: SITTING HEIGHT minus TRACION-TOP OF HEAD.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
67.30	26.50	1ST	72.90	28.70
68.80	27.09	2ND	73.40	28.90
69.20	27.24	3RD	73.70	29.02
69.50	27.36	5TH	74.30	29.25
71.00	27.95	10TH	75.30	29.65
71.80	28.27	15TH	76.00	29.92
72.10	28.39	20TH	76.70	30.20
72.70	28.62	25TH	77.40	30.47
73.00	28.74	30TH	77.90	30.67
73.30	28.86	35TH	78.30	30.83
73.90	29.09	40TH	78.70	30.98
74.30	29.25	45TH	79.00	31.10
74.60	29.37	50TH	79.50	31.30
74.90	29.49	55TH	79.90	31.46
75.30	29.65	60TH	80.40	31.65
75.70	29.80	65TH	80.80	31.81
76.00	29.92	70TH	81.20	31.97
76.30	30.04	75TH	81.80	32.20
77.10	30.35	80TH	82.40	32.44
77.90	30.67	85TH	83.20	32.76
78.90	31.06	90TH	83.80	32.99
79.50	31.30	95TH	85.00	33.46
80.90	31.85	97TH	85.80	33.78
81.40	32.05	98TH	86.70	34.13
82.30	32.40	99TH	88.10	34.69

(D32) TRAGION HEIGHT, SITTING

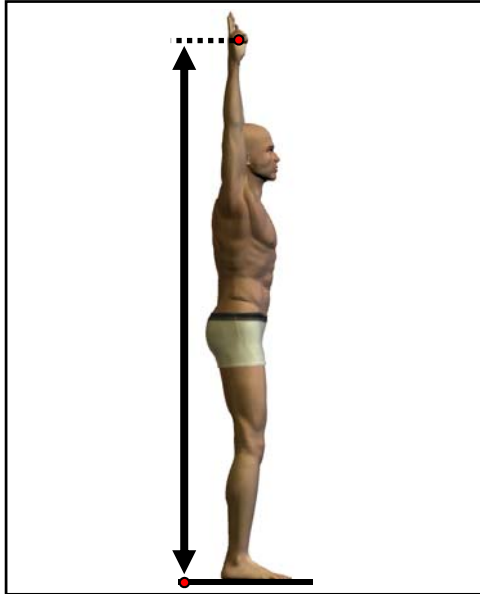
FEMALES		
<u>CM</u>		<u>IN</u>
74.65	MEAN	29.39
0.15	STD ERROR (MEAN)	0.06
3.02	STANDARD DEVIATION	1.19
0.11	STD ERROR (STD DEV)	0.04
65.30	MINIMUM	25.71
83.10	MAXIMUM	32.72
SKEWNESS		0.14
KURTOSIS		3.16
COEFFICIENT OF VARIATION		4.0%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
79.63	MEAN	31.35
0.11	STD ERROR (MEAN)	0.04
3.32	STANDARD DEVIATION	1.31
0.08	STD ERROR (STD DEV)	0.03
70.00	MINIMUM	27.56
91.30	MAXIMUM	35.94
SKEWNESS		0.26
KURTOSIS		3.15
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES								MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
1	0.25	1	0.25	64.55	-	65.55					
3	0.76	4	1.01	65.55	-	66.55					
6	1.52	10	2.53	66.55	-	67.55					
11	2.78	21	5.32	67.55	-	68.55					
26	6.58	47	11.90	68.55	-	69.55					
23	5.82	70	17.72	69.55	-	70.55	2	0.20	2	0.20	
26	6.58	96	24.30	70.55	-	71.55	1	0.10	3	0.31	
45	11.39	141	35.70	71.55	-	72.55	8	0.82	11	1.13	
50	12.66	191	48.35	72.55	-	73.55	12	1.23	23	2.35	
43	10.89	234	59.24	73.55	-	74.55	31	3.17	54	5.53	
46	11.65	280	70.89	74.55	-	75.55	47	4.81	101	10.34	
45	11.39	325	82.28	75.55	-	76.55	69	7.06	170	17.40	
19	4.81	344	87.09	76.55	-	77.55	77	7.88	247	25.28	
18	4.56	362	91.65	77.55	-	78.55	115	11.77	362	37.05	
22	5.57	384	97.22	78.55	-	79.55	109	11.16	471	48.21	
2	0.51	386	97.72	79.55	-	80.55	118	12.08	589	60.29	
5	1.27	391	98.99	80.55	-	81.55	112	11.46	701	71.75	
2	0.51	393	99.49	81.55	-	82.55	88	9.01	789	80.76	
2	0.51	395	100.00	82.55	-	83.55	61	6.24	850	87.00	
				83.55	-	84.55	56	5.73	906	92.73	
				84.55	-	85.55	29	2.97	935	95.70	
				85.55	-	86.55	20	2.05	955	97.75	
				86.55	-	87.55	13	1.33	968	99.08	
				87.55	-	88.55	4	0.41	972	99.49	
				88.55	-	89.55	2	0.20	974	99.69	
				89.55	-	90.55	1	0.10	975	99.80	
				90.55	-	91.55	2	0.20	977	100.00	

(D33) VERTICAL GRIP REACH

The vertical distance between a standing surface and the center of a 1-1/4-in diameter dowel gripped horizontally in the right hand of a participant standing erect with the shoulder, arm, and hand held straight overhead is calculated as follows: OVERHEAD FINGERTIP REACH SITTING plus (STATURE minus SITTING HEIGHT) minus ANSUR mean of HAND LENGTH plus ANSUR mean of WRIST-CENTER OF GRIP LENGTH.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
183.90	72.40	1ST	193.80	76.30
184.60	72.68	2ND	195.00	76.77
185.30	72.95	3RD	196.10	77.20
186.10	73.27	5TH	198.60	78.19
188.10	74.06	10TH	202.20	79.61
189.70	74.69	15TH	204.30	80.43
190.80	75.12	20TH	206.10	81.14
192.50	75.79	25TH	207.70	81.77
193.20	76.06	30TH	208.90	82.24
194.60	76.61	35TH	210.30	82.80
195.70	77.05	40TH	212.10	83.50
196.70	77.44	45TH	213.20	83.94
198.10	77.99	50TH	214.60	84.49
199.60	78.58	55TH	215.90	85.00
200.60	78.98	60TH	217.10	85.47
201.50	79.33	65TH	218.00	85.83
203.40	80.08	70TH	219.40	86.38
204.90	80.67	75TH	220.40	86.77
206.80	81.42	80TH	222.00	87.40
208.60	82.13	85TH	223.80	88.11
211.20	83.15	90TH	226.60	89.21
214.30	84.37	95TH	229.20	90.24
216.30	85.16	97TH	232.20	91.42
217.60	85.67	98TH	233.00	91.73
219.60	86.46	99TH	234.40	92.28

(D33) VERTICAL GRIP REACH

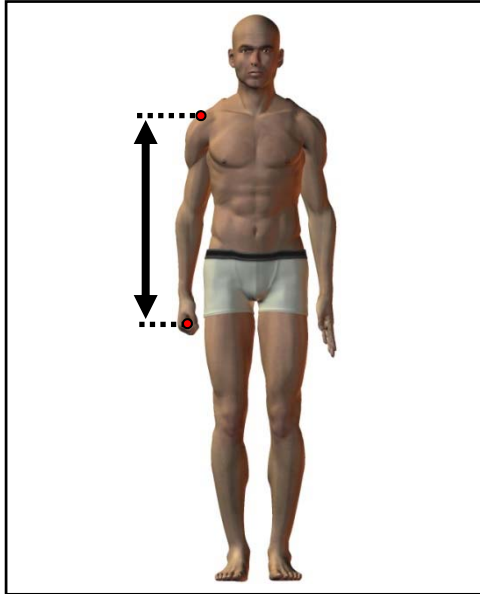
FEMALES		
<u>CM</u>		<u>IN</u>
198.94	MEAN	78.32
0.44	STD ERROR (MEAN)	0.17
8.75	STANDARD DEVIATION	3.45
0.31	STD ERROR (STD DEV)	0.12
177.90	MINIMUM	70.04
226.30	MAXIMUM	89.09
SKEWNESS		0.44
KURTOSIS		2.74
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
214.20	MEAN	84.33
0.30	STD ERROR (MEAN)	0.12
9.39	STANDARD DEVIATION	3.70
0.21	STD ERROR (STD DEV)	0.08
185.10	MINIMUM	72.87
242.90	MAXIMUM	95.63
SKEWNESS		-0.03
KURTOSIS		2.77
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		977

FREQUENCIES												
FEMALES				MALES								
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>	<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.25	1	0.25	177.55	-	179.55						
1	0.25	2	0.51	179.55	-	181.55						
2	0.51	4	1.01	181.55	-	183.55						
8	2.03	12	3.04	183.55	-	185.55						
18	4.56	30	7.59	185.55	-	187.55			1	0.10	1	0.10
25	6.33	55	13.92	187.55	-	189.55			0	0.00	1	0.10
28	7.09	83	21.01	189.55	-	191.55			2	0.20	3	0.31
31	7.85	114	28.86	191.55	-	193.55			2	0.20	5	0.51
33	8.35	147	37.22	193.55	-	195.55			6	0.61	11	1.13
37	9.37	184	46.58	195.55	-	197.55			14	1.43	25	2.56
28	7.09	212	53.67	197.55	-	199.55			15	1.54	40	4.09
37	9.37	249	63.04	199.55	-	201.55			16	1.64	56	5.73
27	6.84	276	69.87	201.55	-	203.55			34	3.48	90	9.21
19	4.81	295	74.68	203.55	-	205.55			41	4.20	131	13.41
29	7.34	324	82.03	205.55	-	207.55			45	4.61	176	18.01
15	3.80	339	85.82	207.55	-	209.55			64	6.55	240	24.56
13	3.29	352	89.11	209.55	-	211.55			79	8.09	319	32.65
16	4.05	368	93.16	211.55	-	213.55			59	6.04	378	38.69
10	2.53	378	95.70	213.55	-	215.55			81	8.29	459	46.98
8	2.03	386	97.72	215.55	-	217.55			74	7.57	533	54.55
5	1.27	391	98.99	217.55	-	219.55			78	7.98	611	62.54
2	0.51	393	99.49	219.55	-	221.55			82	8.39	693	70.93
0	0.00	393	99.49	221.55	-	223.55			70	7.16	763	78.10
1	0.25	394	99.75	223.55	-	225.55			59	6.04	822	84.14
1	0.25	395	100.00	225.55	-	227.55			40	4.09	862	88.23
				227.55	-	229.55			35	3.58	897	91.81
				229.55	-	231.55			29	2.97	926	94.78
				231.55	-	233.55			19	1.94	945	96.72
				233.55	-	235.55			16	1.64	961	98.36
				235.55	-	237.55			8	0.82	969	99.18
				237.55	-	239.55			2	0.20	971	99.39
				239.55	-	241.55			3	0.31	974	99.69
				241.55	-	243.55			1	0.10	975	99.80
									2	0.20	977	100.00

(D34) VERTICAL GRIP REACH DOWN

The vertical distance between the acromion right landmark and the center of a 1-1/4-in diameter dowel gripped horizontally in the right hand of a participant standing erect with the arms held straight at the sides is calculated as follows: ACROMIAL HEIGHT minus WRIST HEIGHT plus ANSUR mean of WRIST-CENTER OF GRIP LENGTH.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
55.80	21.97	1ST	59.10	23.27
56.60	22.28	2ND	61.20	24.09
56.60	22.28	3RD	61.50	24.21
57.40	22.60	5TH	62.00	24.41
58.00	22.83	10TH	63.10	24.84
58.40	22.99	15TH	63.70	25.08
58.80	23.15	20TH	64.40	25.35
59.00	23.23	25TH	64.90	25.55
59.50	23.43	30TH	65.40	25.75
59.90	23.58	35TH	65.80	25.91
60.20	23.70	40TH	66.10	26.02
60.40	23.78	45TH	66.40	26.14
60.80	23.94	50TH	66.80	26.30
61.10	24.06	55TH	67.10	26.42
61.40	24.17	60TH	67.40	26.54
61.80	24.33	65TH	67.90	26.73
62.20	24.49	70TH	68.20	26.85
62.80	24.72	75TH	68.60	27.01
63.10	24.84	80TH	69.10	27.20
63.80	25.12	85TH	69.90	27.52
64.30	25.31	90TH	70.40	27.72
65.40	25.75	95TH	71.80	28.27
66.20	26.06	97TH	72.50	28.54
67.10	26.42	98TH	73.00	28.74
67.40	26.54	99TH	73.90	29.09

(D34) VERTICAL GRIP REACH DOWN

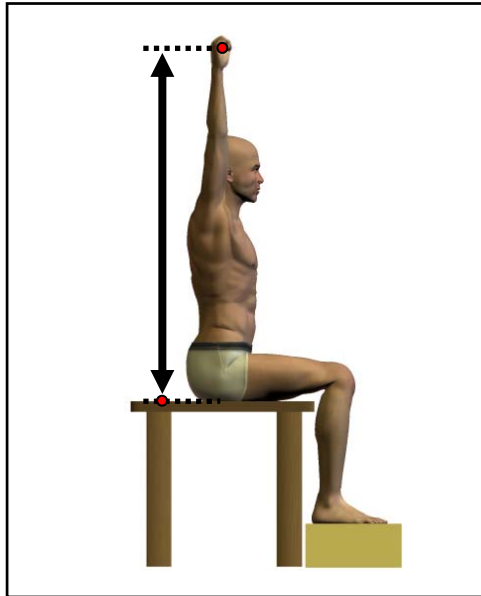
FEMALES		
<u>CM</u>		<u>IN</u>
61.01	MEAN	24.02
0.13	STD ERROR (MEAN)	0.05
2.53	STANDARD DEVIATION	1.00
0.09	STD ERROR (STD DEV)	0.04
54.60	MINIMUM	21.50
69.50	MAXIMUM	27.36
SKEWNESS		0.45
KURTOSIS		3.14
COEFFICIENT OF VARIATION		4.1%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
66.79	MEAN	26.30
0.09	STD ERROR (MEAN)	0.04
2.93	STANDARD DEVIATION	1.15
0.07	STD ERROR (STD DEV)	0.03
57.60	MINIMUM	22.68
76.20	MAXIMUM	30.00
SKEWNESS		0.00
KURTOSIS		3.17
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		977

FEMALES				FREQUENCIES		MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
2	0.51	2	0.51	54.55	-	55.55			
2	0.51	4	1.01	55.55	-	56.55			
11	2.78	15	3.80	56.55	-	57.55			
39	9.87	54	13.67	57.55	-	58.55	3	0.31	3
51	12.91	105	26.58	58.55	-	59.55	8	0.82	11
61	15.44	166	42.03	59.55	-	60.55	8	0.82	19
51	12.91	217	54.94	60.55	-	61.55	13	1.33	32
47	11.90	264	66.84	61.55	-	62.55	37	3.79	69
51	12.91	315	79.75	62.55	-	63.55	62	6.35	131
36	9.11	351	88.86	63.55	-	64.55	79	8.09	210
18	4.56	369	93.42	64.55	-	65.55	102	10.44	312
12	3.04	381	96.46	65.55	-	66.55	130	13.31	442
9	2.28	390	98.73	66.55	-	67.55	151	15.46	593
3	0.76	393	99.49	67.55	-	68.55	127	13.00	720
2	0.51	395	100.00	68.55	-	69.55	76	7.78	796
				69.55	-	70.55	78	7.98	874
				70.55	-	71.55	40	4.09	914
				71.55	-	72.55	34	3.48	948
				72.55	-	73.55	19	1.94	967
				73.55	-	74.55	7	0.72	974
				74.55	-	75.55	2	0.20	976
				75.55	-	76.55	1	0.10	977

(D35) VERTICAL GRIP REACH, SITTING

The vertical distance between a sitting surface and the center of a 1-1/4-in diameter dowel gripped horizontally in the right hand of a participant sitting erect with the arm held straight overhead is calculated as follows: OVERHEAD FINGERTIP REACH SITTING minus ANSUR mean of HAND LENGTH plus ANSUR mean of WRIST-CENTER OF GRIP LENGTH.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
107.80	42.44	1ST	117.50	46.26
110.10	43.35	2ND	118.20	46.54
111.30	43.82	3RD	118.50	46.65
112.20	44.17	5TH	119.90	47.20
113.60	44.72	10TH	122.10	48.07
115.00	45.28	15TH	123.30	48.54
115.80	45.59	20TH	124.30	48.94
116.20	45.75	25TH	125.30	49.33
117.30	46.18	30TH	126.10	49.65
118.30	46.57	35TH	127.10	50.04
119.00	46.85	40TH	128.10	50.43
120.00	47.24	45TH	128.70	50.67
120.50	47.44	50TH	129.50	50.98
121.50	47.83	55TH	130.10	51.22
122.50	48.23	60TH	130.90	51.54
123.50	48.62	65TH	132.10	52.01
124.20	48.90	70TH	132.90	52.32
125.00	49.21	75TH	133.70	52.64
126.50	49.80	80TH	134.70	53.03
127.80	50.31	85TH	135.70	53.43
128.90	50.75	90TH	137.20	54.02
130.60	51.42	95TH	139.90	55.08
132.60	52.20	97TH	141.70	55.79
133.20	52.44	98TH	142.40	56.06
135.30	53.27	99TH	143.30	56.42

(D35) VERTICAL GRIP REACH, SITTING

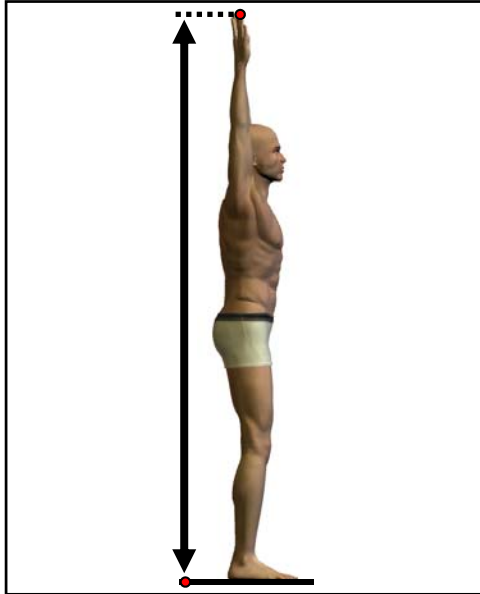
FEMALES		
<u>CM</u>		<u>IN</u>
121.06	MEAN	47.66
0.30	STD ERROR (MEAN)	0.12
5.92	STANDARD DEVIATION	2.33
0.21	STD ERROR (STD DEV)	0.08
106.80	MINIMUM	42.05
139.50	MAXIMUM	54.92
SKEWNESS		0.23
KURTOSIS		2.70
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
129.57	MEAN	51.01
0.19	STD ERROR (MEAN)	0.07
5.95	STANDARD DEVIATION	2.34
0.13	STD ERROR (STD DEV)	0.05
112.90	MINIMUM	44.45
150.00	MAXIMUM	59.06
SKEWNESS		0.14
KURTOSIS		2.77
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES				MALES							
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>	<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>			
3	0.76	3	0.76	106.55	-						
1	0.25	4	1.01	107.55	-						
1	0.25	5	1.27	108.55	-						
5	1.27	10	2.53	109.55	-						
5	1.27	15	3.80	110.55	-						
9	2.28	24	6.08	111.55	-						
17	4.30	41	10.38	112.55	-	1	0.10	0.10			
10	2.53	51	12.91	113.55	-	1	0.10	0.20			
25	6.33	76	19.24	114.55	-	3	0.31	0.51			
22	5.57	98	24.81	115.55	-	3	0.31	0.82			
24	6.08	122	30.89	116.55	-	5	0.51	1.33			
32	8.10	154	38.99	117.55	-	15	1.54	2.87			
18	4.56	172	43.54	118.55	-	16	1.64	4.50			
28	7.09	200	50.63	119.55	-	13	1.33	5.83			
25	6.33	225	56.96	120.55	-	23	2.35	8.19			
22	5.57	247	62.53	121.55	-	23	2.35	10.54			
17	4.30	264	66.84	122.55	-	49	5.02	15.56			
21	5.32	285	72.15	123.55	-	50	5.12	20.68			
20	5.06	305	77.22	124.55	-	51	5.22	25.90			
13	3.29	318	80.51	125.55	-	56	5.73	31.63			
16	4.05	334	84.56	126.55	-	47	4.81	36.44			
16	4.05	350	88.61	127.55	-	63	6.45	42.89			
11	2.78	361	91.39	128.55	-	67	6.86	49.74			
10	2.53	371	93.92	129.55	-	77	7.88	57.63			
6	1.52	377	95.44	130.55	-	54	5.53	63.15			
5	1.27	382	96.71	131.55	-	52	5.32	68.47			
5	1.27	387	97.97	132.55	-	58	5.94	74.41			
4	1.01	391	98.99	133.55	-	49	5.02	79.43			
2	0.51	393	99.49	134.55	-	45	4.61	84.03			
1	0.25	394	99.75	135.55	-	37	3.79	87.82			
0	0.00	394	99.75	136.55	-	28	2.87	90.69			
0	0.00	394	99.75	137.55	-	22	2.25	92.94			
1	0.25	395	100.00	138.55	-	17	1.74	94.68			
				139.55	-	19	1.94	96.62			
				140.55	-	6	0.61	97.24			
				141.55	-	12	1.23	98.46			
				142.55	-	8	0.82	99.28			
				143.55	-	2	0.20	99.49			
				144.55	-	3	0.31	99.80			
				145.55	-	1	0.10	99.90			
				146.55	-	0	0.00	99.90			
				147.55	-	0	0.00	99.90			
				148.55	-	0	0.00	99.90			
				149.55	-	1	0.10	100.00			

(D36) VERTICAL INDEX FINGERTIP REACH

The vertical distance between a standing surface and the tip of the right index finger of a participant standing erect with the right shoulder, arm, and fingers stretched straight overhead is calculated as follows: OVERHEAD FINGERTIP REACH SITTING plus (STATURE minus SITTING HEIGHT) minus (ANSUR mean of HAND LENGTH minus ANSUR mean of WRIST-INDEX FINGER LENGTH).



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
194.20	76.46	1ST	204.90	80.67
194.90	76.73	2ND	206.10	81.14
195.60	77.01	3RD	207.20	81.57
196.40	77.32	5TH	209.70	82.56
198.40	78.11	10TH	213.30	83.98
200.00	78.74	15TH	215.40	84.80
201.10	79.17	20TH	217.20	85.51
202.80	79.84	25TH	218.80	86.14
203.50	80.12	30TH	220.00	86.61
204.90	80.67	35TH	221.40	87.17
206.00	81.10	40TH	223.20	87.87
207.00	81.50	45TH	224.30	88.31
208.40	82.05	50TH	225.70	88.86
209.90	82.64	55TH	227.00	89.37
210.90	83.03	60TH	228.20	89.84
211.80	83.39	65TH	229.10	90.20
213.70	84.13	70TH	230.50	90.75
215.20	84.72	75TH	231.50	91.14
217.10	85.47	80TH	233.10	91.77
218.90	86.18	85TH	234.90	92.48
221.50	87.20	90TH	237.70	93.58
224.60	88.43	95TH	240.30	94.61
226.60	89.21	97TH	243.30	95.79
227.90	89.72	98TH	244.10	96.10
229.90	90.51	99TH	245.50	96.65

(D36) VERTICAL INDEX FINGERTIP REACH

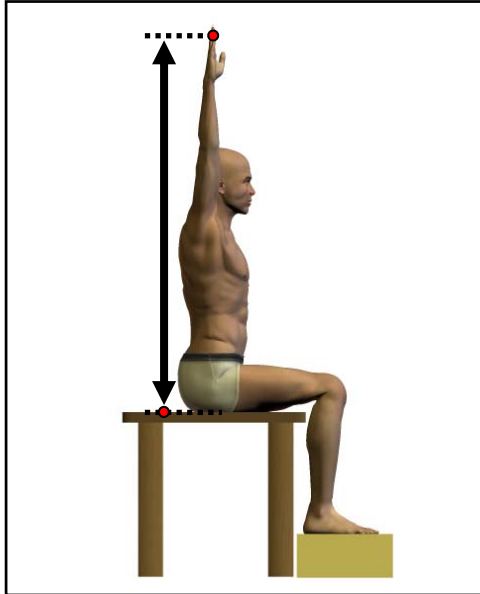
FEMALES		
<u>CM</u>		<u>IN</u>
209.24	MEAN	82.38
0.44	STD ERROR (MEAN)	0.17
8.75	STANDARD DEVIATION	3.45
0.31	STD ERROR (STD DEV)	0.12
188.20	MINIMUM	74.09
236.60	MAXIMUM	93.15
SKEWNESS		0.44
KURTOSIS		2.74
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
225.30	MEAN	88.70
0.30	STD ERROR (MEAN)	0.12
9.39	STANDARD DEVIATION	3.70
0.21	STD ERROR (STD DEV)	0.08
196.20	MINIMUM	77.24
254.00	MAXIMUM	100.00
SKEWNESS		-0.03
KURTOSIS		2.77
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES								MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
1	0.25	1	0.25	187.55	-	189.55					
1	0.25	2	0.51	189.55	-	191.55					
1	0.25	3	0.76	191.55	-	193.55					
6	1.52	9	2.28	193.55	-	195.55					
19	4.81	28	7.09	195.55	-	197.55	1	0.10	1	0.10	
22	5.57	50	12.66	197.55	-	199.55	2	0.20	3	0.31	
31	7.85	81	20.51	199.55	-	201.55	1	0.10	4	0.41	
30	7.59	111	28.10	201.55	-	203.55	3	0.31	7	0.72	
31	7.85	142	35.95	203.55	-	205.55	7	0.72	14	1.43	
33	8.35	175	44.30	205.55	-	207.55	18	1.84	32	3.28	
31	7.85	206	52.15	207.55	-	209.55	12	1.23	44	4.50	
38	9.62	244	61.77	209.55	-	211.55	26	2.66	70	7.16	
26	6.58	270	68.35	211.55	-	213.55	37	3.79	107	10.95	
24	6.08	294	74.43	213.55	-	215.55	50	5.12	157	16.07	
24	6.08	318	80.51	215.55	-	217.55	46	4.71	203	20.78	
18	4.56	336	85.06	217.55	-	219.55	82	8.39	285	29.17	
15	3.80	351	88.86	219.55	-	221.55	63	6.45	348	35.62	
13	3.29	364	92.15	221.55	-	223.55	65	6.65	413	42.27	
13	3.29	377	95.44	223.55	-	225.55	84	8.60	497	50.87	
8	2.03	385	97.47	225.55	-	227.55	77	7.88	574	58.75	
5	1.27	390	98.73	227.55	-	229.55	75	7.68	649	66.43	
3	0.76	393	99.49	229.55	-	231.55	81	8.29	730	74.72	
0	0.00	393	99.49	231.55	-	233.55	60	6.14	790	80.86	
1	0.25	394	99.75	233.55	-	235.55	53	5.42	843	86.28	
1	0.25	395	100.00	235.55	-	237.55	35	3.58	878	89.87	
				237.55	-	239.55	29	2.97	907	92.84	
				239.55	-	241.55	29	2.97	936	95.80	
				241.55	-	243.55	15	1.54	951	97.34	
				243.55	-	245.55	15	1.54	966	98.87	
				245.55	-	247.55	4	0.41	970	99.28	
				247.55	-	249.55	3	0.31	973	99.59	
				249.55	-	251.55	2	0.20	975	99.80	
				251.55	-	253.55	0	0.00	975	99.80	
				253.55	-	255.55	2	0.20	977	100.00	

(D37) VERTICAL INDEX FINGERTIP REACH, SITTING

The vertical distance between a sitting surface and the tip of the right index finger of a participant sitting erect and raising the right shoulder, arm, and fingers straight overhead is calculated as follows: OVERHEAD FINGERTIP REACH SITTING minus ANSUR mean of HAND LENGTH plus ANSUR mean of WRIST-INDEX FINGER LENGTH.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
118.10	46.50	1ST	128.60	50.63
120.40	47.40	2ND	129.30	50.91
121.60	47.87	3RD	129.60	51.02
122.50	48.23	5TH	131.00	51.57
123.90	48.78	10TH	133.20	52.44
125.30	49.33	15TH	134.40	52.91
126.10	49.65	20TH	135.40	53.31
126.50	49.80	25TH	136.40	53.70
127.60	50.24	30TH	137.20	54.02
128.60	50.63	35TH	138.20	54.41
129.30	50.91	40TH	139.20	54.80
130.30	51.30	45TH	139.80	55.04
130.80	51.50	50TH	140.60	55.35
131.80	51.89	55TH	141.20	55.59
132.80	52.28	60TH	142.00	55.91
133.80	52.68	65TH	143.20	56.38
134.50	52.95	70TH	144.00	56.69
135.30	53.27	75TH	144.80	57.01
136.80	53.86	80TH	145.80	57.40
138.10	54.37	85TH	146.80	57.80
139.20	54.80	90TH	148.30	58.39
140.90	55.47	95TH	151.00	59.45
142.90	56.26	97TH	152.80	60.16
143.50	56.50	98TH	153.50	60.43
145.60	57.32	99TH	154.40	60.79

(D37) VERTICAL INDEX FINGERTIP REACH, SITTING

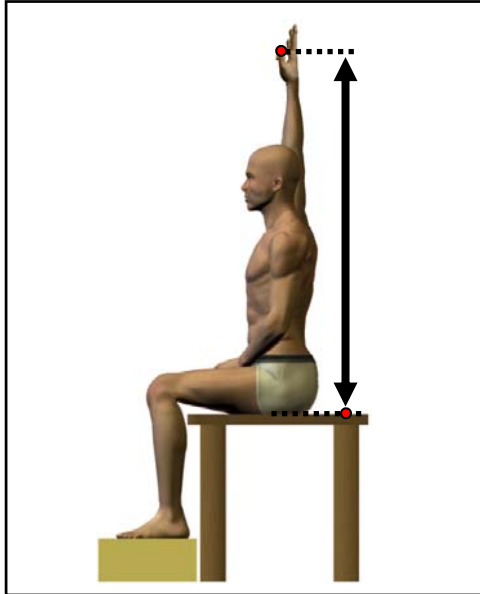
FEMALES		
<u>CM</u>		<u>IN</u>
131.36	MEAN	51.71
0.30	STD ERROR (MEAN)	0.12
5.92	STANDARD DEVIATION	2.33
0.21	STD ERROR (STD DEV)	0.08
117.10	MINIMUM	46.10
149.80	MAXIMUM	58.98
SKEWNESS		0.23
KURTOSIS		2.70
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
140.67	MEAN	55.38
0.19	STD ERROR (MEAN)	0.07
5.95	STANDARD DEVIATION	2.34
0.13	STD ERROR (STD DEV)	0.05
124.00	MINIMUM	48.82
161.10	MAXIMUM	63.43
SKEWNESS		0.14
KURTOSIS		2.77
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES				MALES							
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
4	1.01	4	1.01	116.75	-	118.25					
0	0.00	4	1.01	118.25	-	119.75					
10	2.53	14	3.54	119.75	-	121.25					
8	2.03	22	5.57	121.25	-	122.75					
23	5.82	45	11.39	122.75	-	124.25	1	0.10	1	0.10	
27	6.84	72	18.23	124.25	-	125.75	1	0.10	2	0.20	
37	9.37	109	27.59	125.75	-	127.25	6	0.61	8	0.82	
41	10.38	150	37.97	127.25	-	128.75	7	0.72	15	1.54	
30	7.59	180	45.57	128.75	-	130.25	23	2.35	38	3.89	
42	10.63	222	56.20	130.25	-	131.75	23	2.35	61	6.24	
30	7.59	252	63.80	131.75	-	133.25	35	3.58	96	9.83	
33	8.35	285	72.15	133.25	-	134.75	60	6.14	156	15.97	
25	6.33	310	78.48	134.75	-	136.25	73	7.47	229	23.44	
23	5.82	333	84.30	136.25	-	137.75	81	8.29	310	31.73	
21	5.32	354	89.62	137.75	-	139.25	79	8.09	389	39.82	
15	3.80	369	93.42	139.25	-	140.75	104	10.64	493	50.46	
11	2.78	380	96.20	140.75	-	142.25	103	10.54	596	61.00	
6	1.52	386	97.72	142.25	-	143.75	80	8.19	676	69.19	
5	1.27	391	98.99	143.75	-	145.25	81	8.29	757	77.48	
3	0.76	394	99.75	145.25	-	146.75	67	6.86	824	84.34	
0	0.00	394	99.75	146.75	-	148.25	50	5.12	874	89.46	
0	0.00	394	99.75	148.25	-	149.75	36	3.68	910	93.14	
1	0.25	395	100.00	149.75	-	151.25	24	2.46	934	95.60	
				151.25	-	152.75	17	1.74	951	97.34	
				152.75	-	154.25	14	1.43	965	98.77	
				154.25	-	155.75	9	0.92	974	99.69	
				155.75	-	157.25	2	0.20	976	99.90	
				157.25	-	158.75	0	0.00	976	99.90	
				158.75	-	160.25	0	0.00	976	99.90	
				160.25	-	161.75	1	0.10	977	100.00	

(D38) VERTICAL THUMB TIP REACH, SITTING

The vertical distance between a sitting surface and the tip of the right thumb of a participant sitting erect with the right shoulder, arm, and hand held straight overhead with the thumb lying on the first knuckle of the index finger is calculated as follows: OVERHEAD FINGERTIP REACH SITTING minus ANSUR mean of HAND LENGTH plus ANSUR mean of WRIST-THUMB TIP LENGTH.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
112.90	44.45	1ST	123.00	48.43
115.20	45.35	2ND	123.70	48.70
116.40	45.83	3RD	124.00	48.82
117.30	46.18	5TH	125.40	49.37
118.70	46.73	10TH	127.60	50.24
120.10	47.28	15TH	128.80	50.71
120.90	47.60	20TH	129.80	51.10
121.30	47.76	25TH	130.80	51.50
122.40	48.19	30TH	131.60	51.81
123.40	48.58	35TH	132.60	52.20
124.10	48.86	40TH	133.60	52.60
125.10	49.25	45TH	134.20	52.83
125.60	49.45	50TH	135.00	53.15
126.60	49.84	55TH	135.60	53.39
127.60	50.24	60TH	136.40	53.70
128.60	50.63	65TH	137.60	54.17
129.30	50.91	70TH	138.40	54.49
130.10	51.22	75TH	139.20	54.80
131.60	51.81	80TH	140.20	55.20
132.90	52.32	85TH	141.20	55.59
134.00	52.76	90TH	142.70	56.18
135.70	53.43	95TH	145.40	57.24
137.70	54.21	97TH	147.20	57.95
138.30	54.45	98TH	147.90	58.23
140.40	55.28	99TH	148.80	58.58

(D38) VERTICAL THUMB TIP REACH, SITTING

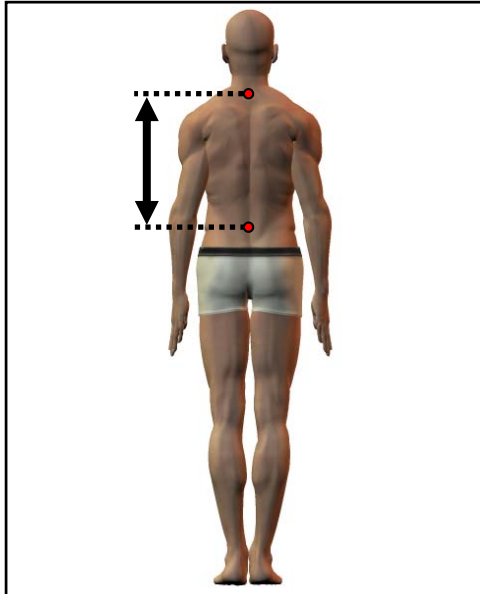
FEMALES		
<u>CM</u>		<u>IN</u>
126.16	MEAN	49.67
0.30	STD ERROR (MEAN)	0.12
5.92	STANDARD DEVIATION	2.33
0.21	STD ERROR (STD DEV)	0.08
111.90	MINIMUM	44.06
144.60	MAXIMUM	56.93
SKEWNESS		0.23
KURTOSIS		2.70
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
135.07	MEAN	53.18
0.19	STD ERROR (MEAN)	0.07
5.95	STANDARD DEVIATION	2.34
0.13	STD ERROR (STD DEV)	0.05
118.40	MINIMUM	46.61
155.50	MAXIMUM	61.22
SKEWNESS		0.14
KURTOSIS		2.77
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES				MALES							
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>	<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>			
3	0.76	3	0.76	111.55	-						
1	0.25	4	1.01	112.55	-						
0	0.00	4	1.01	113.55	-						
6	1.52	10	2.53	114.55	-						
5	1.27	15	3.80	115.55	-						
7	1.77	22	5.57	116.55	-						
17	4.30	39	9.87	117.55	-						
12	3.04	51	12.91	118.55	-	1	0.10	1	0.10		
21	5.32	72	18.23	119.55	-	0	0.00	2	0.20		
26	6.58	98	24.81	120.55	-	5	0.51	7	0.72		
21	5.32	119	30.13	121.55	-	2	0.20	9	0.92		
31	7.85	150	37.97	122.55	-	9	0.92	18	1.84		
21	5.32	171	43.29	123.55	-	18	1.84	36	3.68		
23	5.82	194	49.11	124.55	-	16	1.64	52	5.32		
28	7.09	222	56.20	125.55	-	16	1.64	68	6.96		
23	5.82	245	62.03	126.55	-	21	2.15	89	9.11		
17	4.30	262	66.33	127.55	-	35	3.58	124	12.69		
23	5.82	285	72.15	128.55	-	46	4.71	170	17.40		
19	4.81	304	76.96	129.55	-	54	5.53	224	22.93		
13	3.29	317	80.25	130.55	-	56	5.73	280	28.66		
16	4.05	333	84.30	131.55	-	49	5.02	329	33.67		
15	3.80	348	88.10	132.55	-	54	5.53	383	39.20		
12	3.04	360	91.14	133.55	-	69	7.06	452	46.26		
9	2.28	369	93.42	134.55	-	72	7.37	524	53.63		
7	1.77	376	95.19	135.55	-	67	6.86	591	60.49		
5	1.27	381	96.46	136.55	-	43	4.40	634	64.89		
5	1.27	386	97.72	137.55	-	58	5.94	692	70.83		
4	1.01	390	98.73	138.55	-	59	6.04	751	76.87		
3	0.76	393	99.49	139.55	-	48	4.91	799	81.78		
1	0.25	394	99.75	140.55	-	37	3.79	836	85.57		
0	0.00	394	99.75	141.55	-	34	3.48	870	89.05		
0	0.00	394	99.75	142.55	-	28	2.87	898	91.91		
0	0.00	394	99.75	143.55	-	18	1.84	916	93.76		
1	0.25	395	100.00	144.55	-	17	1.74	933	95.50		
				145.55	-	16	1.64	949	97.13		
				146.55	-	8	0.82	957	97.95		
				147.55	-	6	0.61	963	98.57		
				148.55	-	7	0.72	970	99.28		
				149.55	-	4	0.41	974	99.69		
				150.55	-	2	0.20	976	99.90		
				151.55	-	0	0.00	976	99.90		
				152.55	-	0	0.00	976	99.90		
				153.55	-	0	0.00	976	99.90		
				154.55	-	1	0.10	977	100.00		

(D39) WAIST BACK, VERTICAL (OMPHALION)*

The vertical distance between the cervicale landmark and the waist at the level of the navel (omphalion) is calculated as follows: CERVICALE HEIGHT minus WAIST HEIGHT (OMPHALION).



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
36.60	14.41	1ST	41.10	16.18
36.70	14.45	2ND	41.80	16.46
37.40	14.72	3RD	42.30	16.65
38.40	15.12	5TH	42.90	16.89
39.10	15.39	10TH	43.80	17.24
39.90	15.71	15TH	44.40	17.48
40.20	15.83	20TH	44.80	17.64
40.60	15.98	25TH	45.10	17.76
40.90	16.10	30TH	45.50	17.91
41.20	16.22	35TH	45.90	18.07
41.40	16.30	40TH	46.20	18.19
41.60	16.38	45TH	46.50	18.31
42.00	16.54	50TH	46.80	18.43
42.30	16.65	55TH	47.10	18.54
42.60	16.77	60TH	47.40	18.66
42.70	16.81	65TH	47.70	18.78
43.20	17.01	70TH	48.00	18.90
43.50	17.13	75TH	48.30	19.02
43.90	17.28	80TH	48.70	19.17
44.30	17.44	85TH	49.30	19.41
44.90	17.68	90TH	50.10	19.72
45.60	17.95	95TH	51.00	20.08
46.10	18.15	97TH	51.70	20.35
46.50	18.31	98TH	52.00	20.47
47.60	18.74	99TH	53.00	20.87

* In ANSUR cervicale was defined as the highest point on the seventh cervical vertebra. For consistency with international standards, it is now the most prominent point on the seventh cervical vertebra.

(D39) WAIST BACK, VERTICAL (OMPHALION)

FEMALES		
<u>CM</u>		<u>IN</u>
42.02	MEAN	16.54
0.11	STD ERROR (MEAN)	0.04
2.24	STANDARD DEVIATION	0.88
0.08	STD ERROR (STD DEV)	0.03
34.00	MINIMUM	13.39
48.00	MAXIMUM	18.90
SKEWNESS		-0.04
KURTOSIS		3.08
COEFFICIENT OF VARIATION		5.3%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
46.81	MEAN	18.43
0.08	STD ERROR (MEAN)	0.03
2.46	STANDARD DEVIATION	0.97
0.06	STD ERROR (STD DEV)	0.02
38.80	MINIMUM	15.28
54.80	MAXIMUM	21.57
SKEWNESS		0.12
KURTOSIS		3.30
COEFFICIENT OF VARIATION		5.3%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES				MALES							
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
1	0.25	1	0.25	33.75	-	34.25					
0	0.00	1	0.25	34.25	-	34.75					
0	0.00	1	0.25	34.75	-	35.25					
0	0.00	1	0.25	35.25	-	35.75					
3	0.76	4	1.01	35.75	-	36.25					
5	1.27	9	2.28	36.25	-	36.75					
1	0.25	10	2.53	36.75	-	37.25					
5	1.27	15	3.80	37.25	-	37.75					
4	1.01	19	4.81	37.75	-	38.25					
17	4.30	36	9.11	38.25	-	38.75					
21	5.32	57	14.43	38.75	-	39.25					
21	5.32	78	19.75	39.25	-	39.75	2	0.20	2	0.20	
31	7.85	109	27.59	39.75	-	40.25	1	0.10	3	0.31	
24	6.08	133	33.67	40.25	-	40.75	2	0.20	5	0.51	
42	10.63	175	44.30	40.75	-	41.25	8	0.82	13	1.33	
36	9.11	211	53.42	41.25	-	41.75	4	0.41	17	1.74	
27	6.84	238	60.25	41.75	-	42.25	9	0.92	26	2.66	
38	9.62	276	69.87	42.25	-	42.75	14	1.43	40	4.09	
24	6.08	300	75.95	42.75	-	43.25	20	2.05	60	6.14	
22	5.57	322	81.52	43.25	-	43.75	22	2.25	82	8.39	
23	5.82	345	87.34	43.75	-	44.25	48	4.91	130	13.31	
11	2.78	356	90.13	44.25	-	44.75	51	5.22	181	18.53	
14	3.54	370	93.67	44.75	-	45.25	66	6.76	247	25.28	
10	2.53	380	96.20	45.25	-	45.75	72	7.37	319	32.65	
5	1.27	385	97.47	45.75	-	46.25	78	7.98	397	40.63	
5	1.27	390	98.73	46.25	-	46.75	74	7.57	471	48.21	
1	0.25	391	98.99	46.75	-	47.25	73	7.47	544	55.68	
2	0.51	393	99.49	47.25	-	47.75	87	8.90	631	64.59	
2	0.51	395	100.00	47.75	-	48.25	74	7.57	705	72.16	
				48.25	-	48.75	70	7.16	775	79.32	
				48.75	-	49.25	53	5.42	828	84.75	
				49.25	-	49.75	39	3.99	867	88.74	
				49.75	-	50.25	32	3.28	899	92.02	
				50.25	-	50.75	21	2.15	920	94.17	
				50.75	-	51.25	21	2.15	941	96.32	
				51.25	-	51.75	12	1.23	953	97.54	
				51.75	-	52.25	8	0.82	961	98.36	
				52.25	-	52.75	5	0.51	966	98.87	
				52.75	-	53.25	4	0.41	970	99.28	
				53.25	-	53.75	3	0.31	973	99.59	
				53.75	-	54.25	2	0.20	975	99.80	
				54.25	-	54.75	1	0.10	976	99.90	
				54.75	-	55.25	0	0.00	976	99.90	
							1	0.10	977	100.00	

(D40) WAIST-BUTTOCK DROP (OMPHALION)

The difference between the circumference of the waist at the level of the navel (omphalion) and the circumference at the level of the buttock point landmarks is calculated as follows: BUTTOCK CIRCUMFERENCE minus WAIST CIRCUMFERENCE (OMPHALION).



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
4.60	1.81	1ST	-7.10	-2.80
5.30	2.09	2ND	-4.50	-1.77
6.10	2.40	3RD	-3.20	-1.26
7.20	2.83	5TH	-2.40	-0.94
8.40	3.31	10TH	-0.20	-0.08
10.20	4.02	15TH	1.40	0.55
11.60	4.57	20TH	2.30	0.91
13.40	5.28	25TH	3.30	1.30
14.40	5.67	30TH	4.00	1.57
14.90	5.87	35TH	4.60	1.81
15.50	6.10	40TH	5.50	2.17
16.20	6.38	45TH	6.30	2.48
16.80	6.61	50TH	7.10	2.80
17.40	6.85	55TH	7.90	3.11
18.20	7.17	60TH	8.50	3.35
18.90	7.44	65TH	9.40	3.70
19.90	7.83	70TH	10.00	3.94
20.80	8.19	75TH	10.90	4.29
22.10	8.70	80TH	11.70	4.61
23.50	9.25	85TH	12.60	4.96
25.00	9.84	90TH	13.60	5.35
26.00	10.24	95TH	15.30	6.02
27.60	10.87	97TH	16.30	6.42
27.70	10.91	98TH	16.70	6.57
28.90	11.38	99TH	17.60	6.93

(D40) WAIST-BUTTOCK DROP (OMPHALION)

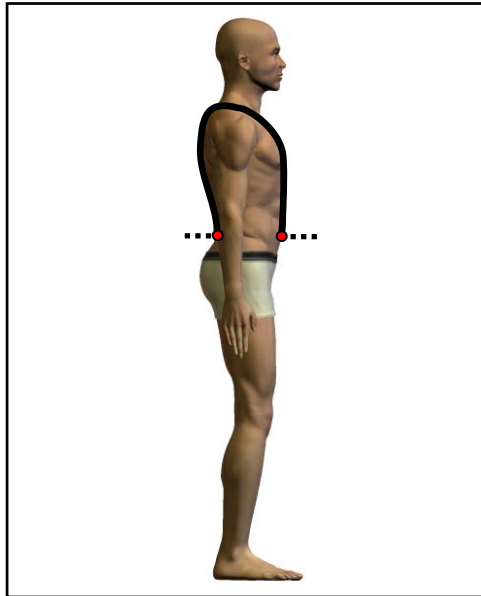
FEMALES		
<u>CM</u>		<u>IN</u>
16.83	MEAN	6.63
0.29	STD ERROR (MEAN)	0.12
5.85	STANDARD DEVIATION	2.30
0.21	STD ERROR (STD DEV)	0.08
-0.90	MINIMUM	-0.35
30.00	MAXIMUM	11.81
SKEWNESS		-0.10
KURTOSIS		2.54
COEFFICIENT OF VARIATION		34.7%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
6.89	MEAN	2.71
0.17	STD ERROR (MEAN)	0.07
5.36	STANDARD DEVIATION	2.11
0.12	STD ERROR (STD DEV)	0.05
-9.60	MINIMUM	-3.78
22.00	MAXIMUM	8.66
SKEWNESS		-0.19
KURTOSIS		2.83
COEFFICIENT OF VARIATION		77.8%
NUMBER OF PARTICIPANTS		977

FREQUENCIES											
FEMALES				MALES							
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
				-10.45	-	-9.45	1	0.10	1	0.10	
				-9.45	-	-8.45	0	0.00	1	0.10	
				-8.45	-	-7.45	1	0.10	2	0.20	
				-7.45	-	-6.45	1	0.10	3	0.31	
				-6.45	-	-5.45	1	0.10	4	0.41	
				-5.45	-	-4.45	3	0.31	7	0.72	
				-4.45	-	-3.45	4	0.41	11	1.13	
				-3.45	-	-2.45	8	0.82	19	1.94	
				-2.45	-	-1.45	6	0.61	25	2.56	
				-1.45	-	-0.45	12	1.23	37	3.79	
1	0.25	1	0.25	-0.45	-	0.55	17	1.74	54	5.53	
0	0.00	1	0.25	0.55	-	1.55	22	2.25	76	7.78	
1	0.25	2	0.51	1.55	-	2.55	34	3.48	110	11.26	
2	0.51	4	1.01	2.55	-	3.55	37	3.79	147	15.05	
6	1.52	10	2.53	3.55	-	4.55	54	5.53	201	20.57	
5	1.27	15	3.80	4.55	-	5.55	53	5.42	254	26.00	
11	2.78	26	6.58	5.55	-	6.55	61	6.24	315	32.24	
10	2.53	36	9.11	6.55	-	7.55	52	5.32	367	37.56	
10	2.53	46	11.65	7.55	-	8.55	67	6.86	434	44.42	
14	3.54	60	15.19	8.55	-	9.55	71	7.27	505	51.69	
11	2.78	71	17.97	9.55	-	10.55	83	8.50	588	60.18	
19	4.81	90	22.78	10.55	-	11.55	82	8.39	670	68.58	
11	2.78	101	25.57	11.55	-	12.55	73	7.47	743	76.05	
17	4.30	118	29.87	12.55	-	13.55	74	7.57	817	83.62	
32	8.10	150	37.97	13.55	-	14.55	50	5.12	867	88.74	
27	6.84	177	44.81	14.55	-	15.55	40	4.09	907	92.84	
28	7.09	205	51.90	15.55	-	16.55	31	3.17	938	96.01	
26	6.58	231	58.48	16.55	-	17.55	18	1.84	956	97.85	
25	6.33	256	64.81	17.55	-	18.55	13	1.33	969	99.18	
27	6.84	283	71.65	18.55	-	19.55	3	0.31	972	99.49	
20	5.06	303	76.71	19.55	-	20.55	2	0.20	974	99.69	
14	3.54	317	80.25	20.55	-	21.55	1	0.10	975	99.80	
15	3.80	332	84.05	21.55	-	22.55	2	0.20	977	100.00	
16	4.05	348	88.10	22.55	-	23.55					
17	4.30	365	92.41	23.55	-	24.55					
10	2.53	375	94.94	24.55	-	25.55					
7	1.77	382	96.71	25.55	-	26.55					
6	1.52	388	98.23	26.55	-	27.55					
5	1.27	393	99.49	27.55	-	28.55					
2	0.51	395	100.00								

(D41) WAIST-WAIST (OMPHALION) OVER SHOULDER

The vertical circumference of the upper torso between the front of the waist at the navel (omphalion) passing up over the midpoint between the sternum and the anterior axillary fold, over the midshoulder landmark, and down the back to the waist (omphalion) posterior landmark is calculated as follows: VERTICAL TRUNK CIRCUMFERENCE (USA) minus CROTCH LENGTH (OMPHALION).



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
82.40	32.44	1ST	91.70	36.10
84.40	33.23	2ND	93.50	36.81
85.20	33.54	3RD	94.50	37.20
86.60	34.09	5TH	95.80	37.72
88.30	34.76	10TH	97.60	38.43
89.30	35.16	15TH	98.90	38.94
90.10	35.47	20TH	100.10	39.41
90.70	35.71	25TH	101.20	39.84
91.60	36.06	30TH	101.80	40.08
92.20	36.30	35TH	102.60	40.39
93.00	36.61	40TH	103.40	40.71
93.50	36.81	45TH	104.10	40.98
94.00	37.01	50TH	104.70	41.22
95.00	37.40	55TH	105.20	41.42
95.70	37.68	60TH	105.90	41.69
96.40	37.95	65TH	106.80	42.05
96.80	38.11	70TH	107.60	42.36
97.40	38.35	75TH	108.30	42.64
98.60	38.82	80TH	109.20	42.99
99.60	39.21	85TH	110.20	43.39
101.60	40.00	90TH	111.80	44.02
103.00	40.55	95TH	113.70	44.76
105.90	41.69	97TH	115.10	45.31
106.60	41.97	98TH	116.60	45.91
109.70	43.19	99TH	116.90	46.02

(D41) WAIST-WAIST (OMPHALION) OVER SHOULDER

FEMALES		
<u>CM</u>		<u>IN</u>
94.54	MEAN	37.22
0.27	STD ERROR (MEAN)	0.11
5.30	STANDARD DEVIATION	2.09
0.19	STD ERROR (STD DEV)	0.07
79.80	MINIMUM	31.42
114.10	MAXIMUM	44.92
SKEWNESS		0.48
KURTOSIS		3.72
COEFFICIENT OF VARIATION		5.6%
NUMBER OF PARTICIPANTS		395

MALES		
<u>CM</u>		<u>IN</u>
104.69	MEAN	41.22
0.17	STD ERROR (MEAN)	0.07
5.45	STANDARD DEVIATION	2.15
0.12	STD ERROR (STD DEV)	0.05
86.60	MINIMUM	34.09
123.20	MAXIMUM	48.50
SKEWNESS		0.04
KURTOSIS		3.01
COEFFICIENT OF VARIATION		5.2%
NUMBER OF PARTICIPANTS		977

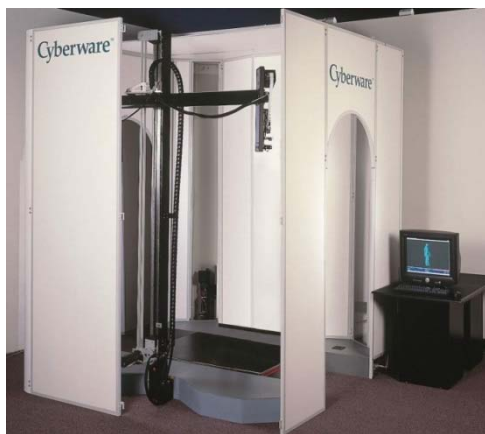
FREQUENCIES											
FEMALES				MALES							
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>	<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>			
1	0.25	1	0.25	79.55 - 80.55							
1	0.25	2	0.51	80.55 - 81.55							
3	0.76	5	1.27	81.55 - 82.55							
3	0.76	8	2.03	82.55 - 83.55							
3	0.76	11	2.78	83.55 - 84.55							
7	1.77	18	4.56	84.55 - 85.55							
8	2.03	26	6.58	85.55 - 86.55							
13	3.29	39	9.87	86.55 - 87.55	2	0.20	2	0.20			
20	5.06	59	14.94	87.55 - 88.55	0	0.00	2	0.20			
26	6.58	85	21.52	88.55 - 89.55	0	0.00	2	0.20			
27	6.84	112	28.35	89.55 - 90.55	5	0.51	7	0.72			
26	6.58	138	34.94	90.55 - 91.55	5	0.51	12	1.23			
28	7.09	166	42.03	91.55 - 92.55	4	0.41	16	1.64			
35	8.86	201	50.89	92.55 - 93.55	14	1.43	30	3.07			
26	6.58	227	57.47	93.55 - 94.55	14	1.43	44	4.50			
26	6.58	253	64.05	94.55 - 95.55	20	2.05	64	6.55			
21	5.32	274	69.37	95.55 - 96.55	17	1.74	81	8.29			
30	7.59	304	76.96	96.55 - 97.55	36	3.68	117	11.98			
16	4.05	320	81.01	97.55 - 98.55	49	5.02	166	16.99			
18	4.56	338	85.57	98.55 - 99.55	58	5.94	224	22.93			
13	3.29	351	88.86	99.55 - 100.55	58	5.94	282	28.86			
10	2.53	361	91.39	100.55 - 101.55	61	6.24	343	35.11			
15	3.80	376	95.19	101.55 - 102.55	81	8.29	424	43.40			
2	0.51	378	95.70	102.55 - 103.55	68	6.96	492	50.36			
5	1.27	383	96.96	103.55 - 104.55	71	7.27	563	57.63			
2	0.51	385	97.47	104.55 - 105.55	71	7.27	634	64.89			
4	1.01	389	98.48	105.55 - 106.55	54	5.53	688	70.42			
1	0.25	390	98.73	106.55 - 107.55	60	6.14	748	76.56			
0	0.00	390	98.73	107.55 - 108.55	58	5.94	806	82.50			
2	0.51	392	99.24	108.55 - 109.55	42	4.30	848	86.80			
1	0.25	393	99.49	109.55 - 110.55	35	3.58	883	90.38			
1	0.25	394	99.75	110.55 - 111.55	21	2.15	904	92.53			
0	0.00	394	99.75	111.55 - 112.55	19	1.94	923	94.47			
0	0.00	394	99.75	112.55 - 113.55	18	1.84	941	96.32			
1	0.25	395	100.00	113.55 - 114.55	15	1.54	956	97.85			
				114.55 - 115.55	6	0.61	962	98.46			
				115.55 - 116.55	3	0.31	965	98.77			
				116.55 - 117.55	5	0.51	970	99.28			
				117.55 - 118.55	3	0.31	973	99.59			
				118.55 - 119.55	1	0.10	974	99.69			
				119.55 - 120.55	2	0.20	976	99.90			
				120.55 - 121.55	0	0.00	976	99.90			
				121.55 - 122.55	0	0.00	976	99.90			
				122.55 - 123.55	1	0.10	977	100.00			

CHAPTER VI

THREE-DIMENSIONAL SCANNING

In addition to the traditional measurement stations, ANSUR II participant pilots also visited the scanning station, where 3-D images were taken by three digital scanners: whole-body (WBX), head (PX), and foot. Team members directed participants to each of the three scanners in a sequence that minimized wait time.

All three machines used in this survey—the Cyberware WBX and PX scanners, and the INFOOT foot scanner—were low-power, infrared laser systems that offer no risk of damage to the body (Figure 21). The machines were calibrated daily. Cyscan, the software for the WBX and PX systems, runs on the Windows XP operating system, as does the INFOOT software used in conjunction with the foot scanner. The computers associated with the scanners were set up such that they only connected with the in-field Anthrotech network. Scan data files were transferred over this network via Ethernet data cable connection to the local system server and then uploaded daily to a server located in Yellow Springs, OH (Anthrotech HQ). Data files were transferred daily to a secure server at NSRDEC via a secure connection.



WBX Scanner



PX Scanner



Foot Scanner

FIGURE 21

Scanning Instruments

Furnished by the Government, the CyScan software on the WBX runs in conjunction with the Enhanced Anthropometric Rating System (EARS) Program. EARS (Yin et al., 2009; Yin et al., 2010), also furnished by the Government, was used as an evaluation step to assist the operator in evaluating scan quality.

6.1 PARTICIPANT PREPARATION

When participants arrived at the scanning stations, they were shown to a changing room and asked to change into the appropriately sized scan wear. Scan wear

was spandex compression shorts for men, and spandex shorts and a jog bra for women. Wig caps were placed on the participants' heads to: (1) allow capture of the head surface and (2) compress the hair to minimize the increase to apparent head size caused by hair bulk. Some hair types and styles also caused irregular reflections of the laser light, resulting in extraneous points on the scan; the wig cap minimized this effect as well. A team member placed orange half-inch adhesive dots over selected landmarks previously drawn on the body and orange quarter-inch adhesive dots on all head landmarks. Wooden disks were used to mark left and right acromion landmarks. The landmarks used for the scan procedure are illustrated in Figures 22 through 25.

The participant was then directed to whichever scanner was available. Scanning of a single participant took approximately 15-20 seconds to complete for each scanner, but he/she was asked to remain in the scanner while the operator checked the visual images, as rescans were sometimes necessary to correct problems.

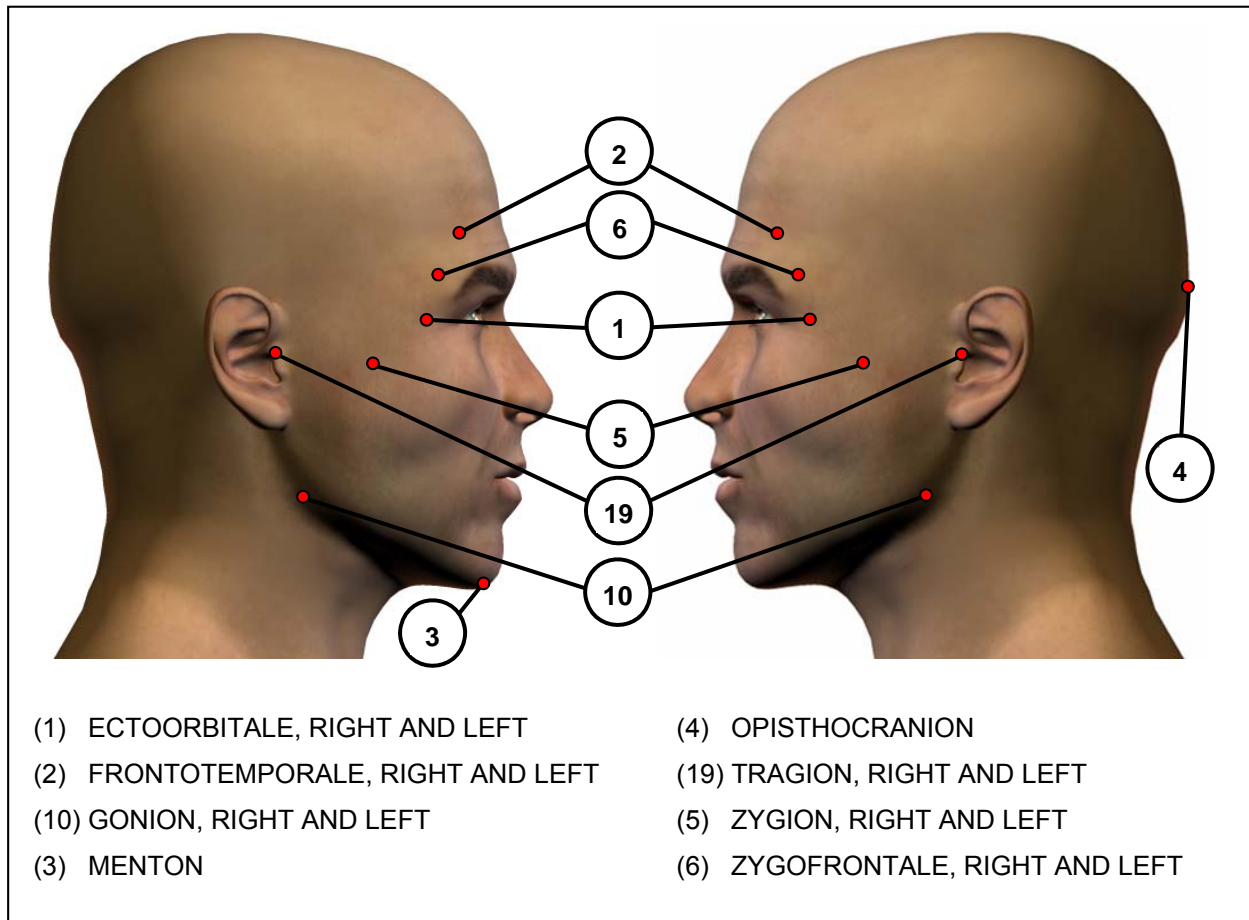


FIGURE 22

Lateral View of Head Scanning Landmarks

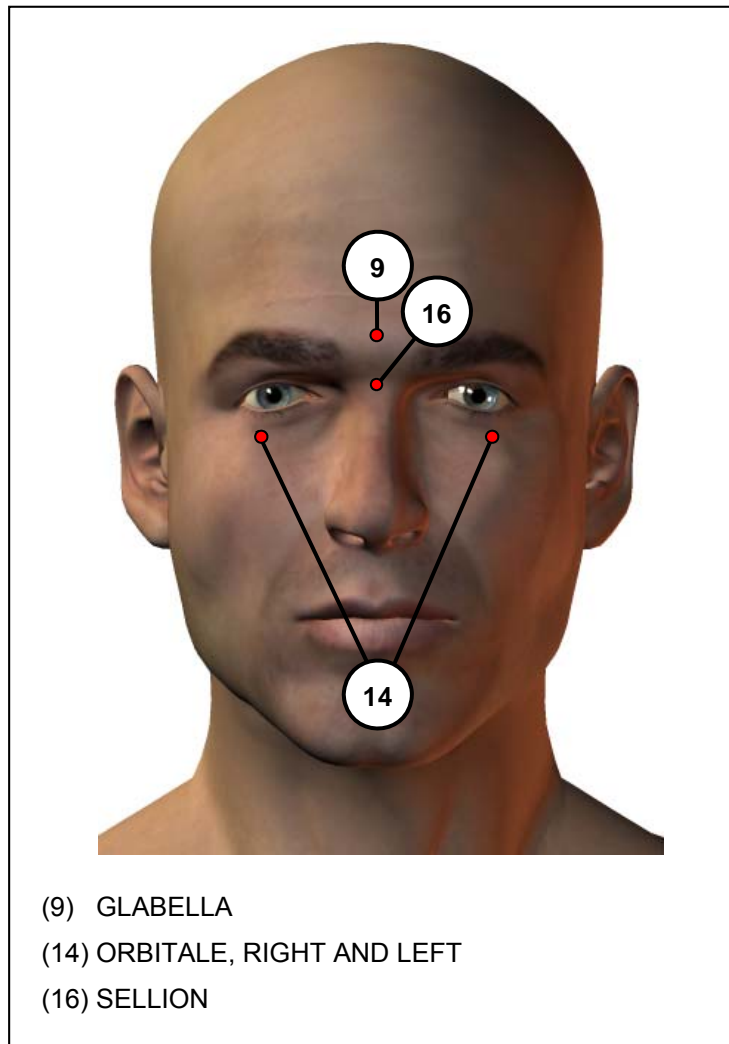
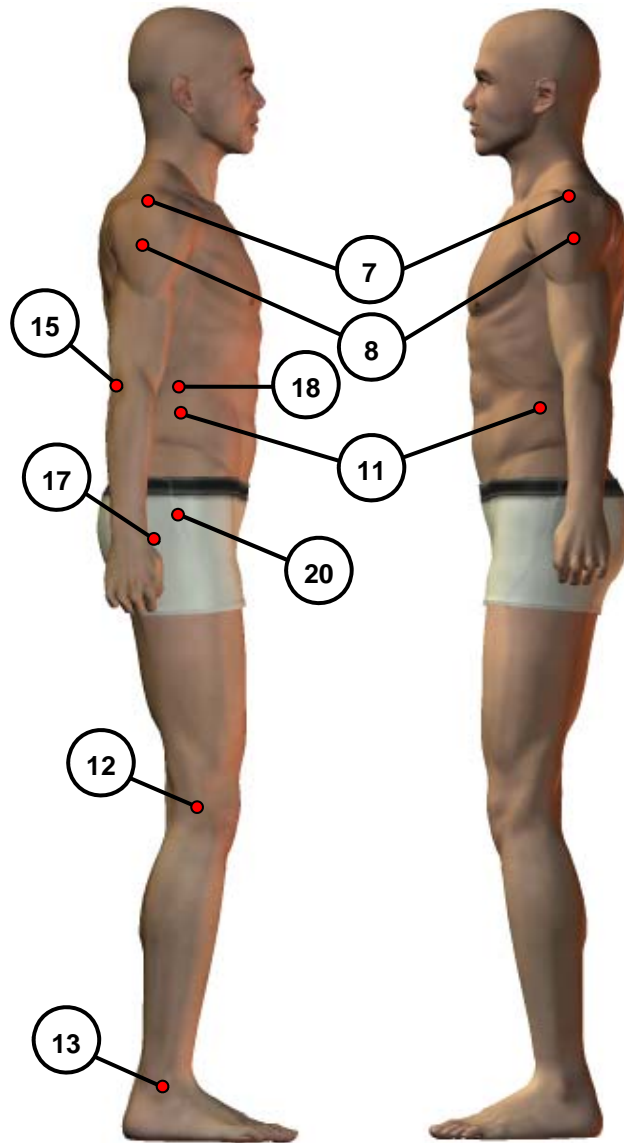


FIGURE 23

Anterior View of Head Scanning Landmarks



- (7) ACROMION, RIGHT AND LEFT
- (8) DELTOID POINT, RIGHT AND LEFT
- (11) ILIOCRISTALE, RIGHT AND LEFT
- (12) LATERAL FEMORAL EPICONDYLE,
STANDING, RIGHT

- (13) LATERAL MALLEOLUS, RIGHT
- (15) RADIALE, RIGHT
- (17) STYLION, RIGHT
- (18) TENTH RIB, RIGHT
- (20) TROCHANTERION, RIGHT

FIGURE 24

Lateral View of Body Scanning Landmarks

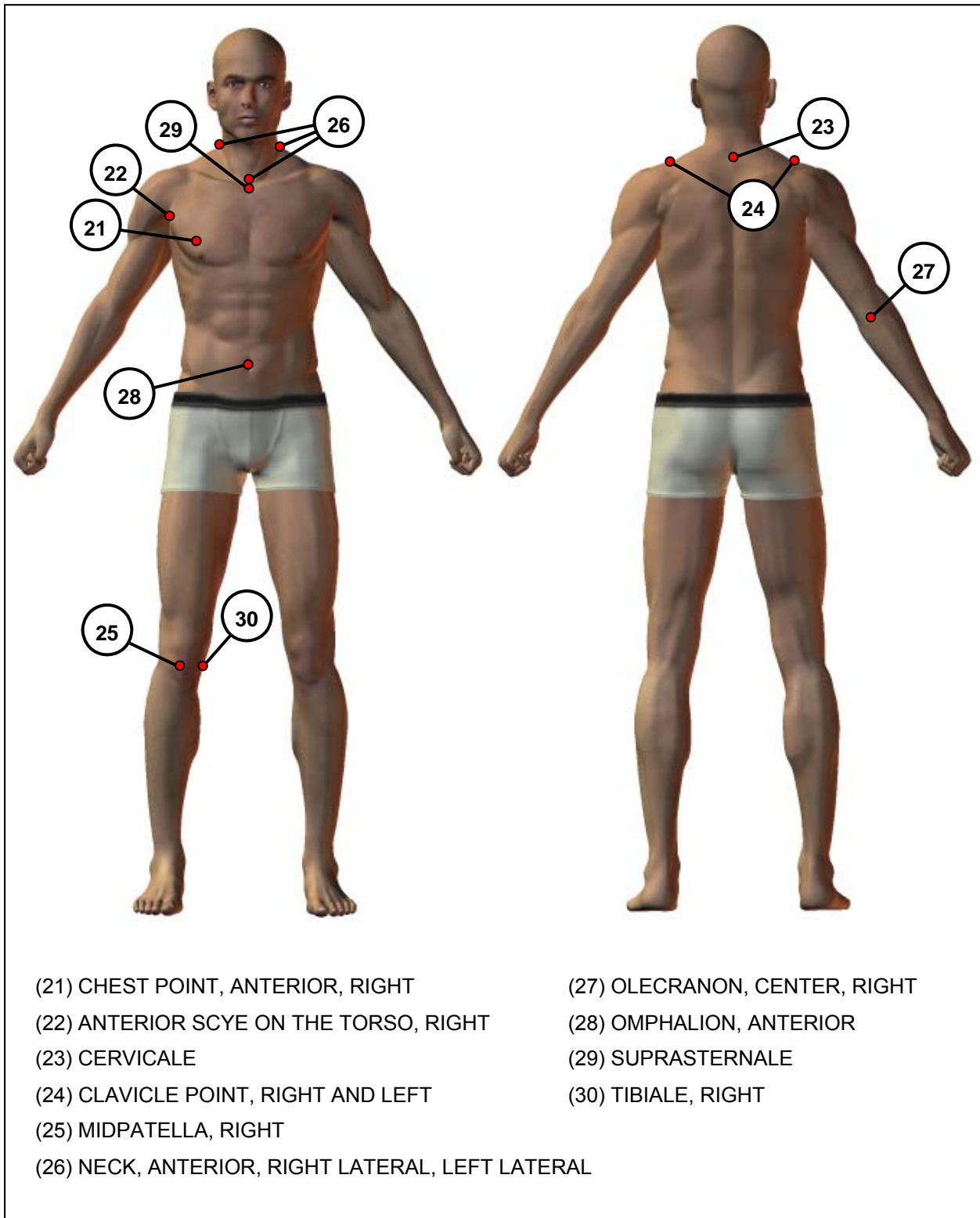


FIGURE 25

Anterior (Left) and Posterior (Right) Views of Body Scanning Landmarks

6.1.1 Whole-Body Scanning

Participants were briefed on the proper posture to assume for the whole-body scan (Figures 26 and 27). In general, the position required that participants stand erect without stiffness. The feet were positioned 30 cm apart and parallel to one another. The arms were straight and held away from the body with fists clenched. The head was in the Frankfurt plane. When participants stepped onto the scan platform, a team member checked to make sure that: (1) the scan wear was wrinkle-free, (2) the wig caps were placed correctly, and (3) all the landmark dots were in place.



FIGURE 26

Anterior View of Whole-Body Scan*

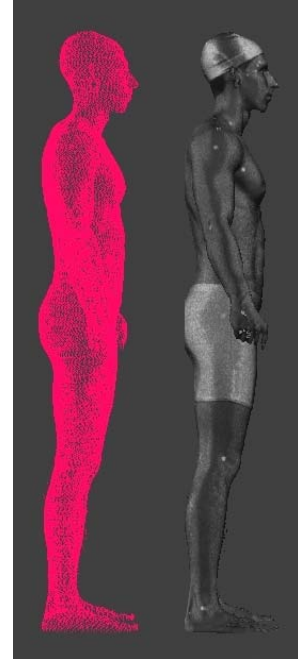


FIGURE 27

Lateral View of Whole-Body Scan*

6.1.2 Head Scanning

Head scans were taken with participants in the seated position. Operators adjusted the height of the chair to ensure that the head was within the scanner field and lightly touched the head stabilizer. Participants were positioned with their heads in the Frankfurt plane and then asked to lift their chins slightly to enable the scanner to completely capture the region beneath the chin (Figures 28 and 29).

* The individual shown in Figures 26-32 is a civilian model and was not part of ANSUR II.



FIGURE 28

Anterior View of Head Scan*

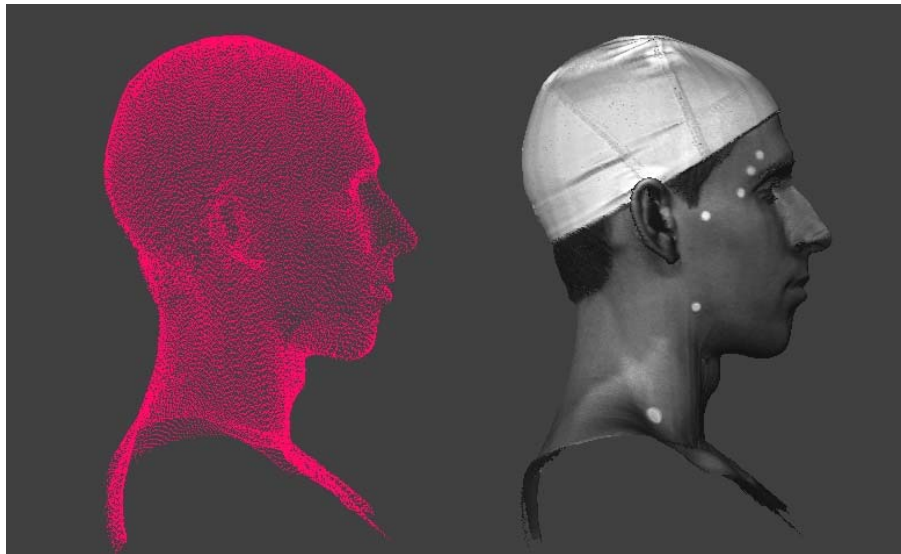


FIGURE 29

Lateral View of Head Scan*

6.1.3 Foot Scanning

In preparation for foot scanning, which was done on the right foot only, a team member checked that the right foot was clean and dry (without perspiration). If the participant had noticeable leg hair, he or she was asked to put on a stocking from ankle

* The individual shown in Figures 26-32 is a civilian model and was not part of ANSUR II.

to knee to prevent scan distortion caused by hair. A sanitary protective paper was wrapped around the leg just below the knee where the scanner closed around the leg. Each participant was asked to step onto the left-foot stage with the left foot and to place the right foot into the scanner. The right foot was aligned with marks on the bottom of the scanner base. Scans were taken in the standing posture with the weight distributed evenly between both feet. Foot scans are seen in Figures 30 and 31.

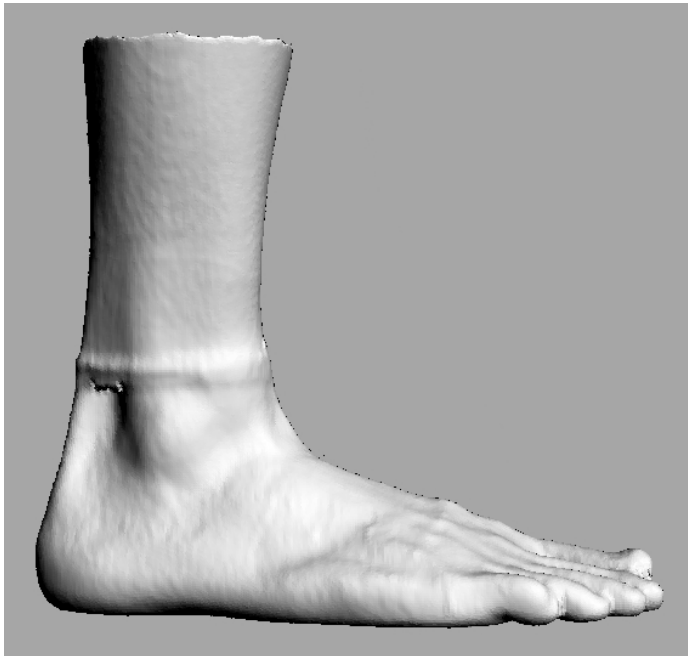


FIGURE 30

Lateral View of Foot Scan*



FIGURE 31

Plantar View of Foot Scan*

6.2 THE UTILITY OF 3-D SCANNING

Until the 1980s, anthropometric databases consisted almost wholly of hundreds of manually measured body-size variables obtained by using traditional instruments such as anthropometers, calipers, and tapes. These methods, when properly employed, were—and still are—a highly accurate means of documenting the body sizes of individuals and of whole populations. What traditional anthropometry cannot do well, however, is reflect human shape. Approximately 30 years ago, the nation's military services began to explore 3-D scanning methodology as a means of supplementing their existing anthropometric databases—beginning with the use of smaller devices for scanning heads and other body parts and, today, use of whole-body scanners.

The two most common uses of 3-D scan data in an ergonomic context are in the design, sizing, and production of military clothing and equipment and the creation of

* The individual shown in Figures 26-32 is a civilian model and was not part of ANSUR II.

accurately proportioned 3-D computer-aided design (CAD) models for the ergonomic design of working environments. Today, the entire production chain for a piece of clothing, beginning with the design and sizing of an item and culminating in the fabrication of the garment, can be achieved in a computer environment populated by 3-D models (Grotepass et al., 2002). While a large-scale operation such as this is still in the future for the nation's military services, a digital system for custom designing clothing for service personnel who fall outside established anthropometric design limits is already under limited trial (Gentsch et al., 2000). The obvious advantages of 3-D scan images for this undertaking include the production of better-fitting garments, reduction in the costs of stocking unusual sizes, and faster response time between measurement and delivery.

Three-dimensional human analogues created from scanned images have an almost infinite number of uses in the design of workplaces such as military vehicles and cockpits where accommodation, lines of vision, and ability to reach hand and foot controls can be tested on a computer screen. Fully dressed and equipped pilots can also be scanned for input into CAD models for assessing workplace interactions.

Other uses for 3-D images stem from the ability of the scanner to record the surface area and volume of the body or any of its parts. The Army made early use of this capacity, for example, by writing software for the scanner to assess the degree of ballistic protection afforded Soldiers wearing various designs of protective body armor (Paquette, 1996).

As an anthropometric tool, 3-D scanning complements traditional methods in two ways. First, a participant can be scanned in a matter of seconds, and the scanned images become permanent records. Users can return to them as many times as needed to extract new dimensions or to employ them in the creation of computer models. Second, the relationship of one dimension to another, or to several other dimensions, is clearly apparent. This aids in understanding body shape, as well as body size.

6.3 TRADITIONAL ANTHROPOMETRY AND 3-D SCANNING

While some progress has been made in achieving consistency between traditional anthropometric measurements and those obtained by extraction from 3-D scans, significant differences between the two techniques remain. While researchers have identified a number of reasons for these differences (Han et al., 2010; Kouchi & Mochimaru, 2006; Perkins et al., 2000), the three chief causes appear to be tissue compression that occurs in manual measurements, algorithms used to extract measurements from 3-D images, and posture.

Comparisons show that scan-generated measurements tend to be significantly larger than those obtained by manual measurement. One way to assess the importance of these differences is to determine whether they exceed the allowable errors established for interobserver differences in the first ANSUR survey (Gordon et al.,

1989) and subsequently adopted by the International Organization for Standardization (ISO) (ISO 20685:2010). A recent study of 14 comparative measurements, for example, found that the differences between the scanned and traditional measurements exceeded the allowable errors specified by ISO 20685 in all cases (Han et al., 2010).

In these comparisons, circumference measurements are the most problematic. Manual methods of measuring around the body and its parts generally require that the tape be in contact with the skin all the way around the body part. This is difficult to achieve without slightly compressing the flesh and, thus, may result in a somewhat smaller value than that obtained by the scanner, which simply “sees” the outlines and has no effect on the tissue. An alternative explanation, persuasive especially for scanners with lower point density, is that the scanner-extracted circumference must use available points, essentially “connecting the dots” and that that route between dots may be more jagged (and therefore longer) than the smooth route taken by the tape.

When sufficient care is taken in positioning the participant and ensuring that the hair is covered by a bald cap, heights and lengths in general show smaller, though sometimes significant, discrepancies. Han and her colleagues (2010) have developed regression equations for adjusting values of some extracted scan data to make them more consistent with traditionally measured values.

6.4 POSTURE

Consistent participant positioning is a major factor in obtaining reliable body-size measurements in both traditional and 3-D scanning methods, as well as a source of differences in outcome between the two methods when whole-body scanning is required. The basic standing posture used in manual measuring calls for the participant to stand straight with the heels together and the arms hanging relaxed at the sides. This position is impractical for a system that uses light to produce digital images. When arms and legs are too close to the torso, or too close together, they prevent the scanner from capturing other parts of the body (such as the crotch and armpits). Thus, scanned participants are asked to stand with arms held away from the body and legs placed farther apart.

Experiments conducted by Kouchi and Mochimaru (2006) established the effects of postural differences in 42 manual and scanned measurements of 40 Japanese adults. Participants were measured and scanned in four different positions, the basic traditional posture (Figure 32a), and in three postures in which the arms were held increasingly away from the body and the feet were spread increasingly apart. The researchers found that leg abduction significantly affected hip and thigh measurements, while abduction of the arms significantly affected measurements of the shoulder and chest. For most other variables, when the feet were placed less than 25 cm apart and the arms were abducted less than 10°, the measurements were comparable to those obtained in the basic traditional posture. The posture used in ANSUR II is very similar to this posture (Figure 32b).

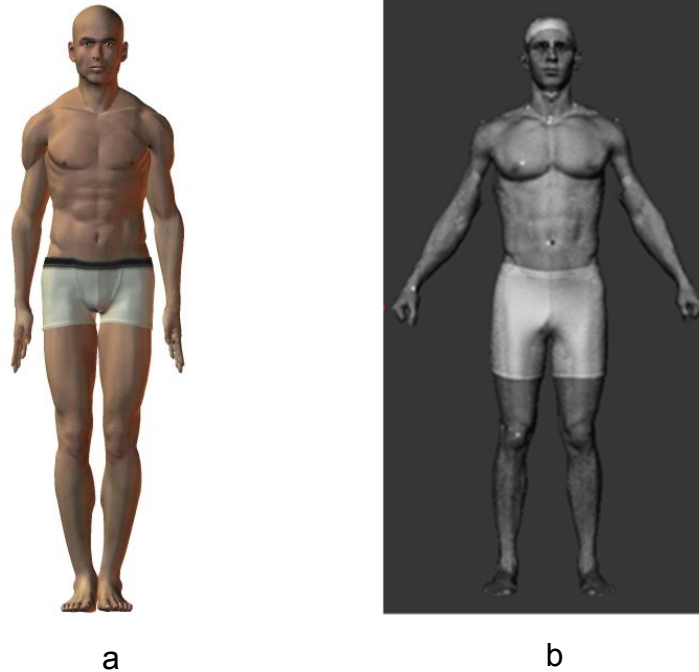


FIGURE 32

Traditional and ANSUR II Posture*

Posture is especially important in systems where measurements and landmarks are located automatically. The algorithms that locate measurement points assume a particular posture on the part of the participant. If the participant is in a posture that differs from the assumed posture, even slightly, then measurements can be taken at inappropriate locations. Of course, such measurements are never comparable. Automatic landmark location was not used in the ANSUR II survey.

In general, it is difficult to draw too many conclusions about the comparability of scan-extracted and directly measured anthropometry from the published literature. The tested systems vary in scan quality, and they vary in the mathematical techniques used in extracting dimensions. Some of these applications can be used on any scan; others function only on one system. Some systems are fully automatic—they can extract dimensions from a scan whose participant has had no preparation. Others require an operator to identify a set of key landmarks before extraction can begin. Still others identify landmarks that have been identified through palpation (by a trained anthropometrist) prior to scanning. The consensus in the anthropometric community is that the most likely way to obtain scan-extracted dimensions that are similar to traditionally measured ones is to pre-mark the study participants using palpation of traditional landmarks. That was the approach taken in this study. As scan extraction software continues to improve, this data set will continue to be useful, since the landmarks were verified through palpation and they are visible on the scan.

* The individual shown in Figures 26-32 is a civilian model and was not part of ANSUR II.

CHAPTER VII

OBSERVER ERROR

Since anthropometric data are used in the design of workspaces, uniforms, and personal protective clothing and equipment, excessive error in the data can result in badly designed workspaces, poorly fitting uniforms, and potentially unsafe protective gear. Further, several studies have shown that insufficient information about observer error can lead to misinterpretation of population comparisons (Jamison and Zegura, 1974; Utermohle and Zegura, 1982; Utermohle et al., 1983). While considerable effort was made to minimize the amount of interobserver error (hereafter, observer error) in the ANSUR II pilots survey, observer error is a fact of life in almost any scientific endeavor. Because such problems cannot be eliminated entirely, the most responsible approach is to measure the observer error so that users of the data will be able to judge for themselves its effects on their particular applications.

Error analysis of anthropometric data is usually performed *after* the data collection has been completed. The approach used in the ANSUR II pilots survey was to establish an allowable observer error for each dimension *prior* to the commencement of data collection. This enabled the use of repeated measures data during the survey to monitor and improve the quality of the data. Selected participants were re-measured daily at each station throughout the course of the survey and the resultant data were analyzed weekly for observer error. This information was used as continuous feedback to the team to maintain the high quality of the data collection.

The allowable errors were established for three purposes. First, they were used during the initial training period as an indicator that measurers had successfully learned their tasks. Team members conducted practice measurements on a group of participants to learn their assigned dimensions. Observer error results were calculated regularly to assess the ability of each measurer to repeat measurements within fixed limitations, and the ability of each pair of measurers to achieve interobserver consistency. The performance of measurers in training was rated against standards established by experienced measurers (see Section 7.2).

The second use of the allowable observer error levels was to "recalibrate" the team at the beginning of each new survey location. Because the team traveled by car to each new location, there was often a period of several days between measuring sessions. In order to ensure consistency from one location to the next and to minimize measurer "drift" during the course of the survey, error trials were conducted at the beginning of each new location.

Finally, allowable observer error was used as a standard for daily error checks. Twice a day, at each station, a participant was re-measured to provide error data on actual participants during the course of the survey. These data were examined daily and analyzed weekly. If a measuring pair consistently exceeded the allowable observer error for a given dimension, the cause of the drift was determined and corrective action

taken. Thus, the allowable error values in a very real sense established the minimum reliability for the data collected in the survey.

7.1 OBSERVER ERROR IN THE ANTHROPOMETRIC LITERATURE

There are a number of different analytical methods and approaches to error analysis. A literature review of anthropometric error data revealed six approaches: analysis of variance (Bennett and Osborne, 1986; Jamison and Zegura, 1974; Kouchi et al., 1999; Utermohle and Zegura, 1982), correlation coefficients (Branson et al., 1982; Gordon and Bradtmiller, 1992; Jamison and Ward, 1993; Jamison and Zegura, 1974; Kouchi et al., 1996; Kemper and Pieters, 1974; Ulijaszek and Kerr, 1999; Ulijaszek and Lourie, 1994), mean differences (Branson et al., 1982; Gordon and Bradtmiller, 1992; Kouchi et al., 1996), technical error measurement (Branson et al., 1982; Cameron, 1984; Gordon and Bradtmiller, 1992; Goto and Mascie-Taylor, 2007; Harris and Smith, 2009; Jamison and Ward, 1993; Johnston and Mack, 1985; Kouchi et al., 1996; Ulijaszek and Kerr, 1999; Ulijaszek and Lourie, 1994; Utermohle and Zegura, 1982), paired T-tests (Albrecht, 1983; Utermohle and Zegura, 1982), 11 separate univariate measures (Utermohle et al., 1983), and various multivariate measures (Jamison and Zegura, 1974; Page, 1976; Utermohle et al., 1983). Utermohle and colleagues (1983) have observed: "There is no consensus concerning which statistical procedures are optimal or even important for the analysis of measurement error in physical anthropology." This literature review appears to bear that out.

Analysis of variance is a generally useful technique, which has often been applied to error data. Depending upon how it is applied, it can show how much of the measurement error is due to: (1) *interobserver* differences, (2) *intraobserver* differences and, where applicable, (3) the use of varying measurement methods or instruments. As Bennett and Osborne (1986) emphasize, analyses of variance are often used as a measure of differences between populations. Thus, when these analyses of variance can demonstrate statistically significant differences between groups as defined by measurers (interobserver error), the conclusions of a large number of studies showing anthropometric differences between populations should be questioned. This point is also made by Jamison and Zegura (1974) about multivariate techniques and by Page (1976) about principal components.

While the partitioning of error variance into interobserver and intraobserver components can be useful for population comparisons, and is of interest in its own right, it nevertheless has little to offer for the setting of permissible error levels in advance of data collection. Indeed in the present case, because the sample size is large, an analysis that relies solely on statistical significance must be regarded with extreme caution. What is needed in addition is a technique that examines observer differences in terms of the units of measurement.

A second analytical approach to error data is exemplified by Kemper and Pieters (1974). In that study, the investigators compared nine measurements obtained on the same participants by measurers at two different research institutes in The Netherlands.

(An important distinction here is that the two teams were trained on the basis of the same written document, but were not trained by the same persons or trained with each other.) The authors calculated the mean differences between measurements, including the sign (positive or negative) of the differences. Additionally, they calculated correlation coefficients between the two measurements. These ranged from 0.872 for Biacromial Diameter to 0.996 for Stature. A third value calculated in their study was a correlation coefficient between the difference (between the two measurements) and the mean of the two measurements. This last value was a measure of whether the difference increases with an increase in the absolute size of the measurement. Most correlation coefficients were not statistically different from zero, and all but three were less than 0.2. Here again, however, these values are useful in analyzing data after they have been collected, but are not directly applicable to setting maximum acceptable error levels in advance of data collection, or monitoring measurer performance during data collection.

In the context of this lack of consensus for reporting statistics and the lack of utility of many of these statistics for ongoing data monitoring, the 1988 ANSUR (Gordon et al., 1989) set allowable error rates based on the mean of absolute differences (MADs). This was simple to calculate and easily interpretable. The decision at that time was validated by the usefulness of those data during data collection, and by their usefulness in data interpretation following the survey. Those values have been incorporated into an international standard as well (ISO 20685:2010).

7.2 OBSERVER ERROR TEST

The vast majority of the traditional anthropometric dimensions measured in this study were duplicated from the 1987-1988 U.S. Army ANSUR (Gordon et al., 1989). The values established for the ANSUR survey were developed from three main sources: (1) research literature, (2) examination of test/retest values from surveys in the Harry G. Armstrong Aerospace Medical Research Laboratory Anthropometric Data Bank, and (3) analysis of the results of an observer error test conducted specifically for the ANSUR survey by acknowledged experts in anthropometry. For the ANSUR dimensions retained in the ANSUR II survey, there was no need to re-validate the allowable errors, since it was known in advance that the measurements could be reliably done and in every case the ANSUR actual observer errors were within the allowable error limits. Not all the dimensions to be measured in the ANSUR II pilots survey were pre-validated by ANSUR, however. Anthrotech performed a new validation trial on a subset of ANSUR II pilots dimensions for three reasons: (1) the dimension was new, (2) the ANSUR dimension was modified in some way, or (3) the actual observer errors in ANSUR suggested that the pre-set allowable errors could be lowered. A detailed description of the observer error test, along with the results, can be found in *ANSUR II Methods and Summary Statistics* (Gordon et al., 2014).

7.3 DAILY OBSERVER ERROR

As noted in Chapter II, data collection was organized into half-day units. In each half day, each station measured one participant twice. Each station therefore had a total of 10 re-measure participants for each full week of measuring. The re-measure participants were typically measured by the second measurer at the station. Exceptions occurred when a team member was absent, or during transitions when one team member was being replaced by another. In those cases a substitute recorder was used, as only trained measurers collected data. When substitute recorders were used, the sole measurer measured the participant for both the original measure and the repeat measure. Thus most data collected were inter-observer data, but there were occasions where intra-observer data were collected. For simplicity of presentation, the small amount of intra-observer error data was combined with the much larger body of inter-observer error data for analysis. In addition, where permanent measurer substitutions were made, the inter-observer error data from all measurer pairs at a station were combined for analysis. At the end of each week, a weekly summary of re-measure data for each station was compiled. The MADs for the re-measure participants were evaluated. If the mean of the deltas exceeded the allowable error, the team supervisor met with the measurers at that station to determine the cause of the difficulty. Even when no mean delta exceeded the allowable error, however, the weekly summary was shown to the measurers so they could monitor their own performance over the course of the survey. Note that participants were also sent for repeat scans, but data from those scans were not examined during data collection, nor are they analyzed here.

With the twice-daily schedule for repeat measures and a total of only about 1,000 pilots, the number of repeat pilot participants was relatively limited. The pilot repeat measure data were combined with the ANSUR II non-pilot repeat measure data to increase the statistical validity of the analysis.

Tables 23 through 33 show the observer error, expressed as means of the absolute values of the deltas for each measured dimension. The right-hand columns show the allowable error for each dimension. Dimensions are grouped by type. In nearly every case, the MAD was lower than the allowable error. The observer errors ranged from a low of 0.9 mm for both male and female Interpupillary Breadths, as well as male Head Breadth to a high of 16.8 mm for the male Vertical Trunk Circumference (USA). Although the observer errors were lower than the allowable errors, the larger observer errors were associated with dimensions which have the larger allowable errors. The standing heights (Table 23) generally had observer errors in the 2- to 6-mm range, with the exception of Crotch Height, which involves subjective judgment about the amount of pressure used, and Wrist Height, which is highly sensitive to the position of the shoulders. Errors in the sitting heights (Table 24) were somewhat higher, being generally in the 2- to 5-mm range. Errors were higher in Elbow Rest Height, since it is sensitive to both arm and torso positioning, and errors were higher in Waist Front Length, Sitting (5.3 mm males; 5.4 mm females), since it is sensitive to torso positioning.

TABLE 23

Observer Error for Standing Heights*†
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Acromial Height	337	3.6	174	3.4	7
Axilla Height	337	4.2	174	4.8	7
Buttock Height	354	2.4	201	2.3	4
Cervicale Height	337	2.8	174	3.0	7
Chest Height	354	4.9	201	6.0	9
Crotch Height	354	6.2	201	5.8	10
Iliocristale Height	337	2.6	174	3.1	5
Knee Height, Midpatella	354	2.8	201	2.2	6
Lateral Femoral Epicondyle Height	354	1.6	201	1.7	3
Lateral Malleolus Height	300	1.1	161	1.2	2
Stature	337	3.1	174	2.8	6
Suprasternale Height	337	3.5	174	3.4	5
Tenth Rib Height	337	2.6	174	2.3	5
Tibial Height	354	1.9	201	1.9	2
Trochanterion Height	354	2.5	201	2.6	4
Waist Height (Omphalion)	337	3.6	174	4.0	7
Wrist Height	337	6.4	174	5.8	11

TABLE 24

Observer Error for Sitting Heights*
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Elbow Rest Height	345	5.5	166	5.5	10
Eye Height, Sitting	345	3.9	166	4.4	8
Knee Height, Sitting	345	1.8	166	2.1	2
Popliteal Height	345	2.2	166	2.6	6
Sitting Height	345	2.7	166	3.1	6
Thigh Clearance	345	1.7	166	1.8	3
Waist Front Length, Sitting	345	5.3	166	5.5	7

* Observer error presented in Tables 23–45 was calculated from data of ANSUR II soldiers and pilots.

† The dimensions are grouped here by type, but were grouped for efficiency into several stations for data collection (see Chapter II). The different “n” values in these tables reflect different numbers of repeat participants by station due to absent and replaced team members.

The errors for length dimensions (Table 25) ranged generally from 2 to 12 mm. The lower errors were associated with dimensions encompassing bony landmarks, e.g., Acromion-Radiale Length (2.5 mm males; 2.8 mm females). The higher errors were for dimensions involving soft tissue landmarks, e.g., Interscye II (5.1 mm males; 5.2 mm females). Variable tape tension and interference from the running shorts as the tape passes through the crotch contribute to observer error in both crotch lengths. Functional Leg Length was also among the higher observer error dimensions; this can be attributed to the difficulty of achieving consistency in body position.

TABLE 25

Observer Error for Lengths*†
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Acromion-Radiale Length	337	2.5	174	2.7	4
Buttock-Knee Length	345	5.1	166	5.1	6
Buttock-Popliteal Length	345	5.8	166	5.8	7
Crotch Length (Omphalion)	354	11.6	201	8.1	18
Crotch Length, Posterior (Omphalion)	354	8.6	201	7.4	11
Forearm-Center of Grip Length	337	4.1	174	4.8	7
Forearm-Hand Length	337	2.4	174	2.3	4
Functional Leg Length	345	7.8	166	13.0	17
Interscye I	337	5.3	174	5.7	10
Interscye II	337	5.1	174	5.2	13
Radiale-Styilion Length	337	3.4	174	3.5	6
Shoulder-Elbow Length	337	2.5	174	2.7	6
Shoulder Length	337	2.2	174	2.4	3
Sleeve Length: Spine-Wrist	337	5.3	174	3.7	9
Sleeve Outseam	337	3.8	174	3.7	6
Waist Back Length (Omphalion)	337	3.0	174	2.9	5

Observer errors for breadths and depths (Tables 26 and 27, respectively) ranged generally from 2 to 6 mm. One exception was Forearm-Forearm Breadth (8.4 mm males; 10.5 mm females) for which both body position and breathing cycle are important factors in measurement. The errors in large horizontal circumferences (Table 28) ranged from 5 to 8 mm, while the Vertical Trunk Circumference (USA) errors averaged 10.8 mm for females and 16.8 for males. The considerable difference in observer error between male and female Vertical Trunk Circumference (USA) can be attributed to the difficulty in standardizing tape tension near the male genitalia. The observer errors for small circumferences (Table 29), as a whole, ranged from 2 to 5 mm.

* Observer error presented in Tables 23–45 was calculated from data of ANSUR II soldiers and pilots.

† The dimensions are grouped here by type, but were grouped for efficiency into several stations for data collection (see Chapter II). The different “n” values in these tables reflect different numbers of repeat participants by station due to absent and replaced team members.

TABLE 26

Observer Error for Breadths*
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Biacromial Breadth	345	3.4	166	4.3	8
Bicristal Breadth	354	4.3	201	5.7	8
Bideltoid Breadth	345	4.6	166	5.0	8
Bimalleolar Breadth	300	1.2	161	1.0	2
Chest Breadth	354	5.0	201	4.9	7
Forearm-Forearm Breadth	345	8.4	166	10.4	17
Hip Breadth	354	2.4	201	3.2	6
Hip Breadth, Sitting	345	3.8	166	4.9	6
Waist Breadth	354	3.5	201	3.9	6

TABLE 27

Observer Error for Depths and Weight*
(values in mm and kg)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Abdominal Extension Depth, Sitting	345	4.5	166	4.8	10
Buttock Depth	354	4.9	201	5.0	8
Chest Depth	354	3.5	201	3.5	4
Waist Depth	354	3.7	201	3.5	6
Weight	337	0.1	174	0.1	0.3

TABLE 28

Observer Error for Large Circumferences*
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Buttock Circumference	354	5.6	201	4.8	12
Chest Circumference	354	8.2	201	8.5	14
Shoulder Circumference	338	5.6	172	5.1	12
Vertical Trunk Circumference (USA)	354	16.8	201	11.8	24
Waist Circumference (Omphalion)	338	5.9	172	5.9	12

* Observer error presented in Tables 23–45 was calculated from data of ANSUR II Soldiers and pilots.

TABLE 29

Observer Error for Small Circumferences*
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Ankle Circumference	300	1.8	161	2.0	4
Biceps Circumference, Flexed	337	3.2	174	4.8	6
Calf Circumference	300	1.8	161	1.8	4
Forearm Circumference, Flexed	337	3.5	174	3.7	5
Heel-Ankle Circumference	300	2.0	161	1.9	4
Lower Thigh Circumference	334	2.2	163	3.0	4
Neck Circumference	337	3.0	174	3.5	6
Neck Circumference, Base	337	3.6	174	4.4	8
Thigh Circumference	354	5.1	201	4.3	6
Wrist Circumference	337	1.9	174	2.0	3

Observer errors for the head (Table 30), hand (Table 31), and foot dimensions (Table 32) were generally quite low. All but one were less than 3 mm, and most approached 1 mm, the smallest unit to which these measurements are recorded. These dimensions are small in magnitude, and body position and breathing cycle generally do not affect their measurement. Bitragion Submandibular Arc (3.5 mm males; 4.3 mm females) may have been affected by compression of the soft tissue of the mandible. The reaches (Table 33), on the other hand, are the most sensitive of all dimensions to body positioning difficulties. The observer errors for most reaches ranged from 7 to 11 mm.

TABLE 30

Observer Error for Head Dimensions*
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Bitragion Chin Arc	300	3.0	161	3.0	8
Bitragion Submandibular Arc	300	3.4	161	4.3	6
Bizygomatic Breadth	300	1.2	161	1.3	2
Ear Breadth	300	1.2	161	1.2	2
Ear Length	300	1.4	161	1.3	2
Ear Protrusion	300	1.0	161	1.2	3
Head Breadth	300	0.9	161	1.1	2
Head Circumference	300	1.8	161	2.0	3
Head Length	300	1.0	161	1.6	2
Interpupillary Breadth	300	0.8	161	0.9	2
Menton-Sellion Length	300	1.7	161	1.8	3
Tragion-Top of Head	300	1.8	161	2.1	4

* Observer error presented in Tables 23–45 was calculated from data of ANSUR II Soldiers and pilots.

TABLE 31

Observer Error for Hand Dimensions*
(values in mm)

Dimension	Males		Females		Allowable Error
	N	Observer Error	n	Observer Error	
Hand Breadth	300	1.3	161	1.3	2
Hand Circumference	300	1.6	161	1.7	3
Hand Length	300	1.6	161	1.6	3
Palm Length	300	1.4	161	1.5	2

TABLE 32

Observer Error for Foot Dimensions*
(values in mm)

Dimension	Males		Females		Allowable Error
	N	Observer Error	n	Observer Error	
Ball of Foot Circumference	300	1.9	161	1.9	4
Ball of Foot Length	299	1.4	161	1.3	2
Foot Breadth, Horizontal	299	1.3	161	1.4	2
Foot Length	299	1.2	161	1.3	3
Heel Breadth	300	1.2	161	1.3	2

TABLE 33

Observer Error for Reach Dimensions*
(values in mm)

Dimension	Males		Females		Allowable Error
	N	Observer Error	n	Observer Error	
Overhead Fingertip Reach, Sitting	345	7.7	166	10.1	20
Span	345	7.6	166	9.7	10
Thumbtip Reach	345	8.6	166	11.0	20

The allowable errors were of considerable value in monitoring the progress of training. In the past, the assessment of whether team members were ready to begin data collection was subjective. In ANSUR II, there was a fixed standard, the allowable error, which told both trainers and team members alike when the team was ready to begin actual data collection. Allowable errors also aided in maintaining measurement standards and avoiding measurer drift over the course of a long data collection period. This was of critical importance because the ANSUR II pilot survey took place over 18 months, with as much as 1 to 2 weeks between some measuring sites.

* Observer error presented in Tables 23–45 was calculated from data of ANSUR II Soldiers and pilots.

A potential disadvantage of establishing maximum allowable errors in advance is that team members might strive to achieve that level of interpair comparability and then stop trying to improve. As many of the mean observer errors were considerably lower than the allowable errors, however, this appears not to have been the case in this survey. It remains a potential difficulty, though, in cases where team motivation is a problem.

Observer error measured on a daily basis, as was done in this survey, has two advantages. First, because observer error data are collected throughout the survey, the data collected can be assumed to be "real", i.e., not an artifact of the team making special efforts for a single day of re-measured participants. Second, the daily checking can be used to detect measurement technique problems as soon as they arise, and they can be corrected before the problems become entrenched in the data.

On the other hand, there are two disadvantages to daily collection of observer error data, although they are believed to be outweighed by the advantages. First, the re-measure participants, who are generally not especially pleased to be measured in the first place, are even less pleased to be measured again. This is generally not a significant problem with military participants who are accustomed to following orders. Second, time spent measuring participants a second time is time not spent measuring new participants, but this is a small price to pay for the assurance of data quality gained by including the daily error checks. No modifications in this approach to daily observer error data collection are recommended.

7.4 ESTIMATED OBSERVER ERROR FOR DERIVED DIMENSIONS

Observer error for derived dimensions obviously has no place in correcting problems of measurement technique since these dimensions are not calculated until the survey is completed. However, because the observer error data are useful in assessing statistical significance tests or in analyzing or developing sizing systems and laying out workstations, it is helpful to know the magnitude of the observer error of these dimensions, even after the fact.

Since direct calculation of observer error for the derived dimensions was not generally possible, an alternative strategy was employed. It consisted of estimating observer error using the observer error of the component dimensions. Most of the derived dimensions are calculated by adding or subtracting values of other dimensions. For these dimensions, the observer error is estimated as less than or equal to the sum of the MADs of all component dimensions. Note that addition is used whether the component dimensions are added or subtracted to create the derived dimension. For Clavicle Link, which is created by dividing Biacromial Breadth by two, the observer error is estimated by dividing the observer error of Biacromial Breadth by two.

A model derivation, showing how the observer error for derived dimensions can be estimated using the MAD of component dimensions is shown below for two types of calculation (Gordon et al., 1989). The first is a derived dimension created by

subtraction. The same demonstration could be used for dimensions created by addition alone, by two subtractions, or by a combination of additions and subtractions. The second shows how the observer error for Clavicle Link can be calculated from the MAD of Biacromial Breadth.

Let z be the calculated dimension, and x and y be the measured dimensions.

$$z = x - y \quad MAD(z) = ?$$

$$MAD(z) = MAD(x - y)$$

$$= \frac{\sum_{i=1}^n |(x_{1i} - y_{1i}) - (x_{2i} - y_{2i})|}{n}$$

where x_{1i} , x_{2i} , y_{1i} , y_{2i} ($i= 1 \dots n$) are the measurements for the "i"th individual and x_{1i} , y_{1i} are measurements for observer 1.

$$= \frac{\sum_{i=1}^n |(x_{1i} - x_{2i}) - (y_{1i} - y_{2i})|}{n}$$

$i=1$

$$\leq \frac{\sum_{i=1}^n |(x_{1i} - x_{2i})| + \sum_{i=1}^n |(y_{1i} - y_{2i})|}{n}$$

$$\leq \frac{\sum_{i=1}^n |(x_{1i} - x_{2i})|}{n} + \frac{\sum_{i=1}^n |(y_{1i} - y_{2i})|}{n}$$

$$\leq MAD(x) + MAD(y)$$

$$\therefore MAD(z) \leq MAD(x) + MAD(y)$$

Let r be the calculated dimension and w be the measured dimension.

$$r = \frac{w}{2} \quad MAD(r) = ?$$

$$MAD(r) = MAD\left(\frac{w}{2}\right)$$

$$= \frac{\sum_{i=1}^n \left| \left(\frac{w_{1i}}{2} - \frac{w_{2i}}{2} \right) \right|}{n}$$

$$= \frac{1}{2} \frac{\sum_{i=1}^n |w_{1i} - w_{2i}|}{n}$$

$$= \frac{1}{2} MAD(w)$$

$$\therefore MAD(r) = \frac{1}{2} MAD(w)$$

The estimated observer errors for all derived dimensions are shown in Table 34. These values can be used for the same purposes as observer errors of measured dimensions, although the user should keep in mind that the derived dimension measurements are estimated rather than measured values. These derived values were calculated using the combined observer error data of ANSUR II soldiers and pilots.

TABLE 34

Estimated Observer Error for Derived Dimensions*
(values in mm)

Derived Dimension	Males	Females
Abdominal Link	5.2	5.4
Acromial Height, Sitting	9.4	9.3
Acromion-Axilla Length	7.8	8.2
Arm Length	11.7	10.9
Axilla-Waist Length (Omphalion)	7.8	8.8
Calf Link	2.7	2.9
Cervicale Height, Sitting	8.6	8.9
Chest Height, Sitting	10.7	11.8
Chest-Waist Drop (Omphalion)	14.1	14.3
Clavicle Link	2.0	2.0
Crotch Length, Anterior (Omphalion)	20.2	15.5
Dactylon Height	8.1	7.4
Dactylon Reach from Wall	8.6	11.0
Elbow Rest Height, Standing	11.3	11.4
Elbow-Wrist Length	4.0	3.9
Eye Height	9.7	10.2
Functional Grip Reach	8.6	11.0
Index Finger Reach	8.6	11.0
Neck-Buttock Length	5.2	5.4
Neck Link	7.7	7.9
Neck-Scye Length	7.0	7.8
Pelvic Link	5.1	5.6
Rise (Omphalion)	9.8	9.9
Shoulder-Waist Length (Omphalion)	7.2	7.5
Sleeve Inseam	10.6	10.6
Suprasternale Height, Sitting	9.3	9.2
Suprasternale-Tenth Rib Length	6.1	5.7
Suprasternale-Waist Length (Omphalion)	7.1	7.4
Thigh Link	4.1	4.2
Thorax Link	5.4	5.4
Tragion Height	4.9	4.9
Tragion Height, Sitting	4.5	5.2
Vertical Grip Reach	13.5	15.9
Vertical Grip Reach Down	10.1	9.2
Vertical Grip Reach, Sitting	7.7	10.1
Vertical Index Fingertip Reach	13.5	15.9
Vertical Index Fingertip Reach, Sitting	7.7	10.1
Vertical Thumbtip Reach, Sitting	7.7	10.1
Waist Back, Vertical (Omphalion)	6.4	7.1
Waist-Buttock Drop (Omphalion)	11.6	10.7
Waist-Waist (Omphalion) Over Shoulder	25.4	19.2

* Observer error presented in Tables 23–45 was calculated from data of ANSUR II Soldiers and pilots.

7.5 TECHNICAL ERROR OF MEASUREMENT AND RELIABILITY COEFFICIENT

There are other methods for analyzing observer error data. Two commonly seen in the literature are the technical error of measurement (TEM) and the reliability coefficient (R). Technical error of measurement expresses error in terms of the unit of measurement using the following formula:

$$TEM = \sqrt{\frac{\sum D^2}{2N}}$$

where D is the difference between the first and second measurements and N is the number of individuals measured. As can be seen from the formula, the technical error is basically a way of summarizing differences between two measurements over a series of participants (Ulijaszek and Lourie, 1994).

The reliability coefficient (R) reveals how much of the variation between participants in the measured population is free of measurement error (Ulijaszek and Lourie, 1994). R is calculated as follows:

$$R = 1 - \left\{ \frac{(TEM)^2}{(SD)^2} \right\}$$

where SD is the standard deviation of the measured values. Since R is dimensionless, it can be used to make comparisons between variables that have different magnitudes (Gordon and Bradtmiller, 1992).

Due to the high correlation between TEM and MAD (Utermohle et al., 1983), using both methods is potentially redundant (Gordon and Bradtmiller, 1992); however due to the ubiquitous use of TEM and R in the literature, it may be helpful to some readers to include both of the statistics that are included in this report for comparative purposes. Tables 35 through 45 report TEM and R for the dimensions measured in ANSUR II. In general, the relative magnitude of TEM, and inversely, R, corresponds to that of the MAD seen in the previous tables and varies with dimension type in the same way. These values were calculated using the combined observer error data of ANSUR II soldiers and pilots.

TABLE 35

TEM and R for Standing Heights*
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Acromial Height	3.53	99.6	3.34	99.6
Axilla Height	3.89	99.5	4.22	99.3
Buttock Height	2.57	99.7	2.11	99.8
Cervicale Height	2.68	99.8	2.81	99.7
Chest Height	4.67	99.3	5.73	98.8
Crotch Height	5.87	98.8	5.27	98.6
Iliocristale Height	2.47	99.7	3.12	99.5
Knee Height, Midpatella	2.91	98.9	1.98	99.4
Lateral Femoral Epicondyle Height	1.72	99.6	1.71	99.6
Lateral Malleolus Height	0.95	97.0	1.11	94.9
Stature	3.02	99.8	2.75	99.8
Suprasternale Height	3.22	99.7	3.06	99.6
Tenth Rib Height	2.44	99.8	2.38	99.7
Tibial Height	1.96	99.4	2.09	99.3
Trochanterion Height	2.39	99.8	2.60	99.7
Waist Height (Omphalion)	3.38	99.5	3.79	99.3
Wrist Height	5.91	97.8	5.52	97.4

TABLE 36

TEM and R for Sitting Heights*
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Elbow Rest Height	5.65	95.9	5.48	94.9
Eye Height, Sitting	4.11	98.4	4.12	98.2
Knee Height, Sitting	1.74	99.6	1.98	99.4
Popliteal Height	2.12	99.2	2.53	98.8
Sitting Height	2.99	99.3	2.98	99.2
Thigh Clearance	1.66	98.1	1.65	98.1
Waist Front Length, Sitting	5.20	95.7	5.23	94.2

* Observer error presented in Tables 23–45 was calculated from data of ANSUR II soldiers and pilots.

TABLE 37

TEM and R for Lengths*
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Acromion-Radiale Length	2.43	97.8	2.47	97.5
Buttock-Knee Length	5.74	96.0	4.72	97.6
Buttock-Popliteal Length	6.73	93.8	5.62	96.0
Crotch Length (Omphalion)	10.43	94.0	7.47	96.4
Crotch Length, Posterior (Omphalion)	8.07	91.8	6.51	93.0
Forearm-Center of Grip Length	3.75	94.7	4.31	92.9
Forearm-Hand Length	2.15	99.0	2.10	99.0
Functional Leg Length	8.89	97.0	13.46	93.3
Interscye I	5.85	96.4	6.32	94.7
Interscye II	5.41	95.9	5.78	94.4
Radiale-Stylian Length	3.13	95.1	3.21	94.7
Shoulder-Elbow Length	2.50	97.8	2.47	97.6
Shoulder Length	2.23	93.9	2.29	94.6
Sleeve Length: Spine-Wrist	5.76	97.4	3.84	98.7
Sleeve Outseam	3.60	98.4	3.39	98.5
Waist Back Length (Omphalion)	3.04	98.5	2.87	98.6

TABLE 38

TEM and R for Breadths*
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Biacromial Breadth	3.34	96.6	4.47	93.5
Bicristal Breadth	3.98	94.3	5.52	90.8
Bideltoid Breadth	4.40	96.7	4.64	96.2
Bimalleolar Breadth	1.18	91.5	0.97	92.7
Chest Breadth	4.72	91.5	4.31	93.3
Forearm-Forearm Breadth	8.95	94.4	10.91	89.8
Hip Breadth	2.23	98.8	2.99	98.1
Hip Breadth, Sitting	3.70	97.6	4.30	98.0
Waist Breadth	3.28	98.5	3.23	97.6

* Observer error presented in Tables 23–45 was calculated from data of ANSUR II Soldiers and pilots.

TABLE 39

TEM and R for Depths and Weight*
(values in mm and kg)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Abdominal Extension Depth, Sitting	4.28	97.2	4.66	96.7
Buttock Depth	4.41	95.4	4.40	94.6
Chest Depth	3.17	97.4	3.48	97.3
Waist Depth	3.74	97.3	3.23	97.6
Weight	0.28	99.9	0.08	100.0

TABLE 40

TEM and R for Large Circumferences*
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Buttock Circumference	5.41	99.2	4.25	99.5
Chest Circumference	8.09	98.6	7.55	98.5
Shoulder Circumference	5.91	98.9	5.55	98.4
Vertical Trunk Circumference (USA)	16.23	95.7	10.57	97.2
Waist Circumference (Omphalion)	6.21	99.5	6.28	99.3

TABLE 41

TEM and R for Small Circumferences*
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Ankle Circumference	1.86	98.2	2.15	98.0
Biceps Circumference, Flexed	3.75	98.5	5.93	93.3
Calf Circumference	1.78	99.6	1.61	99.7
Forearm Circumference, Flexed	3.44	97.0	3.55	93.7
Heel-Ankle Circumference	1.85	98.5	1.91	98.8
Lower Thigh Circumference	2.07	99.9	3.70	98.8
Neck Circumference	2.78	98.2	3.48	94.6
Neck Circumference, Base	3.50	97.6	4.05	93.5
Thigh Circumference	4.65	99.1	3.96	99.2
Wrist Circumference	1.88	95.3	1.95	91.2

* Observer error presented in Tables 23–45 was calculated from data of ANSUR II Soldiers and pilots.

TABLE 42

TEM and R for Head Dimensions*
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Bitragion Chin Arc	2.61	96.1	2.88	96.3
Bitragion Submandibular Arc	3.22	95.4	3.92	93.2
Bizygomatic Breadth	1.05	97.0	1.35	95.5
Ear Breadth	1.13	86.1	1.11	83.1
Ear Length	1.27	91.0	1.10	93.3
Ear Protrusion	0.92	89.4	1.11	80.2
Head Breadth	0.88	97.2	1.07	96.4
Head Circumference	1.62	98.9	2.59	98.4
Head Length	1.02	97.7	1.70	94.3
Interpupillary Breadth	0.82	93.7	0.93	93.6
Menton-Sellion Length	1.65	93.1	1.66	93.2
Tragion-Top of Head	1.67	92.7	1.78	92.4

TABLE 43

TEM and R for Hand Dimensions*
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Hand Breadth	1.09	94.2	1.13	91.3
Hand Circumference	1.48	97.9	1.51	97.1
Hand Length	1.40	97.7	1.44	97.9
Palm Length	1.27	96.0	1.31	95.3

TABLE 44

TEM and R for Foot Dimensions*
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Ball of Foot Circumference	1.65	98.2	1.75	97.8
Ball of Foot Length	1.21	98.8	1.12	98.7
Foot Breadth, Horizontal	1.13	95.0	1.21	93.8
Foot Length	1.05	99.3	1.10	99.2
Heel Breadth	1.10	95.6	1.10	95.9

* Observer error presented in Tables 23–45 was calculated from data of ANSUR II Soldiers and pilots.

TABLE 45

TEM and R for Reach Dimensions*
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Overhead Fingertip Reach, Sitting	7.78	98.3	9.50	97.4
Span	7.47	99.1	11.28	97.9
Thumbtip Reach	8.72	95.4	10.28	93.2

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* Observer error presented in Tables 23–45 was calculated from data of ANSUR II Soldiers and pilots.

CHAPTER VIII

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APPENDIX A

APPLICATIONS FOR MEASURED AND DERIVED DIMENSIONS

Most of the measured and derived dimensions for which data are reported in this volume serve multiple design and sizing uses. Some, chiefly head, hand, and foot variables, are needed for the design of a particular class of item to be worn on that part of the body. All the dimensions serve at least one of the seven use categories described below:

Describing Overall Body Size and Proportions: These are dimensions of overall body size and proportions. They are required to determine the anthropometric differences or similarities between populations. They are also used for selecting samples of participants that are anthropometrically representative of a particular population for studies in which body size is of significance (e.g., the evaluation of the workstation layouts for a new armored vehicle). Further, these dimensions are commonly used in anthropometric studies world-wide, and their definitions are generally agreed upon. This means that international population comparisons using these dimensions are valid.

Clothing and Personal Protection Design, Sizing, and Issue: These dimensions are useful for the design and sizing of Army uniforms, utility garments, and personal protective equipment (e.g., body armor, respirators, chemical defense clothing). In this context, “personal protection” also includes boots, gloves, helmets, goggles, and various special purpose items.

Workstation Design: Dimensions in this group are central to the design and layout of single- and multi-person workstations occupied by military personnel. They are also of paramount importance in the design and layout of workstations of weapon systems, particularly those, like tanks, in which space is at a premium. Body clearance dimensions dictate, for example, the size of escape hatches and limited-size passageways that must be designed to allow quick and safe passage of an individual. In the field or in a depot, the performance of maintenance activities is also greatly enhanced if personnel have ready physical and visual access to maintenance and inspection ports, and have the reach capabilities to perform necessary service, repair, or replacement activities, often conducted under adverse conditions.

Occupational Selection: These dimensions are used to screen candidates for anthropometric incompatibility when job assignments are being made. The physical constraints inherent in some occupations, e.g. the dimensions of a helicopter cockpit, preclude individuals of certain sizes and proportions from safely carrying out those missions.

Digital Human Models: These dimensions are needed for developing digital human models used to assess the body’s reaction to hazardous environments, and for two- and three-dimensional models used in the design and evaluation of Army

crewstations and workstations. Digital models are increasingly used in the design process for seated and standing workstations, as well as group modeling for battlefield scenarios.

3-D Scan Validation: The dimensions in this group are those required to create and refine automated scan data extraction algorithms. As scanners are more frequently used as a substitute for actual anthropometric data collection, it becomes more critical than ever to assure users of the data that the measurements arising from 3-D scans are equivalent to those taken with tapes and calipers. As data extraction applications are continuously improving, this is a foreseeable goal. In the interim, however, it is necessary to collect traditional (tape and caliper) dimensions that can be used to test the validity of these applications and the assumptions and the algorithms that underlie them.

International Standards for Ergonomic Design: These dimensions are useful for comparing data sets between nations, and are measured according to the protocol in ISO 7250-1, as well as other international standards. Further, these dimensions form part of a minimum set of dimensions recommended for collection any time humans are measured. The inclusion of these dimensions ensures that the U.S. is using internationally recognized "Best Practices" in its survey design.

Table A-1 lists all the measured and derived dimensions in the ANSUR II pilots survey and designates the use or uses each may serve.

TABLE A-1

Applications for Measured and Derived Dimensions*

Measured or Derived Dimension	Describing Overall Body Size and Proportions	Clothing and Personal Protection Design, Sizing, and Issue	Workstation Design	Occupational Selection	Digital Human Models	3-D Scan Validation	International Standards for Ergonomic Design
1 Abdominal Extension Depth, Sitting			✓	✓			✓
D1 Abdominal Link					✓		
2 Acromial Height		✓			✓	✓	✓
D2 Acromial Height, Sitting			✓		✓		
D3 Acromion-Axilla Length		✓					
3 Acromion-Radiale Length	✓				✓	✓	✓
4 Ankle Circumference	✓	✓			✓		
D4 Arm Length	✓						
5 Axilla Height		✓			✓		✓
D5 Axilla-Waist Length (Omphalion)		✓					
6 Ball Of Foot Circumference		✓					
7 Ball Of Foot Length		✓			✓		✓
8 Biacromial Breadth	✓	✓	✓		✓	✓	✓
9 Biceps Circumference Flexed	✓	✓			✓		
10 Bicristal Breadth					✓		
11 Bideltoid Breadth	✓		✓	✓	✓	✓	✓
12 Bimalleolar Breadth	✓				✓		
13 Bitragion Chin Arc		✓					
14 Bitragion Submandibular Arc		✓					
15 Bizygomatic Breadth	✓	✓		✓	✓	✓	
16 Buttock Circumference	✓	✓		✓	✓	✓	✓
17 Buttock Depth			✓		✓		
18 Buttock Height	✓	✓			✓	✓	
19 Buttock-Knee Length			✓	✓	✓		✓
20 Buttock-Popliteal Length			✓	✓	✓		✓
21 Calf Circumference	✓	✓			✓	✓	✓
D6 Calf Link					✓		
22 Cervicale Height	✓	✓		✓	✓	✓	✓
D7 Cervicale Height, Sitting							

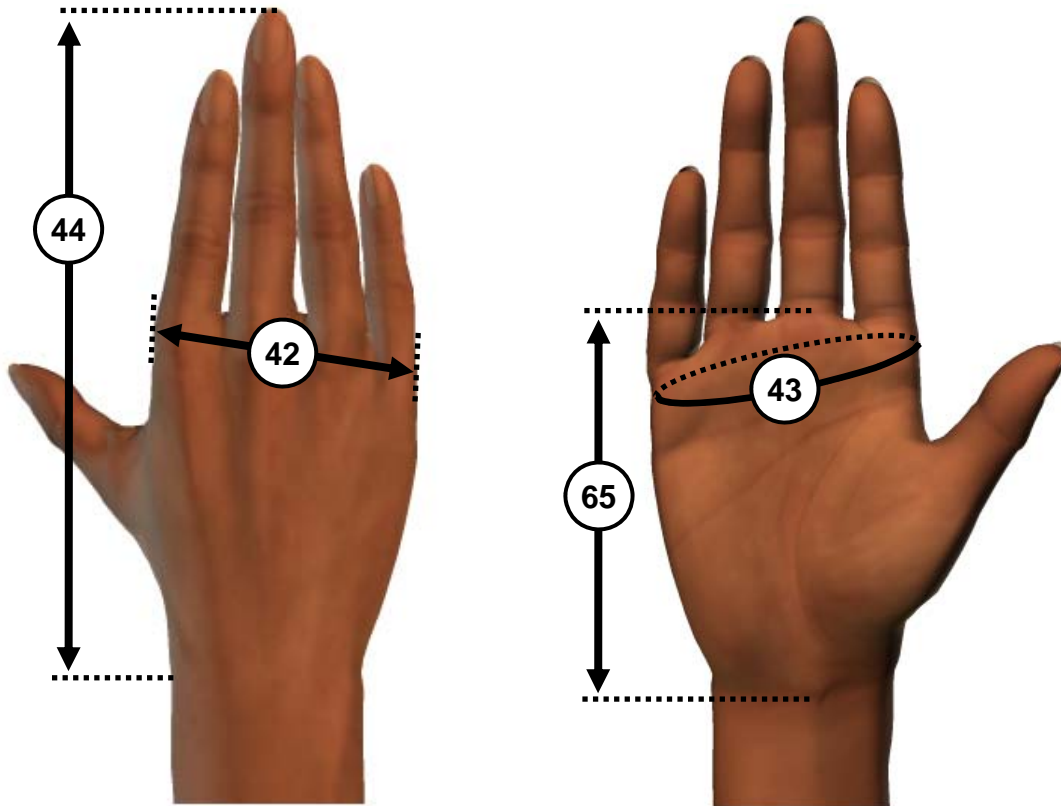
* After Clauser et al., 1986

Measured or Derived Dimension	Describing Overall Body Size and Proportions	Clothing and Personal Protection Design, Sizing, and Issue	Workstation Design	Occupational Selection	Digital Human Models	3-D Scan Validation	International Standards for Ergonomic Design
23 Chest Breadth	✓	✓			✓		
24 Chest Circumference	✓	✓		✓	✓	✓	✓
25 Chest Depth	✓		✓		✓		✓
26 Chest Height		✓			✓	✓	
D8 Chest Height, Sitting		✓					
D9 Chest-Waist Drop (Omphalion)		✓					
D10 Clavicle Link					✓		
27 Crotch Height	✓	✓		✓	✓		✓
D11 Crotch Length Anterior (Omphalion)		✓					
28 Crotch Length Omphalion		✓			✓		
29 Crotch Length Posterior Omphalion		✓					
D12 Dactylion Height			✓		✓		
D13 Dactylion Reach From Wall			✓		✓		
30 Ear Breadth	✓	✓				✓	
31 Ear Length	✓	✓				✓	
32 Ear Protrusion		✓					
33 Elbow Rest Height			✓		✓		✓
D14 Elbow Rest Height, Standing			✓		✓		✓
D15 Elbow-Wrist Length			✓		✓		
D16 Eye Height			✓		✓		✓
34 Eye Height, Sitting	✓		✓	✓	✓		✓
35 Foot Breadth Horizontal	✓	✓		✓	✓		✓
36 Foot Length	✓	✓	✓	✓	✓		✓
38 Forearm Circumference Flexed		✓			✓		
37 Forearm-Center Of Grip Length		✓			✓		
39 Forearm-Forearm Breadth			✓	✓	✓		✓
40 Forearm-Hand Length	✓		✓		✓		✓
D17 Functional Grip Reach			✓		✓		✓
41 Functional Leg Length				✓	✓		
42 Hand Breadth	✓	✓	✓		✓		✓
43 Hand Circumference	✓	✓		✓	✓		✓
44 Hand Length	✓	✓	✓	✓	✓		✓
45 Head Breadth	✓	✓		✓	✓		✓
46 Head Circumference	✓	✓		✓	✓		✓
47 Head Length	✓	✓		✓	✓		✓

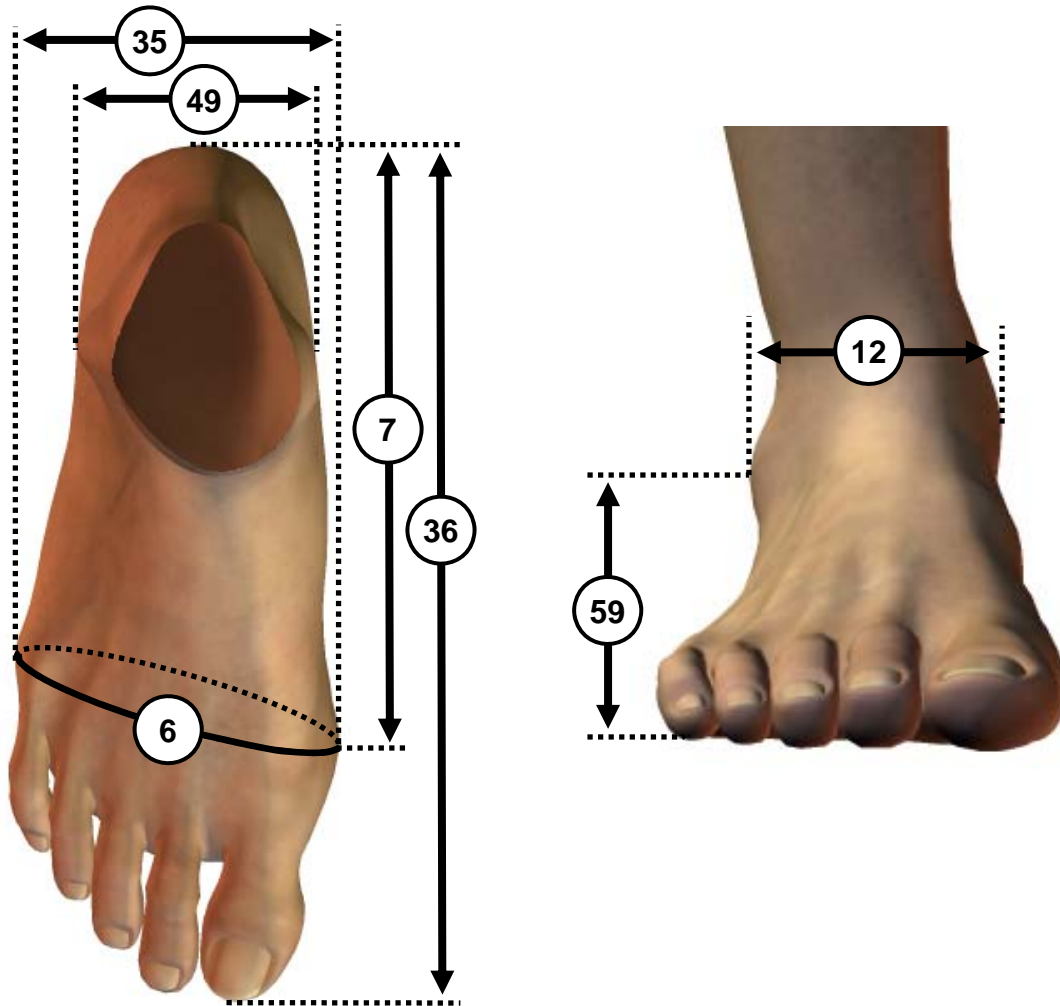
Measured or Derived Dimension	Describing Overall Body Size and Proportions	Clothing and Personal Protection Design, Sizing, and Issue	Workstation Design	Occupational Selection	Digital Human Models	3-D Scan Validation	International Standards for Ergonomic Design
48 Heel Ankle Circumference		✓					
49 Heel Breadth	✓	✓					
50 Hip Breadth	✓		✓		✓	✓	✓
51 Hip Breadth, Sitting	✓		✓	✓	✓		✓
52 Iliocristale Height		✓			✓	✓	
D18 Index Finger Reach			✓		✓		
53 Interpupillary Breadth		✓			✓		
54 Interscye I		✓			✓		
55 Interscye II		✓			✓		
56 Knee Height Midpatella		✓			✓		
57 Knee Height, Sitting	✓		✓	✓	✓		✓
58 Lateral Femoral Epicondyle Height	✓				✓		
59 Lateral Malleolus Height		✓			✓		
60 Lower Thigh Circumference		✓		✓	✓	✓	
61 Menton-Sellion Length	✓	✓		✓	✓		
D19 Neck-Buttock Length		✓					
62 Neck Circumference	✓	✓			✓	✓	✓
63 Neck Circumference Base		✓		✓	✓	✓	✓
D20 Neck Link					✓		
D21 Neck-Scye Length		✓					
64 Overhead Fingertip Reach, Sitting			✓	✓	✓		
65 Palm Length		✓			✓		✓
D22 Pelvic Link					✓		
66 Popliteal Height			✓	✓	✓		✓
67 Radiale-Stylelion Length	✓				✓	✓	✓
D23 Rise (Omphalion)		✓					
68 Shoulder Circumference	✓	✓			✓	✓	
69 Shoulder-Elbow Length			✓	✓	✓		✓
70 Shoulder Length		✓			✓		
D24 Shoulder-Waist Length (Omph)		✓					
71 Sitting Height	✓		✓	✓	✓		✓
D25 Sleeve Inseam		✓					
72 Sleeve Length Spine-Wrist		✓					
73 Sleeve Outseam	✓	✓		✓			✓
74 Span	✓		✓	✓	✓		✓

Measured or Derived Dimension	Describing Overall Body Size and Proportions	Clothing and Personal Protection Design, Sizing, and Issue	Workstation Design	Occupational Selection	Digital Human Models	3-D Scan Validation	International Standards for Ergonomic Design
75 Stature	✓	✓	✓	✓	✓	✓	✓
76 Suprasternale Height	✓				✓		
D26 Suprasternale Height, Sitting		✓					
D27 Suprasternale-Tenth Rib Length		✓			✓		
D28 Suprasternale-Waist (Omph) Length		✓			✓		
77 Tenth Rib Height					✓		
78 Thigh Circumference	✓	✓		✓	✓	✓	✓
79 Thigh Clearance			✓	✓	✓		✓
D29 Thigh Link					✓		
D30 Thorax Link					✓		
80 Thumbtip Reach	✓		✓	✓	✓		✓
81 Tibial Height					✓		✓
D31 Tragion Height					✓		
D32 Tragion Height, Sitting					✓		
82 Tragion-Top Of Head	✓	✓			✓		
83 Trochanterion Height	✓				✓		✓
D33 Vertical Grip Reach			✓		✓		
D34 Vertical Grip Reach Down			✓		✓		✓
D35 Vertical Grip Reach, Sitting			✓		✓		
D36 Vertical Index Fingertip Reach			✓		✓		
D37 Vertical Index Fingertip Reach, Sitting			✓		✓		
D38 Vertical Thumbtip Reach, Sitting			✓		✓		
84 Vertical Trunk Circumference (USA)		✓		✓	✓		✓
85 Waist Back Length Omphalion		✓			✓		
D39 Waist Back, Vertical (Omphalion)		✓					
86 Waist Breadth	✓				✓		
87 Waist Circumference Omphalion	✓	✓			✓	✓	✓
88 Waist Depth					✓		
89 Waist Front Length, Sitting		✓					
90 Waist Height Omphalion	✓	✓			✓		
D40 Waist-Buttock Drop (Omphalion)		✓					
D41 Waist-Waist (Omph) Over Shoulder		✓					
91 Weight	✓	✓	✓	✓	✓		✓
92 Wrist Circumference	✓	✓			✓		✓
93 Wrist Height			✓		✓		

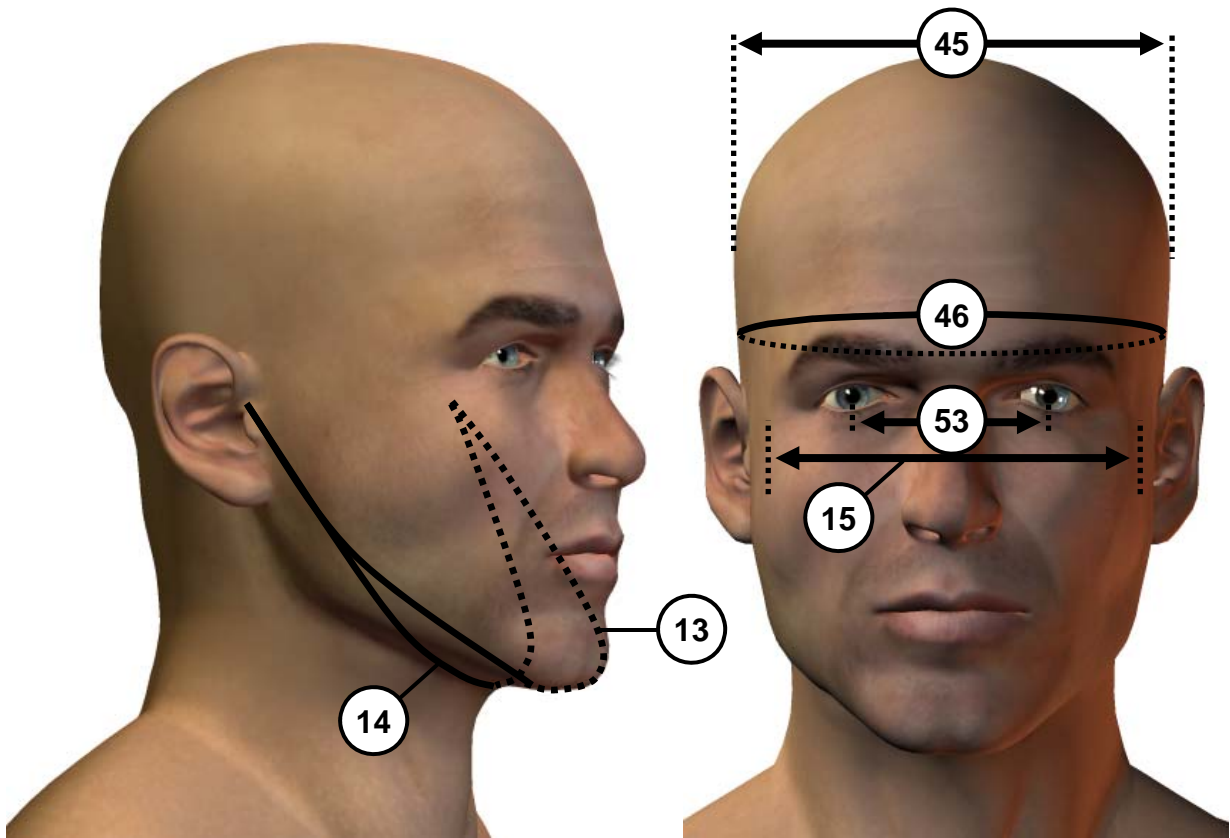
APPENDIX B
VISUAL INDEX OF BODY MEASUREMENTS



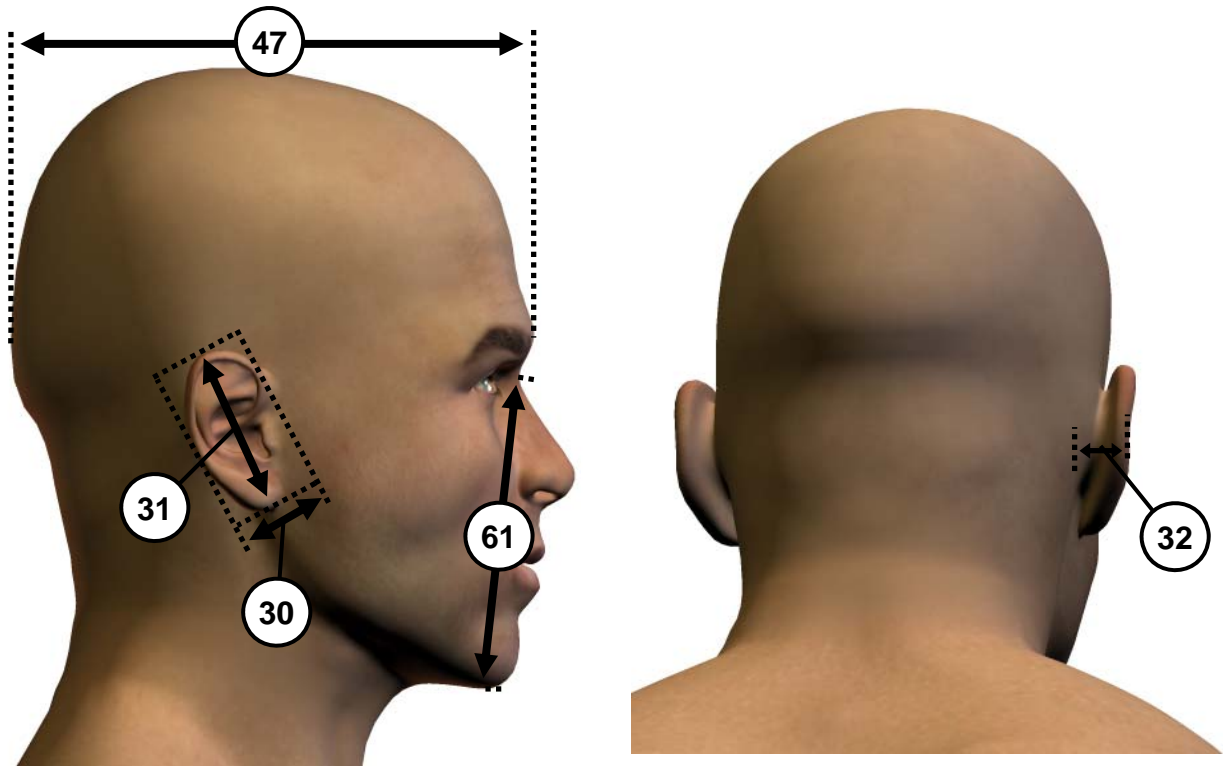
- (42) HAND BREADTH
- (43) HAND CIRCUMFERENCE
- (44) HAND LENGTH
- (65) PALM LENGTH



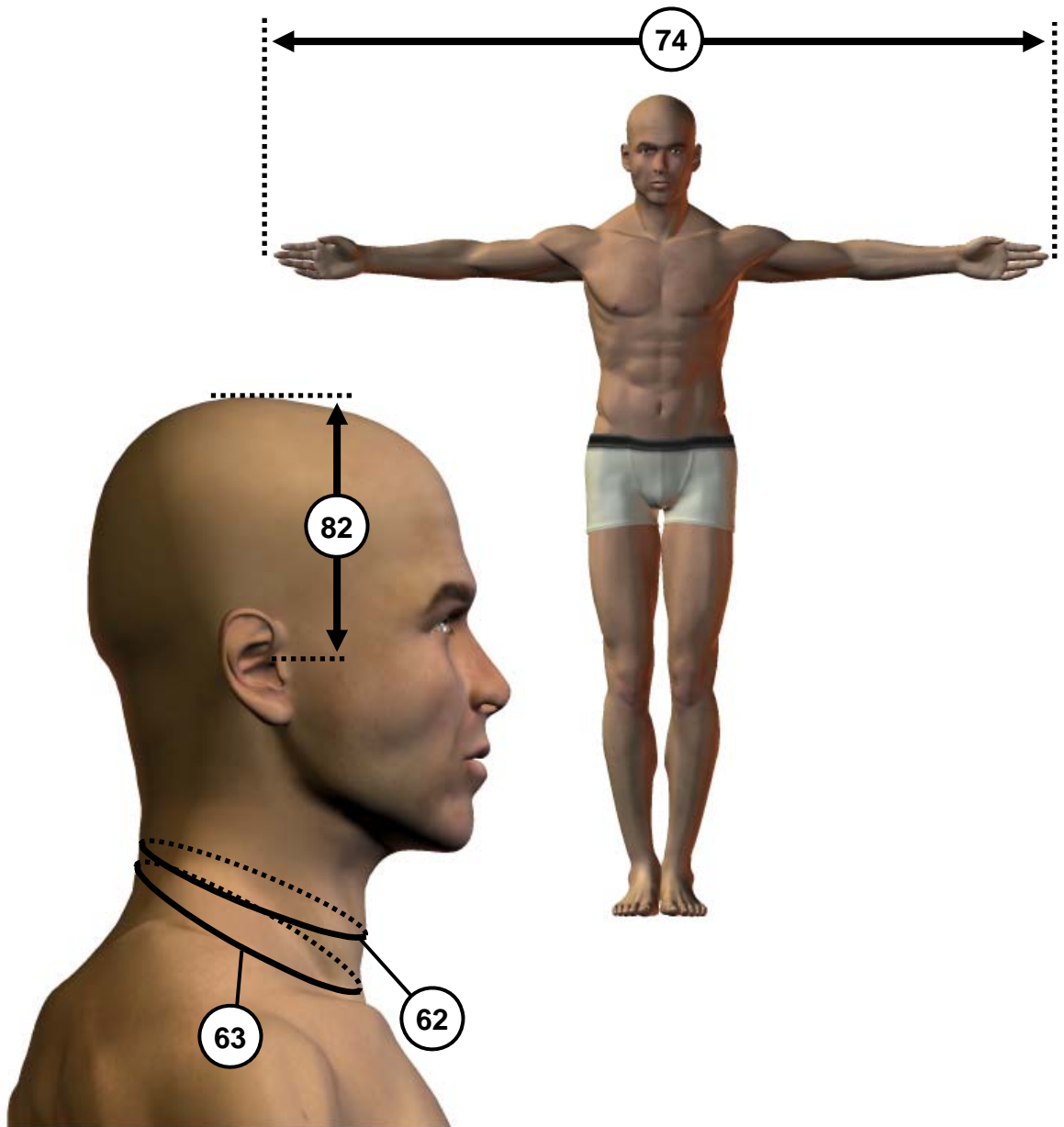
- (6) BALL OF FOOT CIRCUMFERENCE
- (7) BALL OF FOOT LENGTH
- (12) BIMALLEOLAR BREADTH
- (35) FOOT BREADTH, HORIZONTAL
- (36) FOOT LENGTH
- (49) HEEL BREADTH
- (59) LATERAL MALLEOLUS HEIGHT



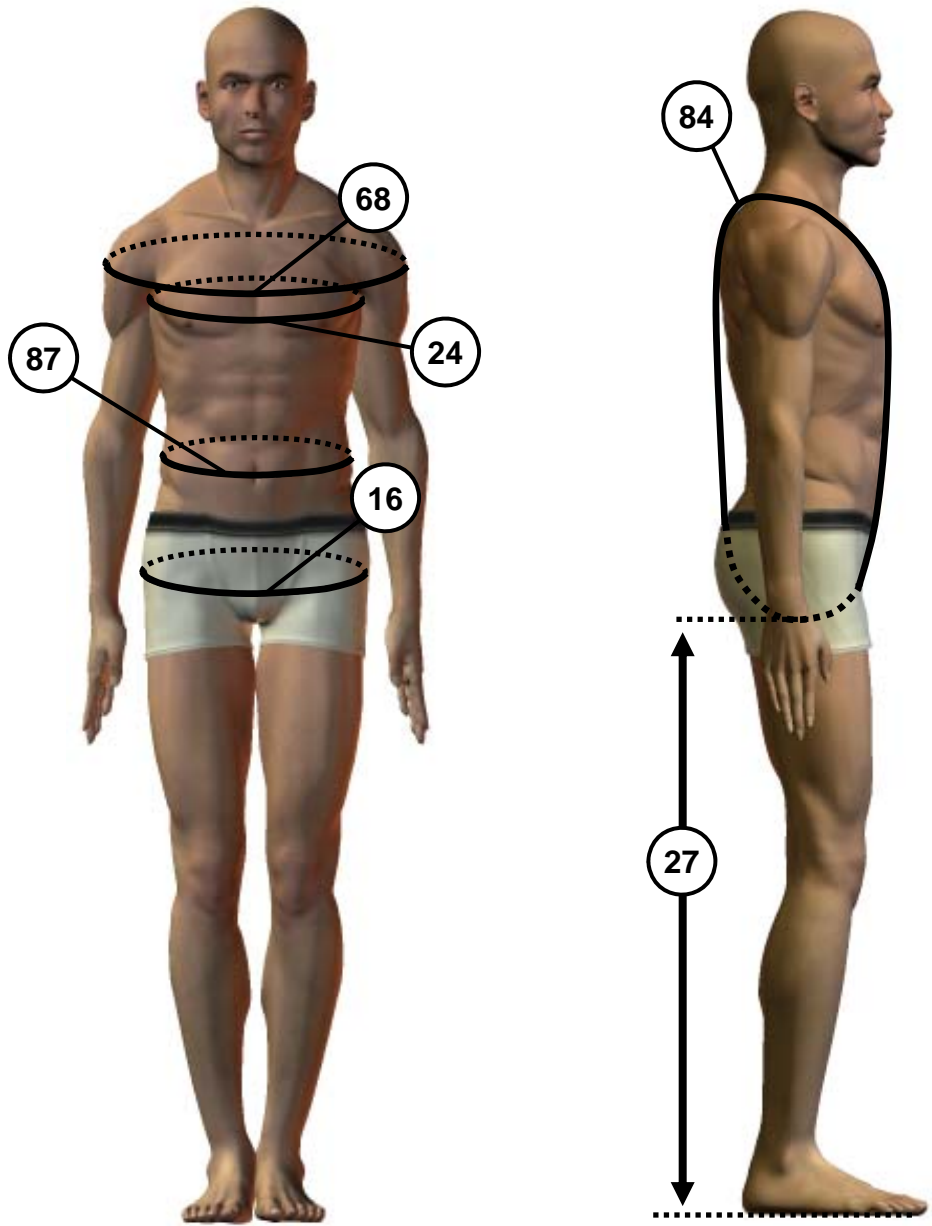
- (13) BITRAGION CHIN ARC
- (14) BITRAGION SUBMANDIBULAR ARC
- (15) BIZYGOMATIC BREADTH
- (45) HEAD BREADTH
- (46) HEAD CIRCUMFERENCE
- (53) INTERPUPILLARY BREADTH



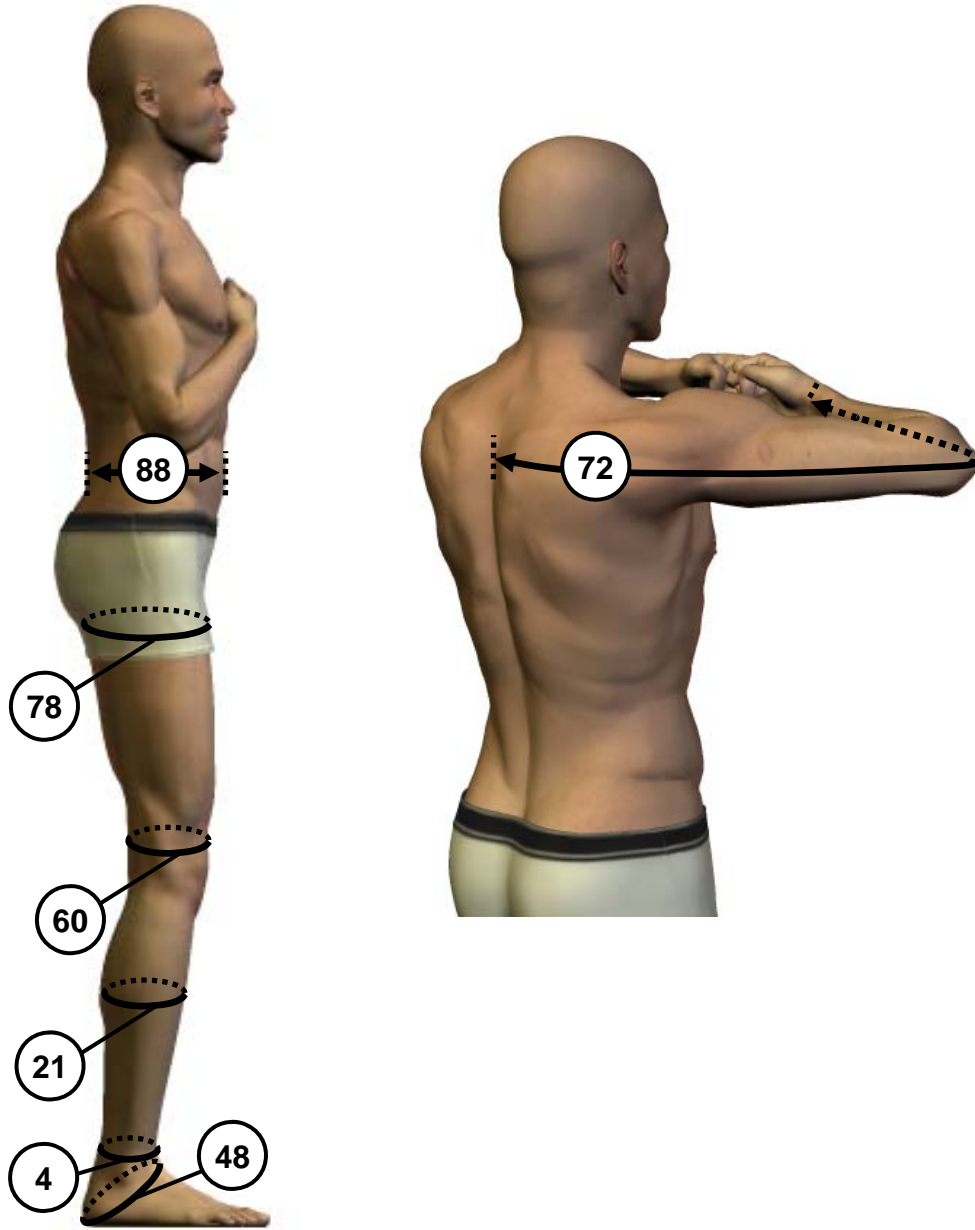
- (30) EAR BREADTH
- (31) EAR LENGTH
- (32) EAR PROTRUSION
- (47) HEAD LENGTH
- (61) MENTON-SELLION LENGTH



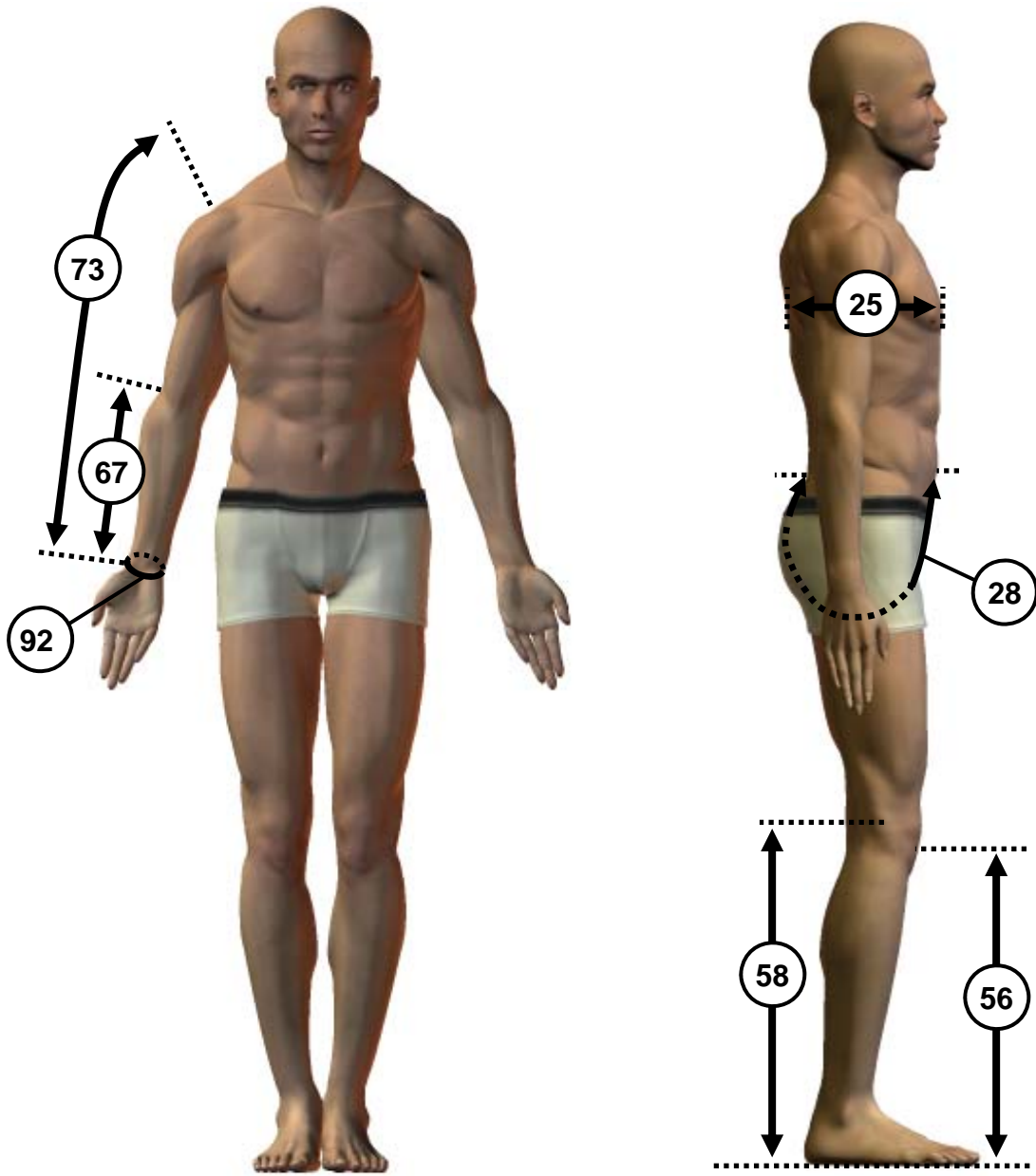
- (62) NECK CIRCUMFERENCE
- (63) NECK CIRCUMFERENCE, BASE
- (74) SPAN
- (82) TRAGION-TOP OF HEAD



- (16) BUTTOCK CIRCUMFERENCE
- (24) CHEST CIRCUMFERENCE
- (27) CROTCH HEIGHT
- (68) SHOULDER CIRCUMFERENCE
- (84) VERTICAL TRUNK CIRCUMFERENCE (USA)
- (87) WAIST CIRCUMFERENCE (OMPHALION)



- (4) ANKLE CIRCUMFERENCE
- (21) CALF CIRCUMFERENCE
- (48) HEEL-ANKLE CIRCUMFERENCE
- (60) LOWER THIGH CIRCUMFERENCE
- (72) SLEEVE LENGTH: SPINE-WRIST
- (78) THIGH CIRCUMFERENCE
- (88) WAIST DEPTH



(25) CHEST DEPTH

(28) CROTCH LENGTH (OMPHALION)

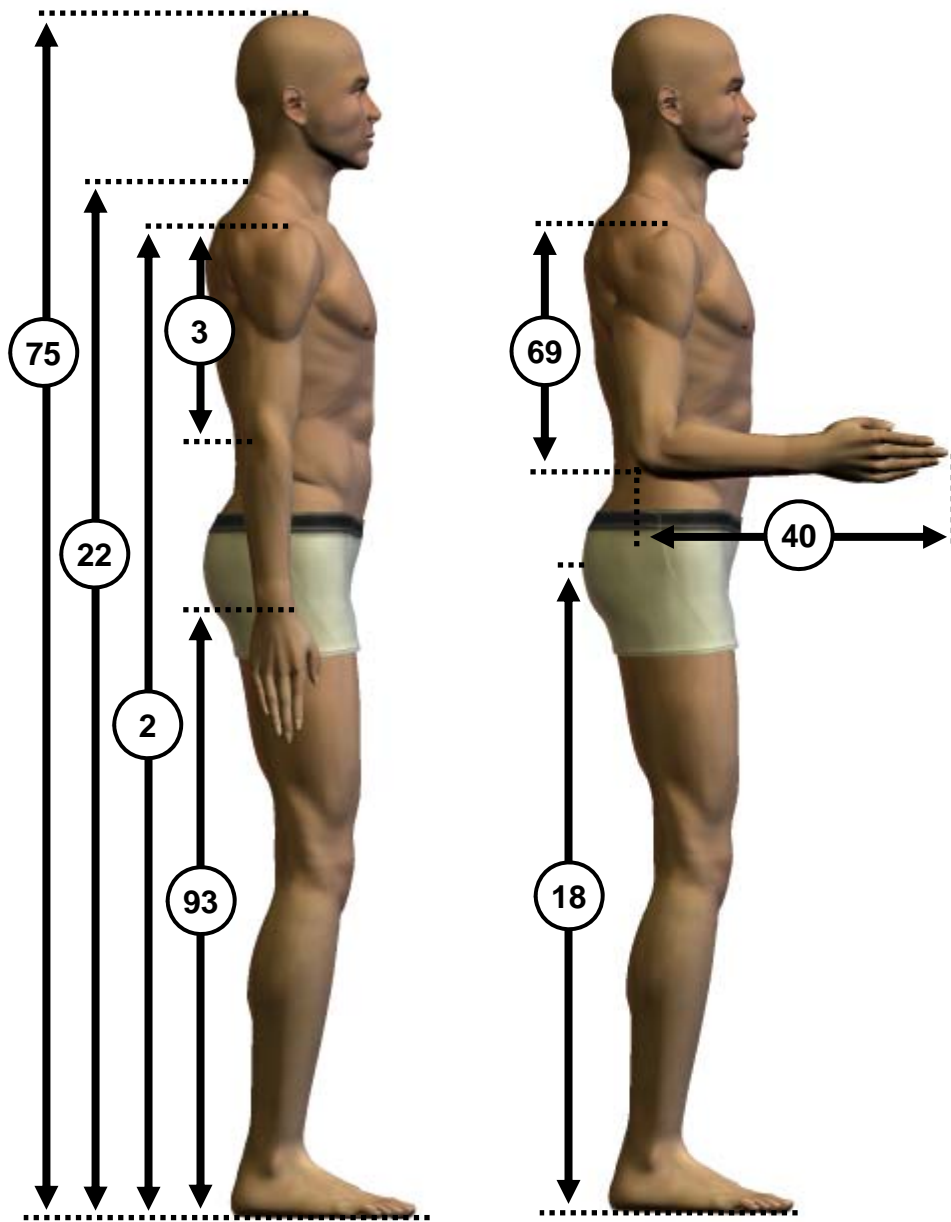
(56) KNEE HEIGHT, MIDPATELLA

(58) LATERAL FEMORAL EPICONDYLE HEIGHT

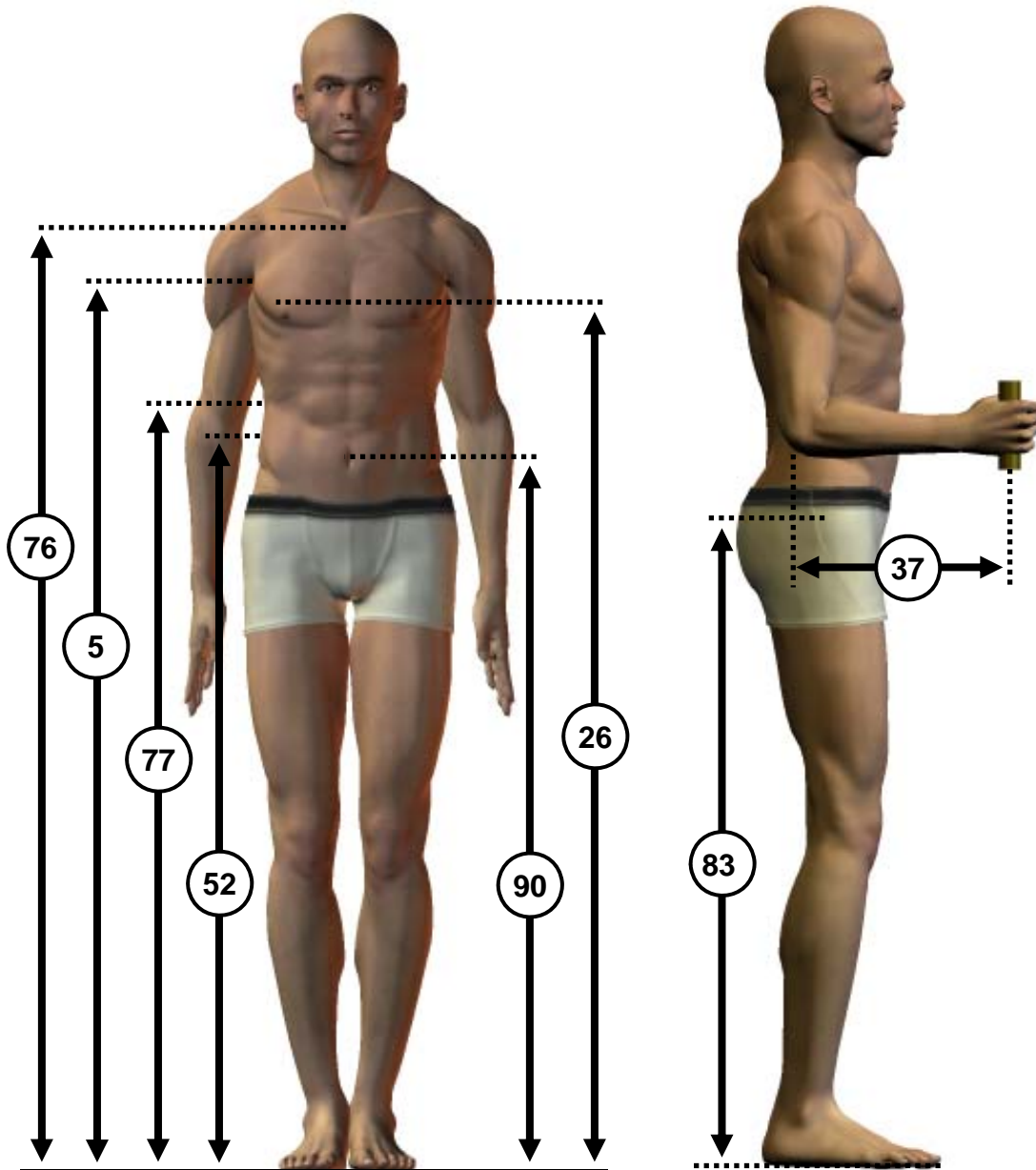
(67) RADIALE-STYLION LENGTH

(73) SLEEVE OUTSEAM

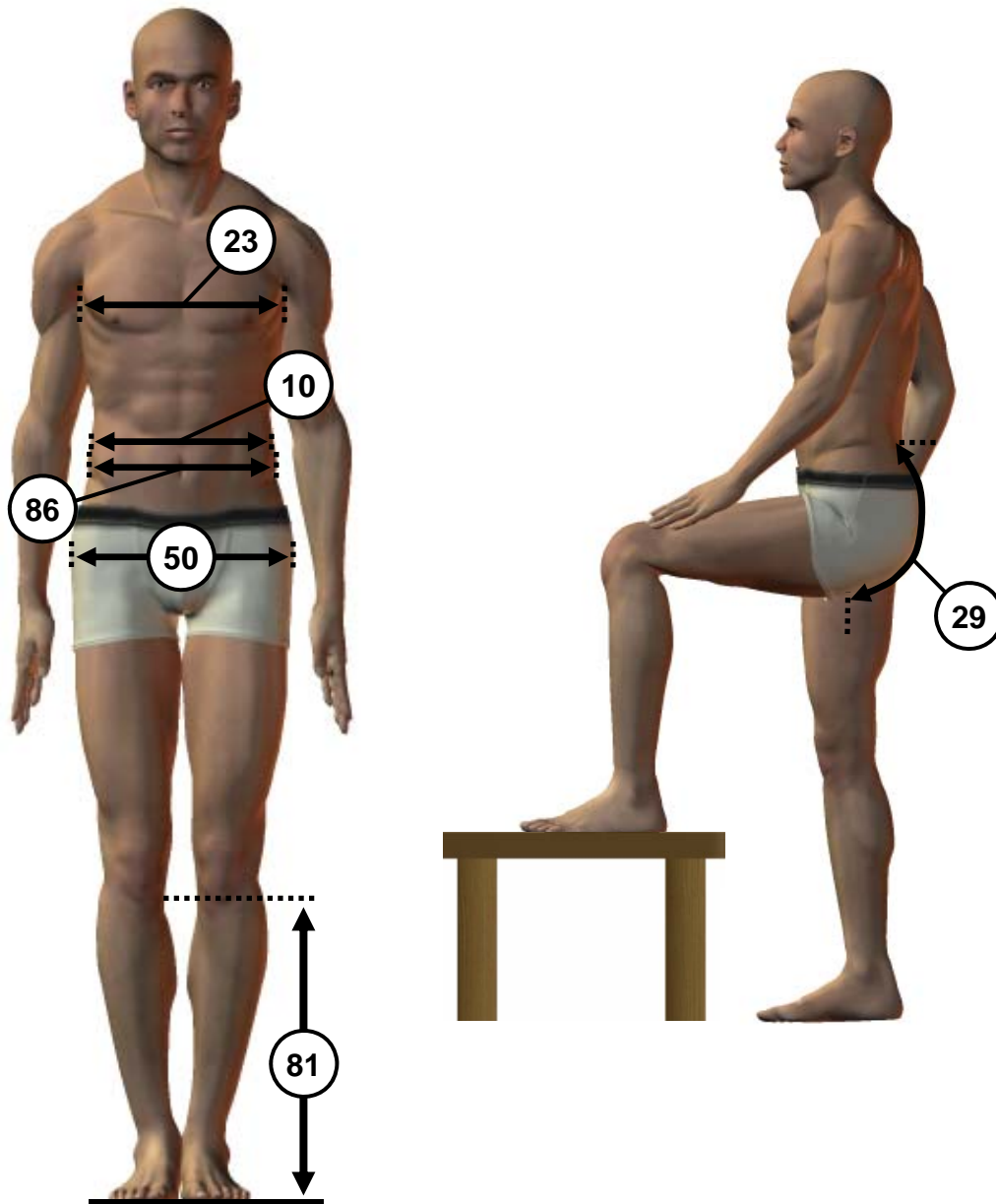
(92) WRIST CIRCUMFERENCE



- (2) ACROMIAL HEIGHT
- (3) ACROMION-RADIALE LENGTH
- (18) BUTTOCK HEIGHT
- (22) CERVICALE HEIGHT
- (40) FOREARM-HAND LENGTH
- (69) SHOULDER-ELBOW LENGTH
- (75) STATURE
- (93) WRIST HEIGHT



- (5) AXILLA HEIGHT
- (26) CHEST HEIGHT
- (37) FOREARM-CENTER OF GRIP LENGTH
- (52) ILIOCRISTALE HEIGHT
- (76) SUPRASTERNALE HEIGHT
- (77) TENTH RIB HEIGHT
- (83) TROCHANTERION HEIGHT
- (90) WAIST HEIGHT (OMPHALION)



(10) BICRISTAL BREADTH

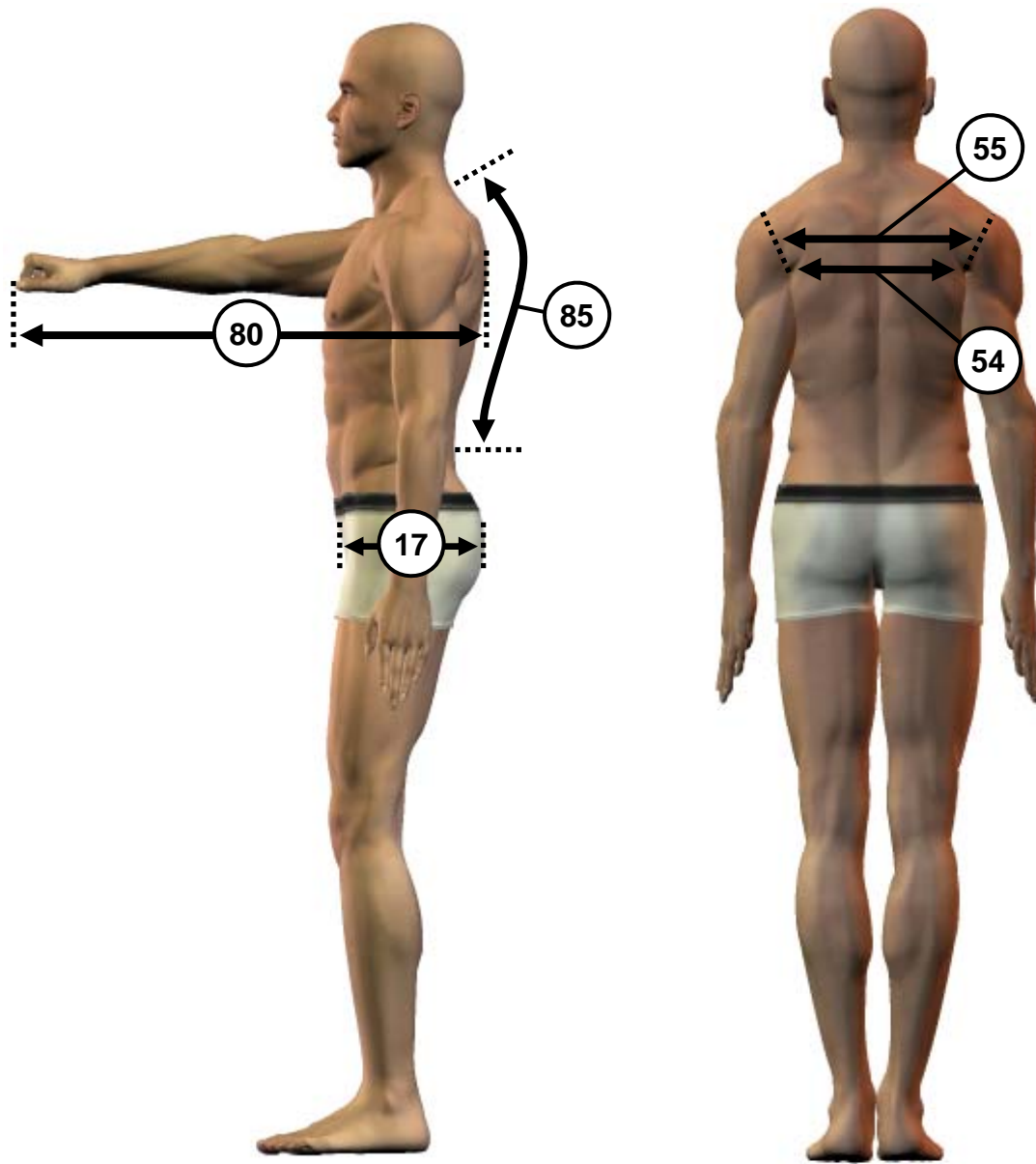
(23) CHEST BREADTH

(29) CROTCH LENGTH, POSTERIOR (OMPHALION)

(50) HIP BREADTH

(81) TIBIAL HEIGHT

(86) WAIST BREADTH



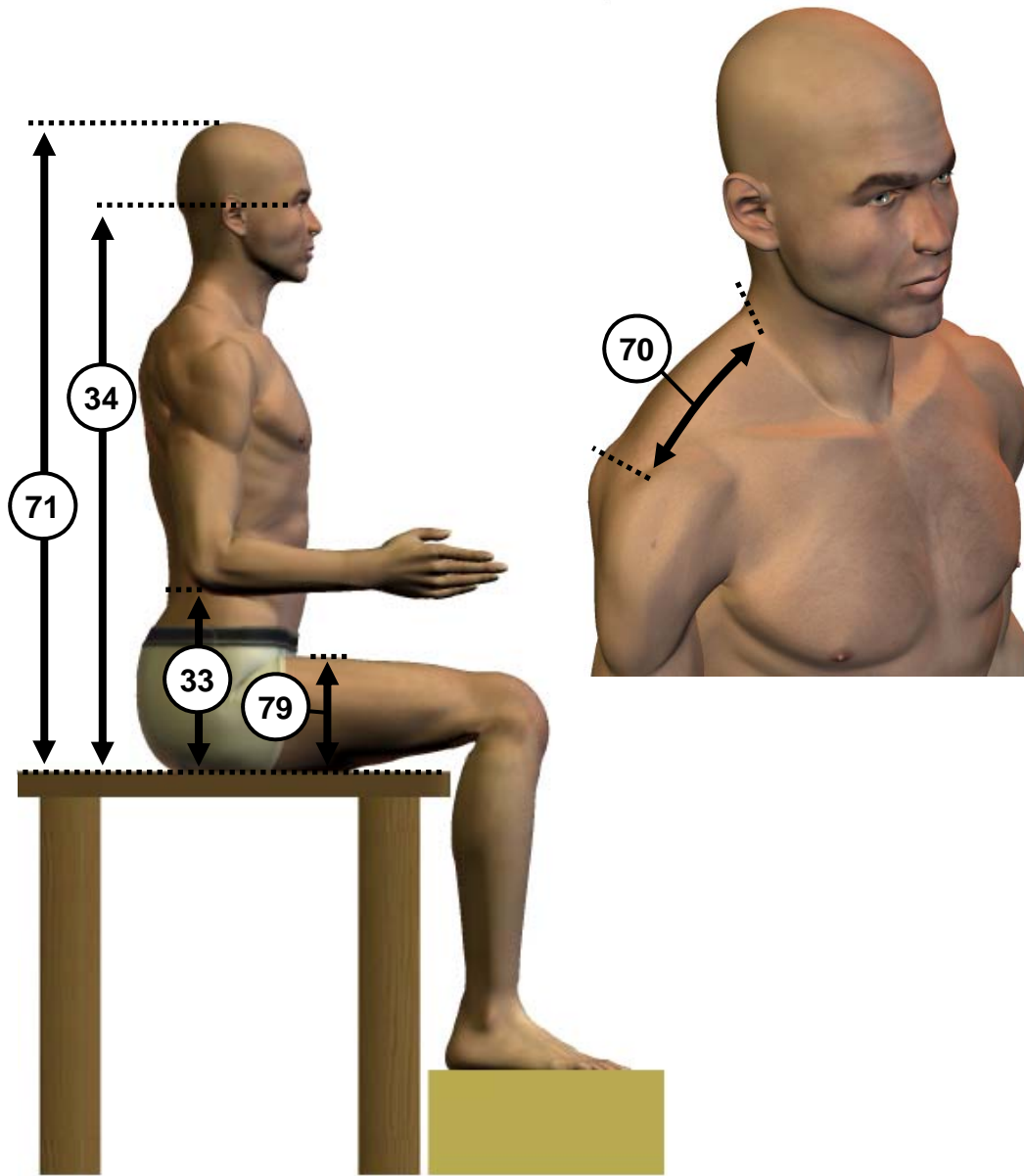
(17) BUTTOCK DEPTH

(54) INTERSCYE I

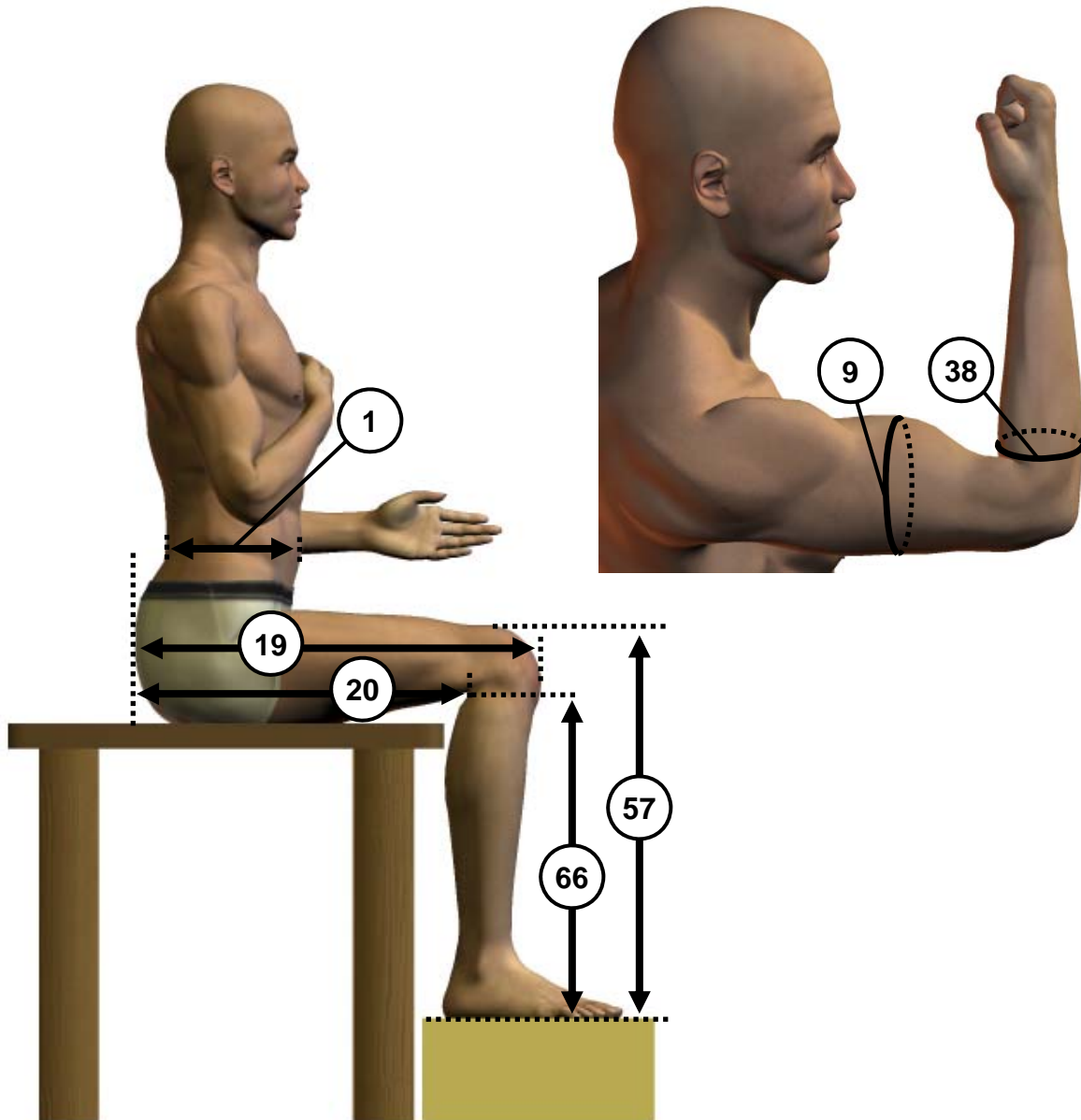
(55) INTERSCYE II

(80) THUMB TIP REACH

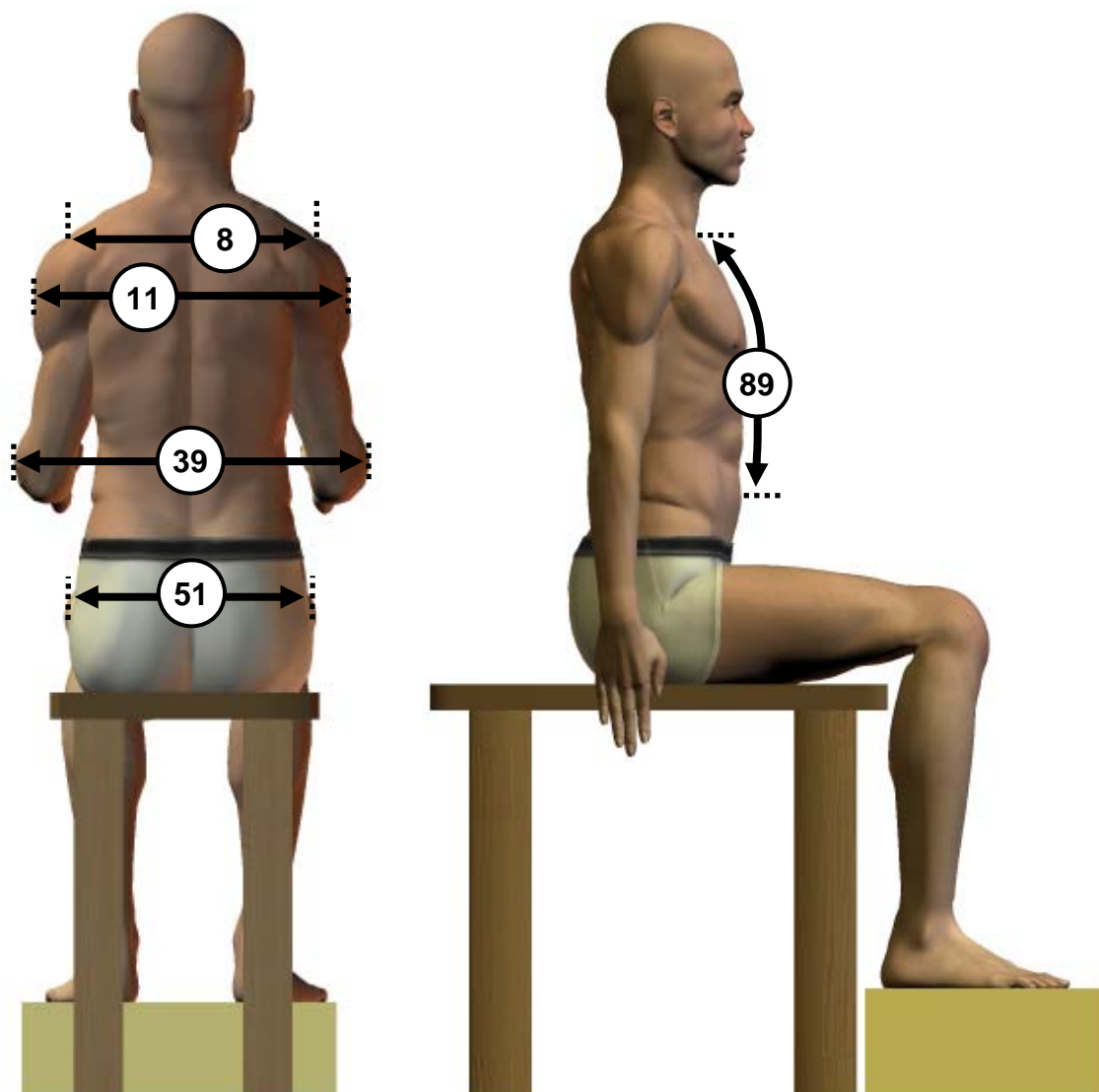
(85) WAIST BACK LENGTH (OMPHALION)



- (33) ELBOW REST HEIGHT
- (34) EYE HEIGHT, SITTING
- (70) SHOULDER LENGTH
- (71) SITTING HEIGHT
- (79) THIGH CLEARANCE



- (1) ABDOMINAL EXTENSION DEPTH, SITTING
- (9) BICEPS CIRCUMFERENCE, FLEXED
- (19) BUTTOCK-KNEE LENGTH
- (20) BUTTOCK-POPLITEAL LENGTH
- (38) FOREARM CIRCUMFERENCE, FLEXED
- (57) KNEE HEIGHT, SITTING
- (66) POPLITEAL HEIGHT



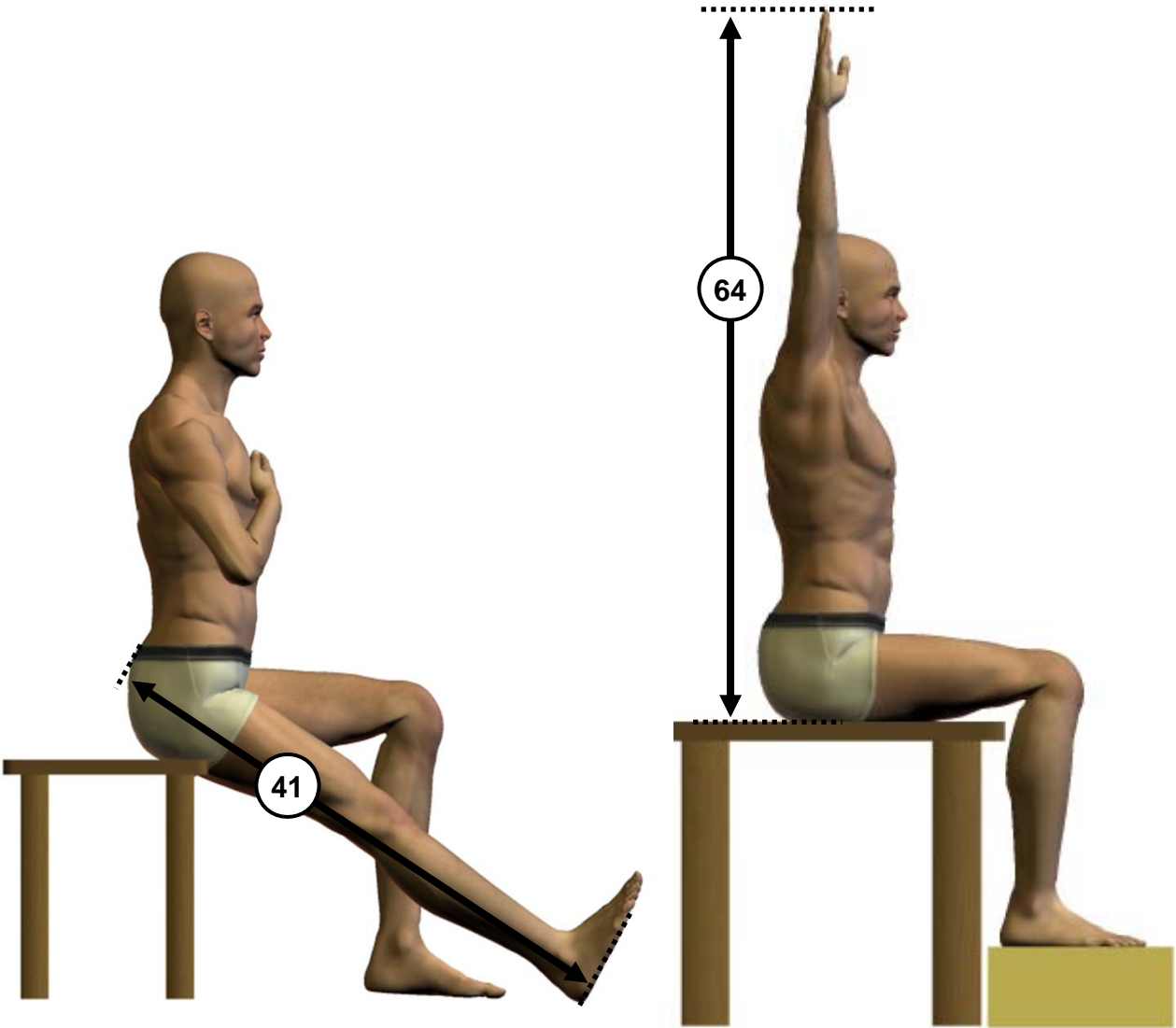
(8) BIACROMIAL BREADTH

(11) BIDELOID BREADTH

(39) FOREARM-FOREARM BREADTH

(51) HIP BREADTH, SITTING

(89) WAIST FRONT LENGTH, SITTING

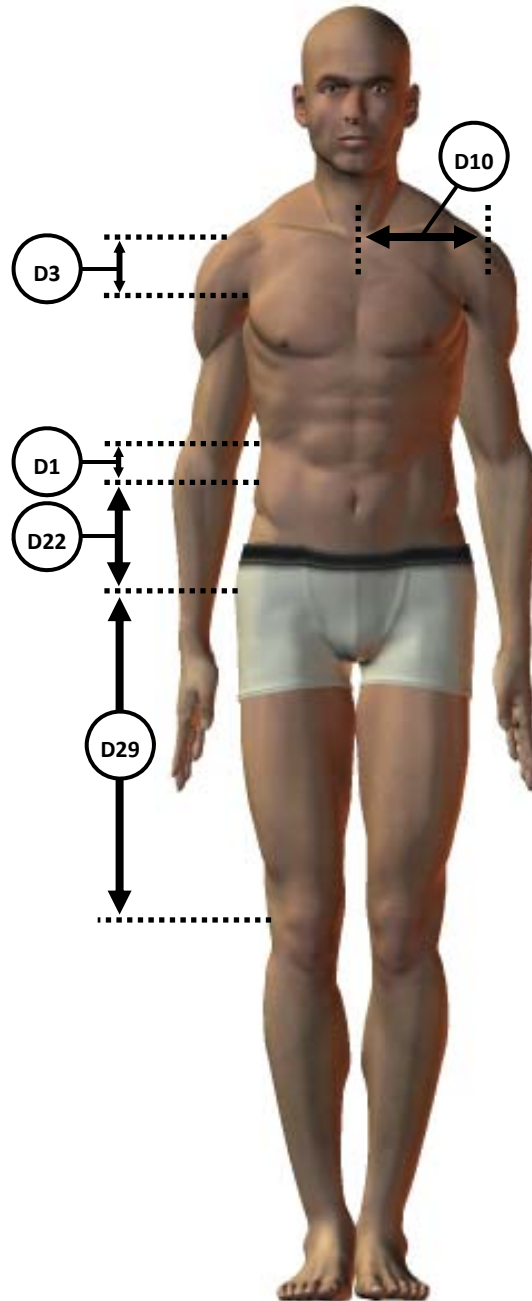


(41) FUNCTIONAL LEG LENGTH

(64) OVERHEAD FINGERTIP REACH, SITTING

APPENDIX C

VISUAL INDEX OF DERIVED DIMENSIONS



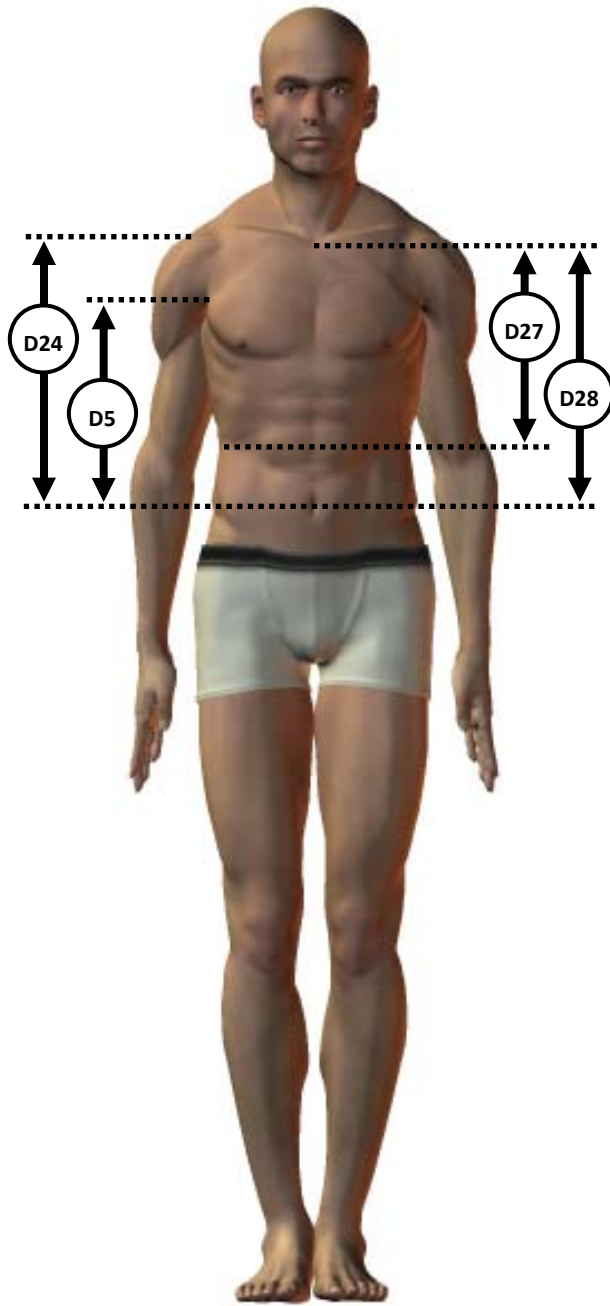
(D1) ABDOMINAL LINK

(D3) ACROMION-AXILLA LENGTH

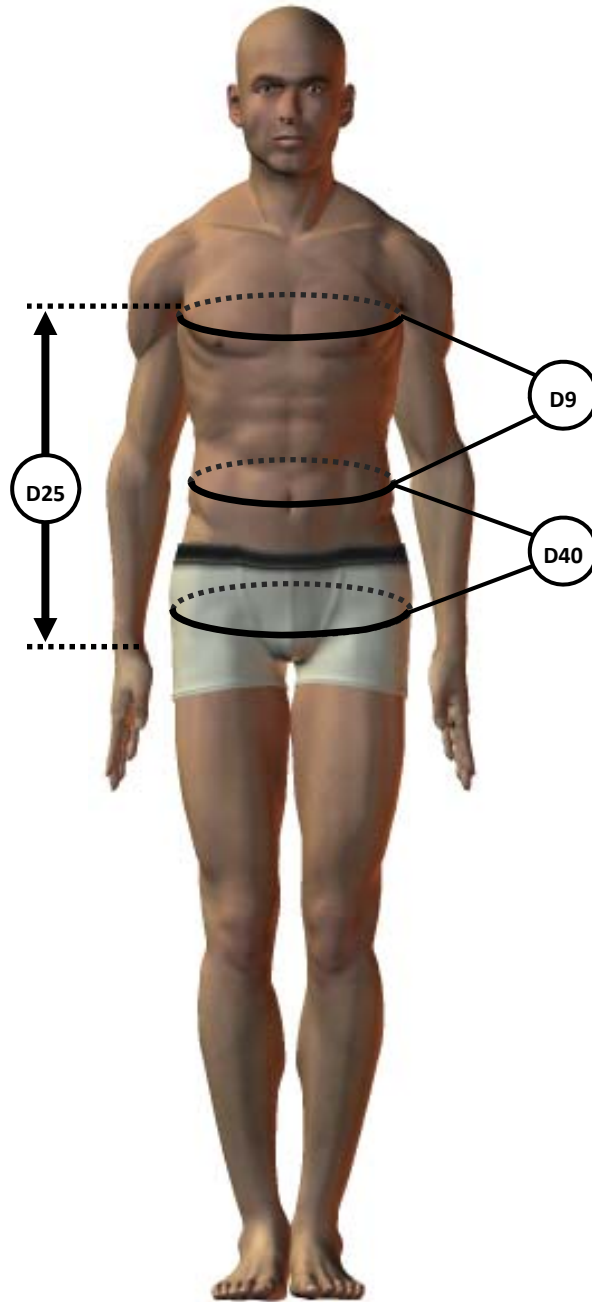
(D10) CLAVICLE LINK

(D22) PELVIC LINK

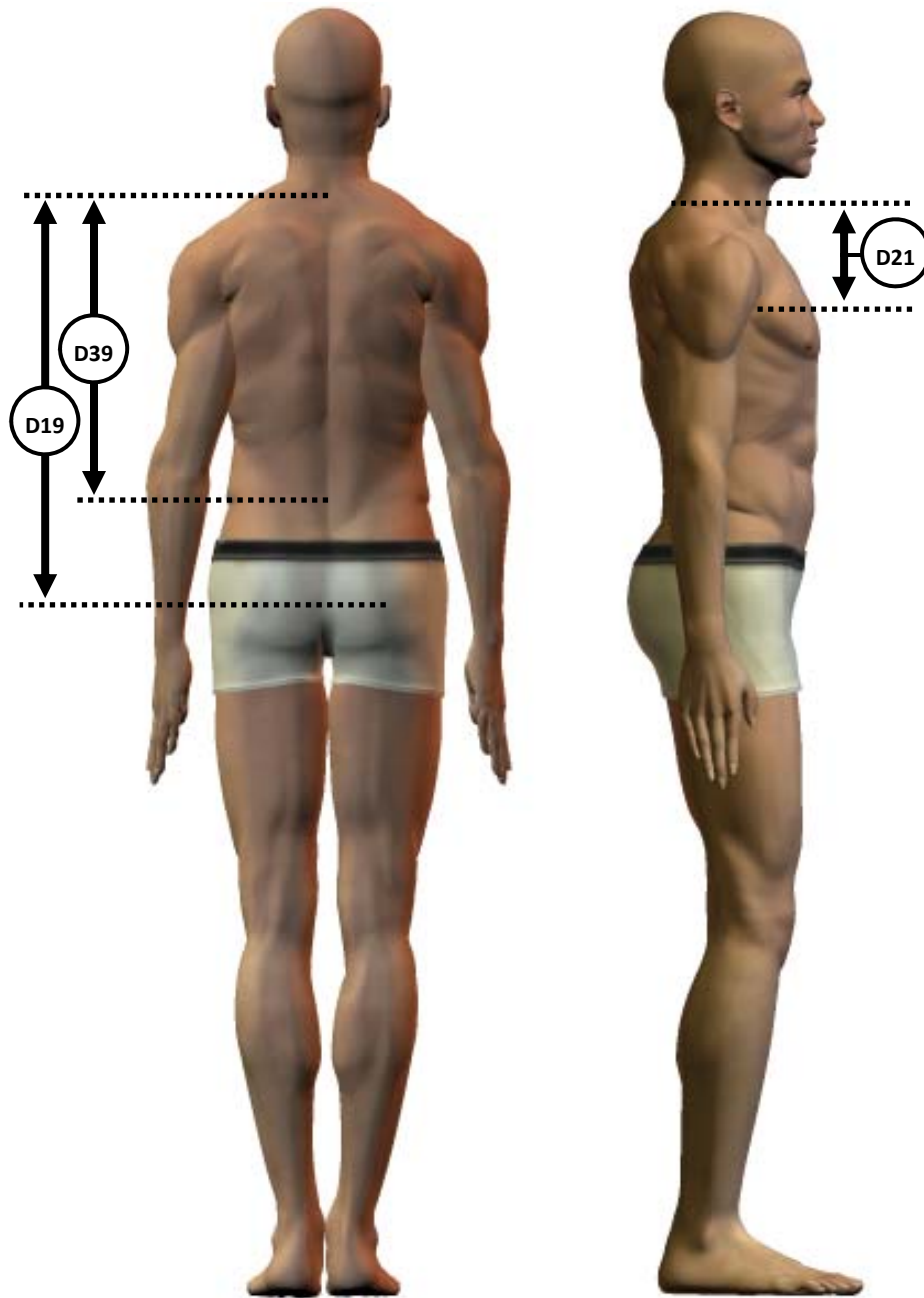
(D29) THIGH LINK



- (D5) AXILLA-WAIST LENGTH (OMPHALION)
- (D24) SHOULDER-WAIST LENGTH (OMPHALION)
- (D27) SUPRASTERNALE-TENTH RIB LENGTH
- (D28) SUPRASTERNALE-WAIST LENGTH (OMPHALION)



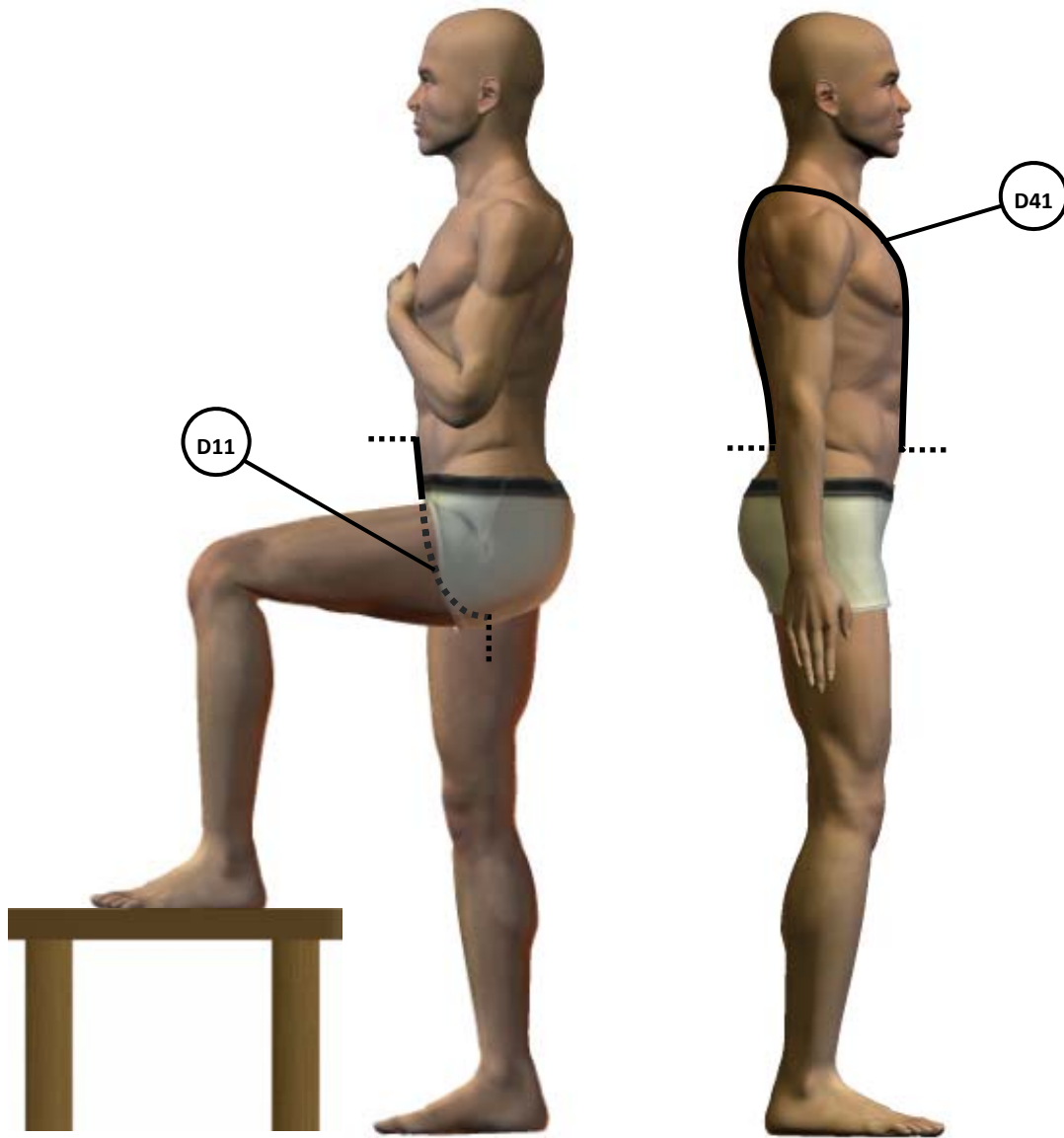
- (D9) CHEST-WAIST DROP (OMPHALION)
- (D25) SLEEVE INSEAM
- (D40) WAIST-BUTTOCK DROP (OMPHALION)



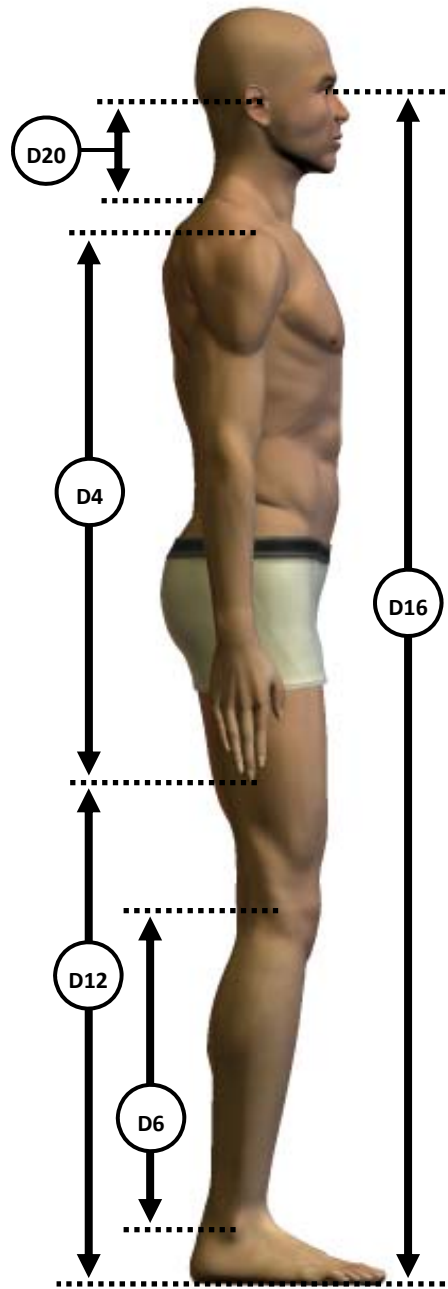
(D19) NECK-BUTTOCK LENGTH

(D21) NECK-SCYE LENGTH

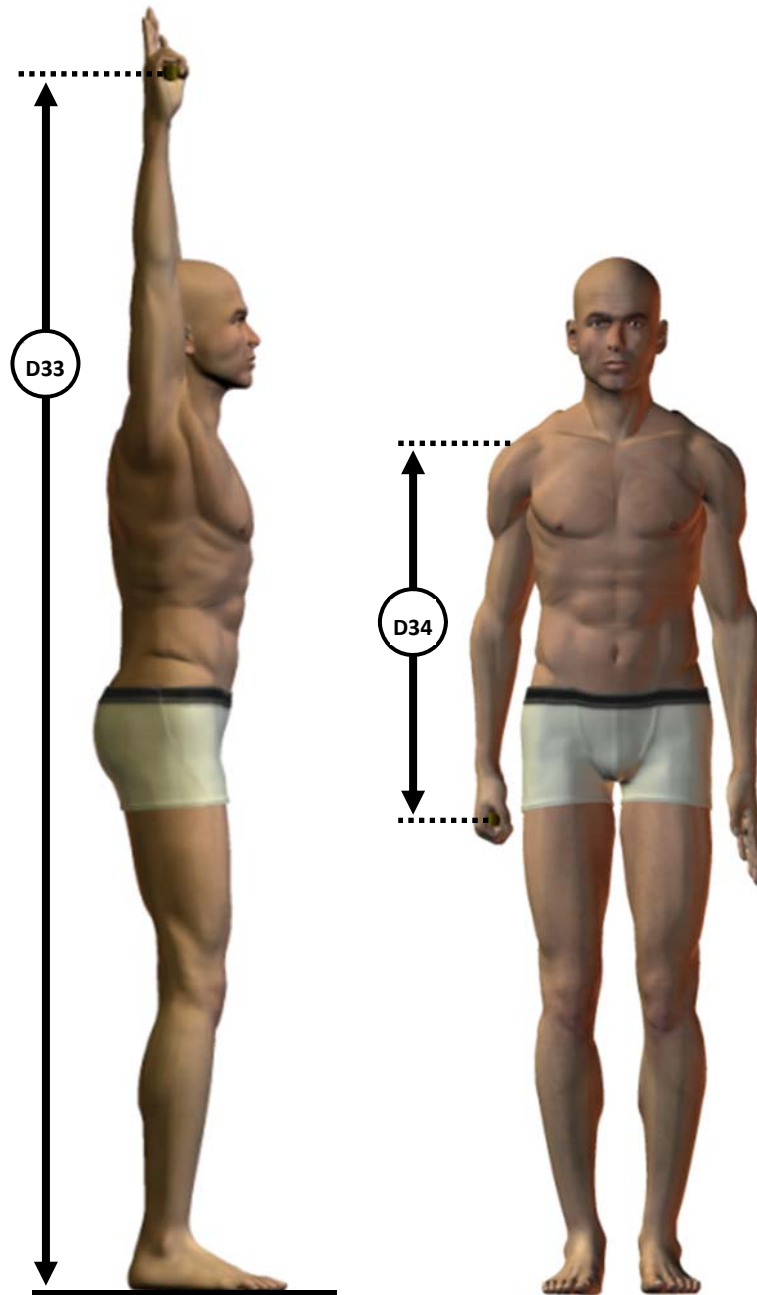
(D39) WAIST BACK, VERTICAL (OMPHALION)



(D11) CROTCH LENGTH, ANTERIOR (OMPHALION)
(D41) WAIST-WAIST (OMPHALION) OVER SHOULDER

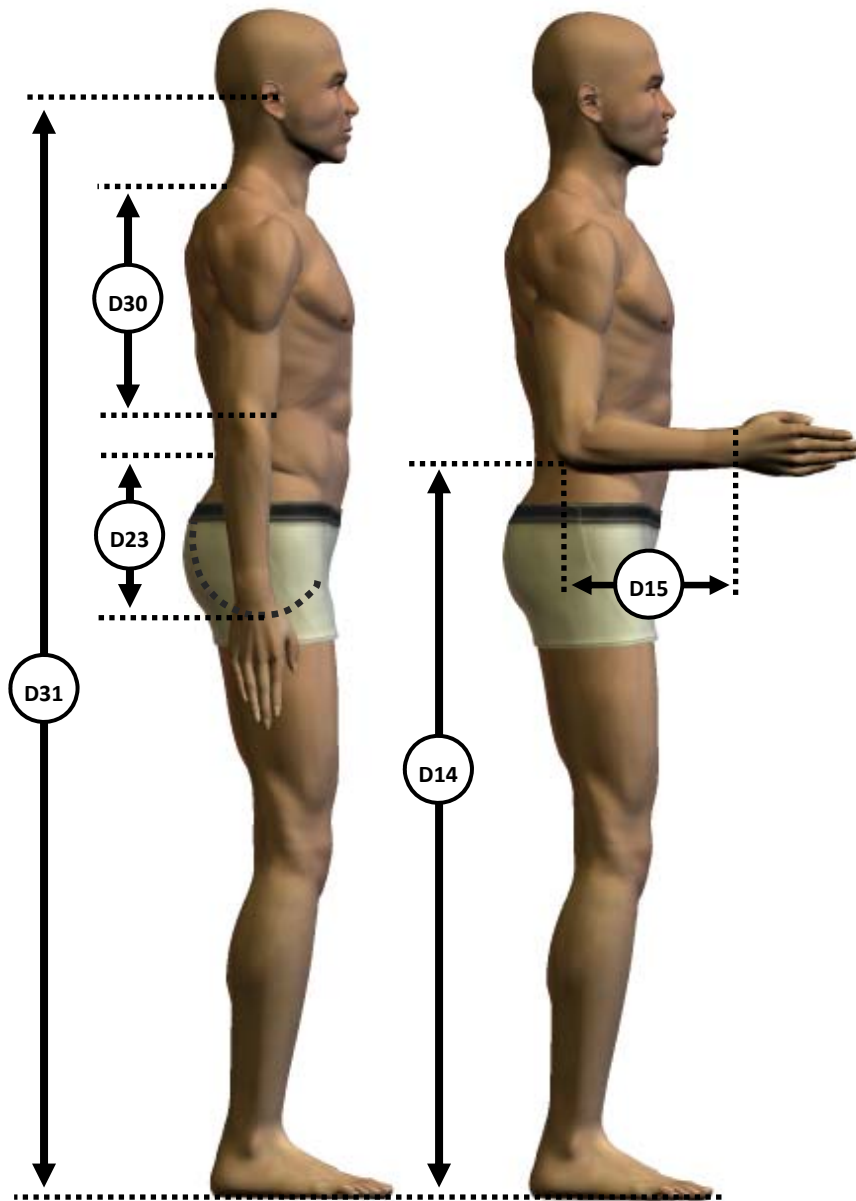


- (D4) ARM LENGTH
- (D6) CALF LINK
- (D12) DACTYLION HEIGHT
- (D16) EYE HEIGHT
- (D20) NECK LINK



(D33) VERTICAL GRIP REACH

(D34) VERTICAL GRIP REACH DOWN



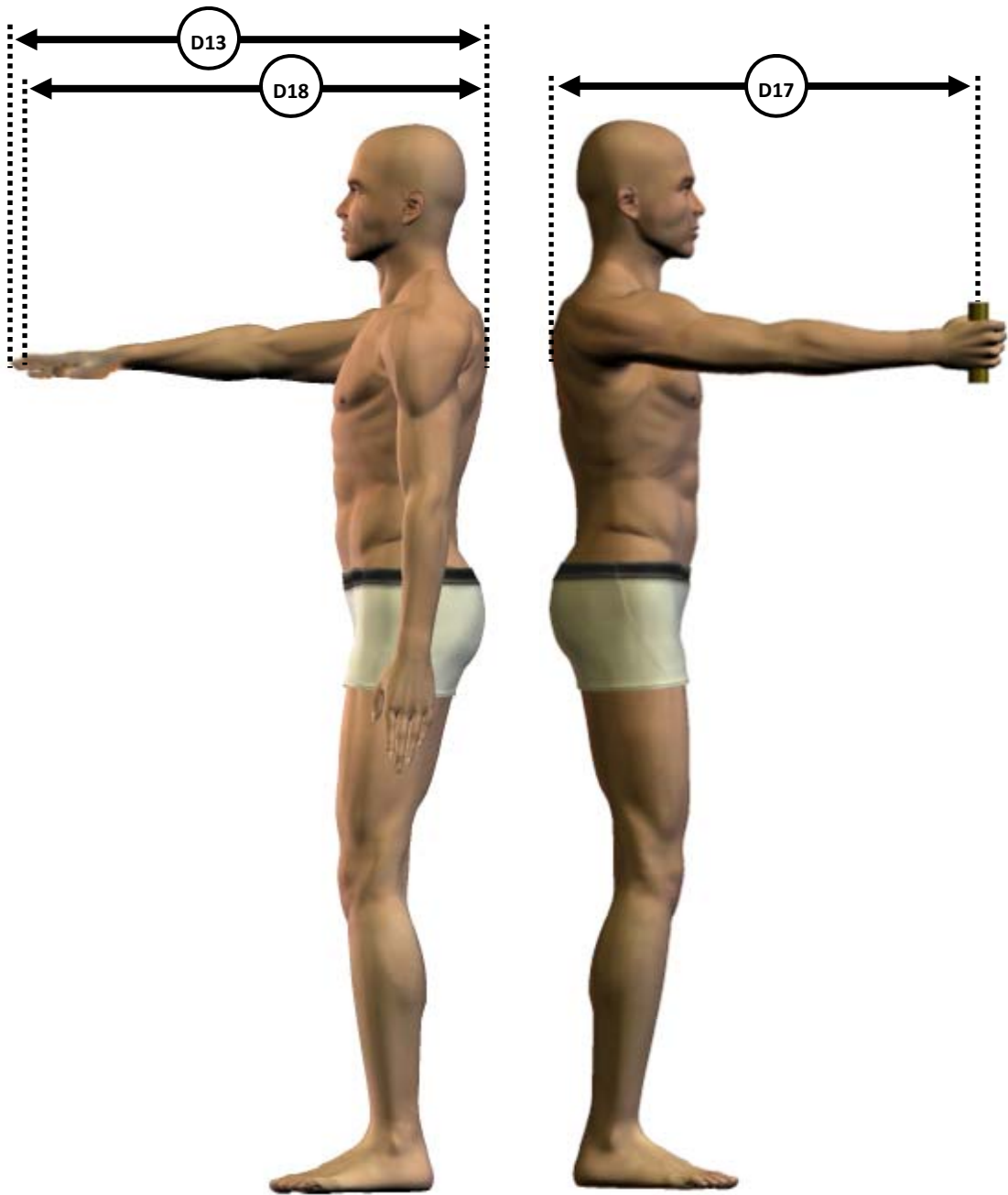
(D14) ELBOW REST HEIGHT, STANDING

(D15) ELBOW-WRIST LENGTH

(D23) RISE (OMPHALION)

(D30) THORAX LINK

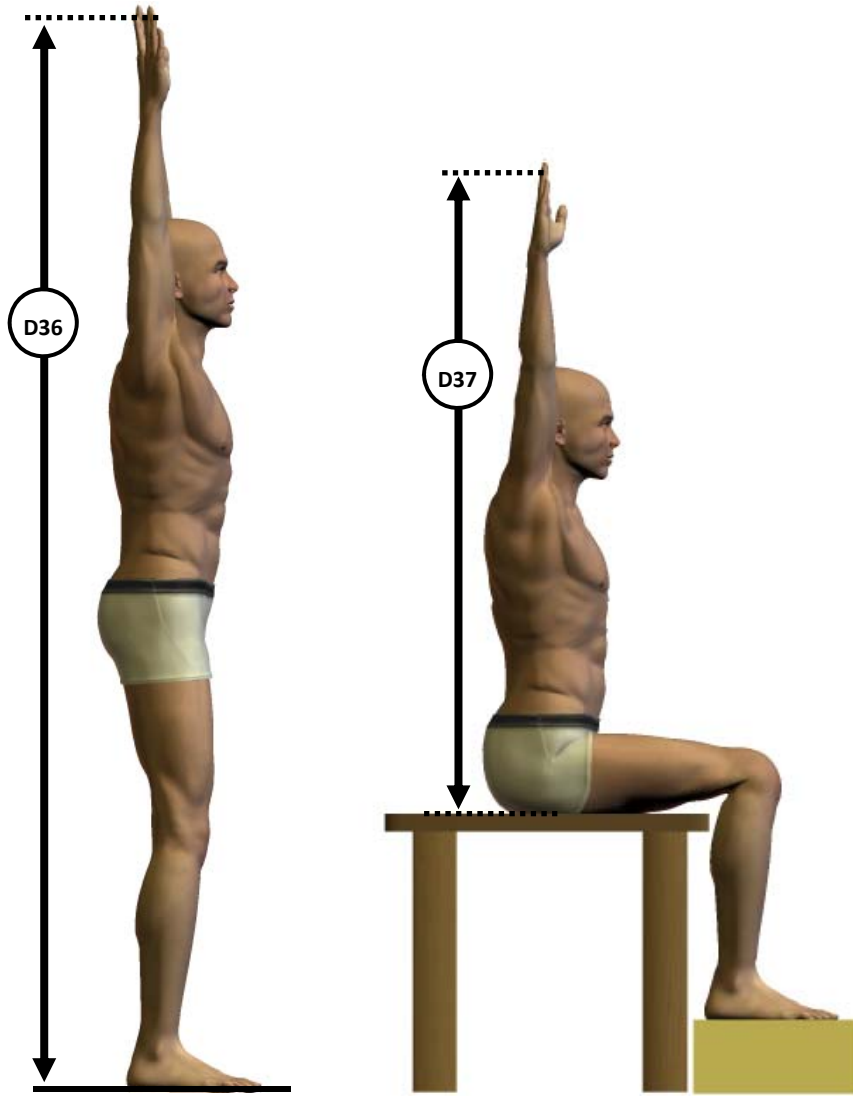
(D31) TRAGION HEIGHT



(D13) DACTYLION REACH FROM WALL

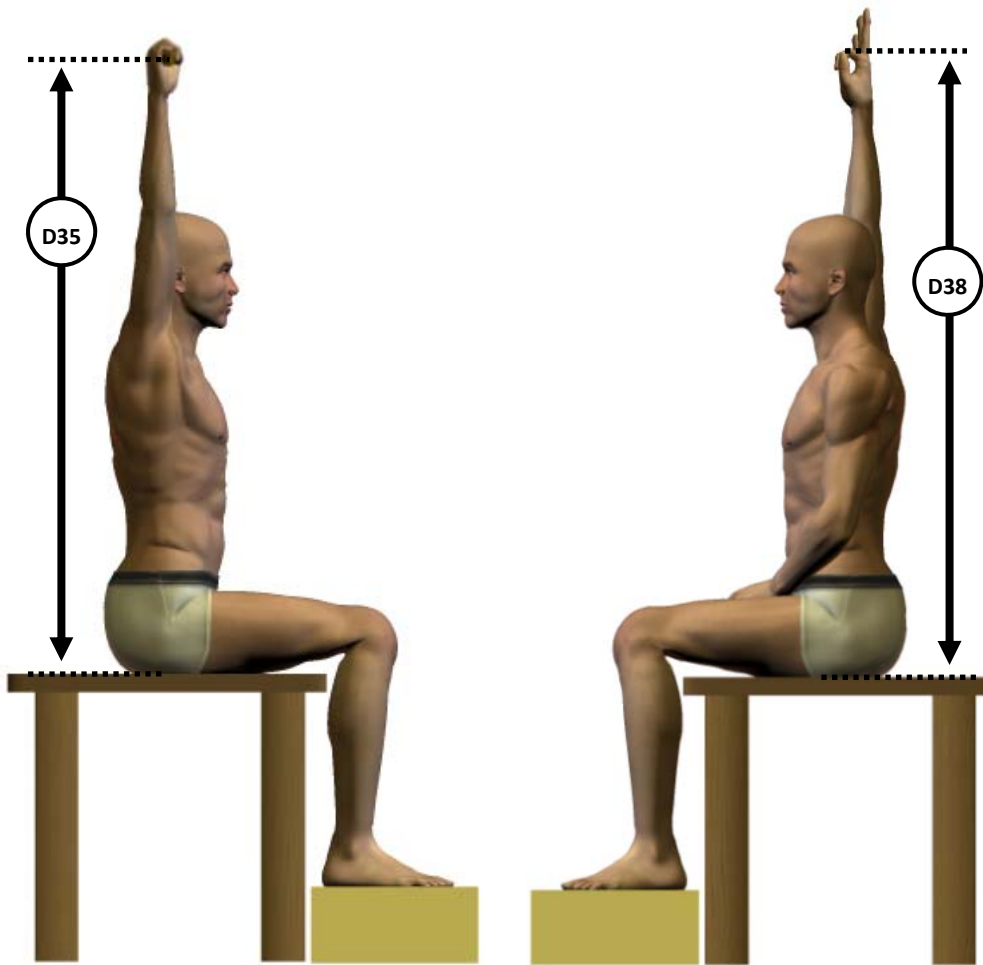
(D17) FUNCTIONAL GRIP REACH

(D18) INDEX FINGER REACH



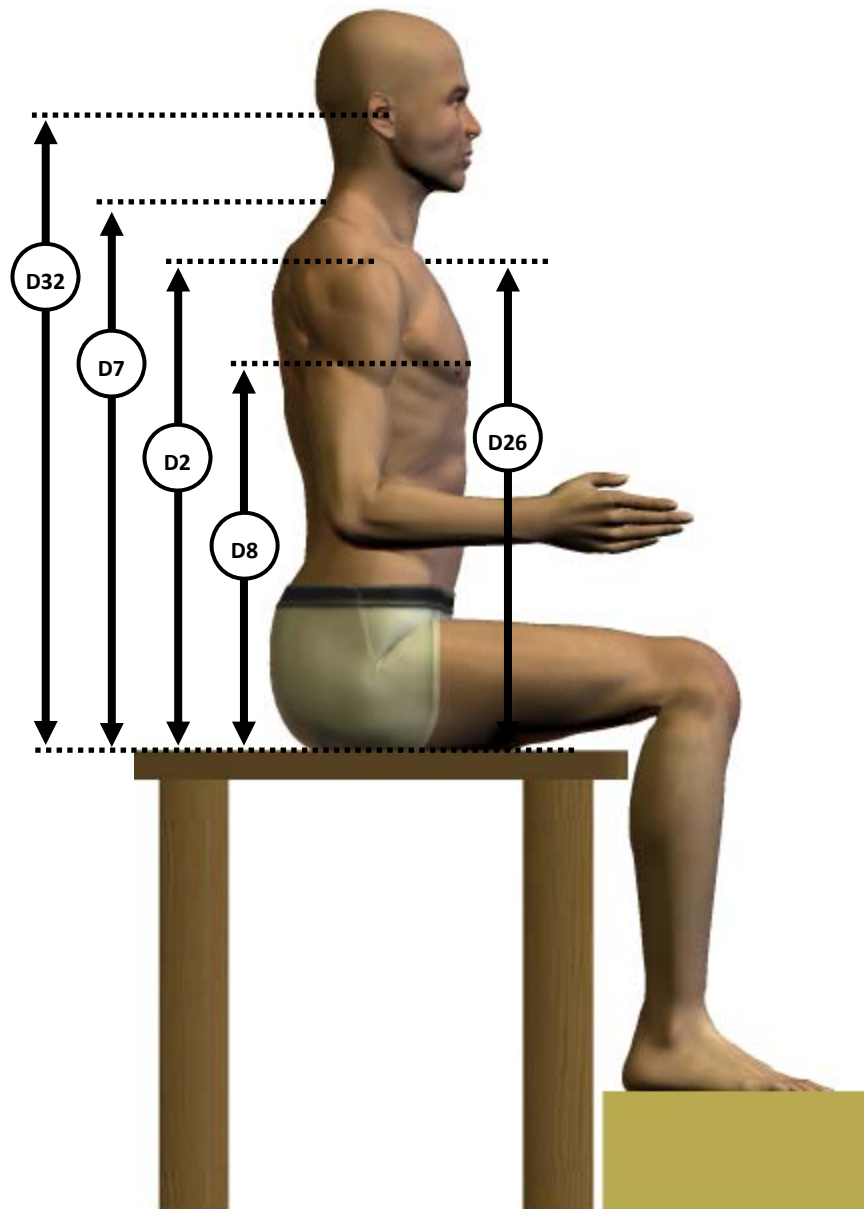
(D36) VERTICAL INDEX FINGERTIP REACH

(D37) VERTICAL INDEX FINGERTIP REACH, SITTING



(D35) VERTICAL GRIP REACH, SITTING

(D38) VERTICAL THUMB TIP REACH, SITTING



- (D2) ACROMIAL HEIGHT, SITTING
- (D7) CERVICALE HEIGHT, SITTING
- (D8) CHEST HEIGHT, SITTING
- (D26) SUPRASTERNALE HEIGHT, SITTING
- (D32) TRAGION HEIGHT, SITTING

APPENDIX D

STATISTICAL MEASURES

The statistical measures used in this report to summarize the survey data are univariate statistics selected to provide potential users with a maximum of useful information. They are also the statistics used in other anthropometric reports prepared by the U.S. Army as well as other military services.

The statistics provided for each variable are the following:

1. The arithmetic mean (\bar{x}). This is the arithmetic average and is computed as the sum of the values divided by the number of values:

$$\bar{x} = \frac{\sum X}{N}$$

where X is the individual measurement and N is the sample size.

2. The standard error of the mean (Se). This is a standard deviation type of statistic and is an estimate of the sampling error of the mean. It is computed as:

$$Se_{\bar{x}} = \frac{SD}{\sqrt{N}}$$

where SD is the standard deviation for that variable and N is the sample size.

3. The standard deviation (SD). This is a measure of variability and is computed as:

$$SD = \sqrt{\frac{\sum (X - \bar{x})^2}{N}}$$

where X is the individual measurement, \bar{x} is the mean value for that measurement, and N is the sample size.

4. The standard error of the SD (Se_{SD}). This is another measure of variability and is an estimate of the sampling error of the SD. It is computed as:

$$Se_{SD} = \frac{SD}{\sqrt{2N}}$$

where SD is the standard deviation of the variable of interest and N is the sample size.

5. Minimum. The smallest observed value for a particular variable.
6. Maximum. The largest observed value for a particular variable.
7. N. The number of subjects measured for a particular variable.
8. Skewness (β_1). A dimensionless statistic that is an indicator of whether a set of data is symmetrically distributed. It is computed as:

$$\beta_1 = \frac{\sum (X - \bar{x})^3}{N \times SD^3}$$

where X is the individual measurement, \bar{x} is the mean of that measurement, N is the sample size, and SD is the standard deviation of the measurement. In a normal distribution the value of β_1 is 0.

9. Kurtosis (β_2). A dimensionless statistic that indicates the level of agreement between a normal distribution and the actual distribution of the data.

$$\beta_2 = \frac{\sum (X - \bar{x})^4}{N \times SD^4}$$

where X is the individual measurement, \bar{x} is the mean of that measurement, N is the sample size, and SD is the standard deviation of the measurement. In a normal distribution the value for β_2 is 3. It should be noted that some commercially available statistical packages automatically center kurtosis around 0.

10. The coefficient of variation. A statistic that restates the standard deviation as a percent of the mean and is computed as:

$$CV = 100 \times \frac{SD}{\bar{x}}$$

where \bar{x} is the mean and SD is the standard deviation of a measurement.

11. The frequency tables. These tables group the data for a variable into a series of intervals. The intervals used in this output are 1 mm, 2 mm, 2.5 mm, 5 mm, 10 mm, 15 mm, and 20 mm. For each interval, the tables list the start and end point of the interval, the number of participants who fall within the interval (frequency or F), the cumulative frequency (Cum F), and

the values of F and CumF expressed as a percentage of the total number of measurements for that variable (FPct and CumFPct).

12. The percentiles. This group of statistics represents measures of order or position. These measures can be thought of as being obtained by arranging the data in order from the smallest to the largest and then observing the value of the datum which lies at a specified position in the array. The 99 percentiles—ranging from the first to the 99th—are the values at the points which separate consecutive blocks or units of 1% of the data in the ordered array. The first percentile is the value that separates the smallest 1% of the data from the 99% of the data with larger values; the second percentile separates the smallest 2% from the larger 98% and so on. Twenty-five of these percentiles which are believed to be the most useful to designers and engineers have been included for each measurement. When distributions are normally distributed, percentiles can be estimated from the mean and standard deviation. However, these estimates are just that – estimates. Exact percentiles calculated from the data are generally preferable, and that is the approach that has been taken here.

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APPENDIX E

DIMENSION-NUMBER CROSS-REFERENCE TABLE

Many users of the ANSUR II pilots database will be familiar with the ANSUR database and the associated male pilots database from 1988–1989. To assist users familiar with ANSUR dimension numbers, a cross-reference table has been provided for the new and old dimension numbers (Table E-1). The table includes all of the measured and derived dimensions in ANSUR and ANSUR II. A blank in the column means that that dimension was not measured in that survey. If a dimension retained the same name but was changed in such a way that it is no longer comparable, then that dimension is listed twice (e.g. Functional Leg Length).

TABLE E-1

Cross Reference of Dimension Numbers from ANSUR II and ANSUR

ANSUR II Number	Dimension Name	ANSUR Number
1	Abdominal Extension Depth, Sitting	1
D1	Abdominal Link	D1
2	Acromial Height	2
D2	Acromial Height, Sitting	3
D3	Acromion-Axilla Length	D2
3	Acromion-Radiale Length	4
4	Ankle Circumference	5
D4	Arm Length	D3
5	Axilla Height	6
	Axilla-Waist Length (Natural Indentation)	D4
D5	Axilla-Waist Length (Omphalion)	D5
	Axillary Arm Circumference	7
6	Ball of Foot Circumference	8
7	Ball of Foot Length	9
8	Biacromial Breadth	10
9	Biceps Circumference, Flexed	11
10	Bicristal Breadth	
11	Bideltoid Breadth	12
12	Bimalleolar Breadth	13
	Bispinous Breadth	14
13	Bitragion Chin Arc	15
	Bitragion Coronal Arc	16
	Bitragion Crinion Arc	17
	Bitragion Frontal Arc	18

TABLE E-1 Continued

ANSUR II Number	Dimension Name	ANSUR Number
14	Bitragion Submandibular Arc	19
	Bitragion Subnasale Arc	20
15	Bizygomatic Breadth	21
	Bustpoint/The lion-Bustpoint/The lion Breadth	22
16	Buttock Circumference	23
17	Buttock Depth	24
18	Buttock Height	25
19	Buttock-Knee Length	26
20	Buttock-Popliteal Length	27
21	Calf Circumference	28
	Calf Height	29
D6	Calf Link	D6
22	Cervicale Height	
	Cervicale Height	30
D7	Cervicale Height, Sitting	
	Cervicale Height, Sitting	31
23	Chest Breadth	
	Chest Breadth	32
24	Chest Circumference	33
	Chest Circumference at Scye	34
	Chest Circumference below Breast	35
25	Chest Depth - Females	36
25	Chest Depth - Males	
	Chest Depth - Males	36
26	Chest Height - Males	
26	Chest Height - Females	37
	Chest Height - Males	37
D8	Chest Height, Sitting - Females	D7
D8	Chest Height, Sitting - Males	
	Chest-Waist Drop (Natural Indentation)	D8
D9	Chest-Waist Drop (Omphalion) - Females	D9
D9	Chest-Waist Drop (Omphalion) - Males	
D10	Clavicle Link	D10
27	Crotch Height	38
	Crotch Length (Natural Indentation)	39

TABLE E-1 Continued

ANSUR II Number	Dimension Name	ANSUR Number
28	Crotch Length (Omphalion)	40
	Crotch Length, Anterior (Natural Indentation)	D11
D11	Crotch Length, Anterior (Omphalion)	D12
	Crotch Length, Posterior (Natural Indentation)	41
29	Crotch Length, Posterior (Omphalion)	42
D12	Dactylion Height	D13
D13	Dactylion Reach From Wall	D14
	Dactylion Reach From Wall, Extended	D15
30	Ear Breadth	43
31	Ear Length	44
	Ear Length above Tragion	45
32	Ear Protrusion	46
	Elbow Circumference	47
33	Elbow Rest Height	48
D14	Elbow Rest Height, Standing	D16
D15	Elbow-Wrist Length	D18
D16	Eye Height	D19
34	Eye Height, Sitting	49
	Eye-Tragion Link	D20
35	Foot Breadth, Horizontal	50
36	Foot Length	51
37	Forearm-Center Of Grip Length	D17
38	Forearm Circumference, Flexed	52
39	Forearm-Forearm Breadth	53
40	Forearm-Hand Length	54
D17	Functional Grip Reach	D21
	Functional Grip Reach, Extended	D22
41	Functional Leg Length	
	Functional Leg Length	55
	Gluteal Furrow Height	56
42	Hand Breadth	57
43	Hand Circumference	58
44	Hand Length	59
45	Head Breadth - Females	
45	Head Breadth - Males	60
46	Head Circumference - Females	

TABLE E-1 Continued

ANSUR II Number	Dimension Name	ANSUR Number
46	Head Circumference - Males	61
47	Head Length - Females	
47	Head Length - Males	62
48	Heel-Ankle Circumference	63
49	Heel Breadth	64
50	Hip Breadth	65
51	Hip Breadth, Sitting	66
52	Iliocristale Height	67
D18	Index Finger Reach	D23
	Index Finger Reach, Extended	D24
53	Interpupillary Breadth	68
54	Interscye I	69
55	Interscye II	70
	Knee Circumference	71
56	Knee Height, Midpatella	72
57	Knee Height, Sitting	73
58	Lateral Femoral Epicondyle Height	74
59	Lateral Malleolus Height	75
60	Lower Thigh Circumference	76
61	Menton-Sellion Length	77
	Midshoulder Height, Sitting	78
	Neck-Bustpoint/Thelion Length	79
D19	Neck-Buttock Length	D26
	Neck-Gluteal Furrow Length	D27
62	Neck Circumference	80
63	Neck Circumference Base	81
	Neck Height, Lateral	82
D20	Neck Link	D25
D21	Neck-Scye Length	D28
	Overhead Fingertip Reach	83
	Overhead Fingertip Reach, Extended	84
64	Overhead Fingertip Reach, Sitting	85
65	Palm Length	
D22	Pelvic Link	D29
66	Popliteal Height	86
67	Radiale-Styilion Length	87

TABLE E-1 Continued

ANSUR II Number	Dimension Name	ANSUR Number
	Rise (Natural Indentation)	D30
D23	Rise (Omphalion)	D31
	Scye Circumference	88
	Scye Depth	89
68	Shoulder Circumference	
	Shoulder Circumference	90
69	Shoulder-Elbow Length	91
70	Shoulder Length	92
	Shoulder Slope	D32
	Shoulder-Waist Length (Natural Indentation)	D33
D24	Shoulder-Waist Length (Omphalion)	D34
71	Sitting Height	93
D25	Sleeve Inseam	D35
	Sleeve Length: Spine-Elbow	94
	Sleeve Length: Spine-Scye	95
72	Sleeve Length: Spine-Wrist	96
73	Sleeve Outseam	97
74	Span	98
75	Stature	99
	Strap Length	100
76	Suprasternale Height	101
D26	Suprasternale Height, Sitting	D36
D27	Suprasternale-Tenth Rib Length	
D28	Suprasternale-Waist Length (Omphalion)	
77	Tenth Rib Height	102
78	Thigh Circumference	103
79	Thigh Clearance	104
D29	Thigh Link	D37
D30	Thorax Link	D38
	Thumb Breadth	105
80	Thumbtip Reach	106
	Thumbtip Reach, Extended	D39
81	Tibial Height	
D31	Tragion Height	D40
D32	Tragion Height, Sitting	D41
82	Tragion-Top Of Head - Females	

TABLE E-1 Continued

ANSUR II Number	Dimension Name	ANSUR Number
82	Tragion-Top Of Head - Males	H44
83	Trochanterion Height	107
D33	Vertical Grip Reach	D42
D34	Vertical Grip Reach Down	D43
	Vertical Grip Reach, Extended	D44
D35	Vertical Grip Reach, Sitting	D45
D36	Vertical Index Fingertip Reach	D46
	Vertical Index Fingertip Reach Down	D47
	Vertical Index Fingertip Reach, Extended	D48
D37	Vertical Index Fingertip Reach, Sitting	D49
	Vertical Thumbtip Reach Down	D50
D38	Vertical Thumbtip Reach, Sitting	D51
	Vertical Trunk Circumference (ASCC)	108
84	Vertical Trunk Circumference (USA)	109
	Vertical Wrist Height	D52
	Vertical Wrist Height, Extended	D53
	Vertical Wrist Height, Sitting	D54
	Waist Back Length (Natural Indentation)	110
85	Waist Back Length (Omphalion)	
	Waist Back Length (Omphalion)	111
	Waist Back, Vertical (Natural Indentation)	D55
D39	Waist Back, Vertical (Omphalion)	
	Waist Back, Vertical (Omphalion)	D56
86	Waist Breadth	112
	Waist-Buttock Drop (Natural Indentation)	D57
D40	Waist-Buttock Drop (Omphalion)	D58
	Waist Circumference (Natural Indentation)	113
87	Waist Circumference (Omphalion)	114
88	Waist Depth	115
	Waist Front Length (Natural Indentation)	116
	Waist Front Length (Omphalion)	117
89	Waist Front Length, Sitting	
	Waist Height (Natural Indentation)	118
90	Waist Height (Omphalion)	119
	Waist Height, Sitting (Natural Indentation)	120
	Waist Height, Sitting (Omphalion)	121

TABLE E-1 Continued

ANSUR II Number	Dimension Name	ANSUR Number
	Waist-Hip Length	122
	Waist (Natural Indentation)-Waist (Omphalion) Length	123
	Waist-Waist (Natural Indentation) Over Shoulder	D59
D41	Waist-Waist (Omphalion) Over Shoulder	D60
91	Weight	124
	Wrist-Center of Grip Length	125
92	Wrist Circumference	126
93	Wrist Height	127
	Wrist Height, Sitting	128
	Wrist-Index Finger Length	129
	Wrist-Thumbtip Length	130
	Wrist-Wall Length	131
	Wrist-Wall Length, Extended	132

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APPENDIX F

COMPARABILITY OF ANSUR II DIMENSIONS WITH DIMENSIONS OF OTHER LARGE-SCALE SURVEYS

The primary objective of this appendix is to document the comparability of the dimensions measured in the ANSUR II pilots survey with like or similarly named dimensions measured in other large-scale anthropometric surveys. Data from surveys are frequently used to compare body size distributions among and between populations (e.g., males and females, occupational groups, racial groups, age categories). A particularly vexing problem in drawing conclusions from such comparisons is whether differences between the data reflect real population differences or are the result of using different techniques to measure what may be described or named as the same dimension. Differences in landmark definitions, subject positioning, instruments, and measuring techniques can and do lead to significantly different results.

It is particularly important that the body-size comparability among U.S. military populations be known. Items of personal-protective equipment, clothing, and weapon systems are sometimes designed to be used by more than one U.S. military service and/or by allied services in other countries. In recent years, design for commonality of use among North Atlantic Treaty Organization (NATO) services has received increased emphasis. This kind of cooperative effort requires knowledge of population distributions of dimensions, which form the basis for sizing, procurement, and issue of protective equipment, and determination of the comparability of persons who may be called upon to use often-restrictive workspaces, as in the case of pilots from one country undergoing training in another nation's aircraft.

Dimensions measured in ANSUR II are compared to like or similarly named dimensions measured in various surveys (Table F-1). The U.S. military surveys compared include Navy aviators (Gifford et al, 1965); Air Force (Churchill et al., 1977); Marine Corps (Donelson and Gordon, 1996); Army in 1966 (White and Churchill, 1971), 1970 (Churchill et al., 1977), and 1988 (Gordon et al., 1989); and female-personnel-only surveys from the Air Force (Clauser et al., 1972) and Army (Churchill et al., 1977). In addition, surveys of the Canadian Forces (McCann et al., 1975) and the Royal Air Force (Bolton et al., 1973), as well as two civilian surveys, the National Health and Nutrition Examination (NHANES) (CDC, 2012), and Civilian American and European Surface Anthropometry Resources (CAESAR) (Blackwell et al., 2002), were compared.

Data from the earlier military surveys serve as the basis for the design of current equipment, clothing, and systems. Many of these, of course, will remain in military inventories for some time. The following means were used to judge the comparability of ANSUR II dimensions to other survey dimensions:

1. Published descriptions of the dimensions and how they were measured.
2. Published definitions of the landmarks used.
3. Examination of summary statistics.

4. A comparability table published in the ANSUR final report (Gordon et al., 1989). Table F-1 presents the authors' judgment about the comparability of the ANSUR II data to data from the other surveys listed. The following codes are used:

C - COMPARABLE – The landmarks and measuring techniques used are of such comparability that differences between data from surveys can be considered to reflect real anthropometric differences between populations.

PC - PROBABLY COMPARABLE – Differences in landmark definitions and/or measuring techniques exist. However the differences are not large enough to exclude these data from most human engineering applications such as the sizing, design, procurement, and issuing of military equipment or assessing the suitability of assigning personnel to restrictive workspaces.

NC - NOT COMPARABLE – Landmark differences and measuring techniques are believed to be different enough so that dimensions so coded should not be used as the basis for answering any population comparison questions.

CU - COMPARABILITY UNKNOWN – Several dimensions that are listed as CU were determined in other surveys by means other than direct measurement. Data from other dimensions coded CU reflect discrepancies for which no explanation is readily apparent.

The comparability between derived dimensions in ANSUR II and like dimensions measured directly in other surveys is, and will remain, unknown without extensive analyses. Therefore, derived dimensions do not appear in this table.

TABLE F-1

ANSUR II Dimensions: Assessment of Comparability with Other Surveys

Dimension	U.S. Navy Aviators 1964 (Gifford et al., 1965)	U.S. Army 1966 (White and Churchill, 1971)	U.S. Army Aviators 1970 (Churchill et al., 1971)	U.S. Air Force 1967 (Churchill et al., 1977)	Royal Air Force 1970/1971 (Bolton et al., 1973)	Canadian Forces 1974 (McCann et al., 1975)	U. S. Air Force Women 1968 (Clauser et al., 1972)	U.S. Army Women 1977 (Churchill et al., 1977)	U.S. Army 1988 (Gordon et al., 1989)	U.S. Marine Corps 1994 (Donelson and Gordon, 1996)	NHANES (CDC, 2012)	CAESAR (Blackwell et al., 2002)
Abdominal Ext Depth, Sit					NC			C	C			
Acromial Height		NC	PC	PC			PC	PC	C			
Acromion-Radiale Length				PC			PC	PC	C		PC	
Ankle Circumference	C	C	C	C	C		C	C	C			NC
Axilla Height					NC			C	C			
Ball of Foot Circumference		PC	C	C	NC			C	C			
Ball of Foot Length		C	C	C				C	C			
Biacromial Breadth	NC	NC	NC	NC	NC	NC	NC	NC	C			NC
Biceps Circumference, Flexed	C	C	C	C	C	C	C	C	C			
Bicristal Breadth	PC			PC			PC					
Bideltoid Breadth		C	C	C		C	C	C	C			C
Bimalleolar Breadth				C								
Bitragion Chin Arc									C			
Bitragion Submandibular Arc	C			C				C	C			
Bizygomatic Breadth	PC	C	C	C		C	C	C	C			C
Buttock Circumference	C	C	C	C	C	C		C	C	C		NC
Buttock Depth	C			C			C					
Buttock Height				C			C	C	C			
Buttock-Knee Length	NC	NC	NC	NC	NC		NC	NC	C			PC
Buttock-Popliteal Length	NC	NC	NC	NC		NC	NC	NC	C			
Calf Circumference	C	C	C	C	C		C	C	C		NC	
Cervicale Height	NC	NC	NC	NC			C	C	PC			
Chest Breadth	PC	PC	PC	PC			PC	PC	NC			
Chest Circumference	PC	PC	PC	PC	PC	PC	PC	PC	C	C		NC
Chest Depth	PC	PC	PC	PC			PC	PC	PC			
Chest Height	CU			CU			CU	CU	PC			
Crotch Height	PC	PC	PC	PC	PC	PC	PC	PC	C			NC
Crotch Length (Omphalion)				NC					C			NC
Crotch Length, Post. (Omph)									C			
Ear Breadth	C			C			C	C	C			
Ear Length	C			C			C	C	C			
Ear Protrusion				NC					C			
Elbow Rest Height	PC		PC	PC	PC				C			C
Eye Height, Sitting	C	C	C	C			C	C	C			C

TABLE F-1 Continued

Dimension	U.S. Navy Aviators 1964 (Gifford et al., 1965)	U.S. Army 1966 (White and Churchill, 1971)	U.S. Army Aviators 1970 (Churchill et al., 1971)	U.S. Air Force 1967 (Churchill et al., 1977)	Royal Air Force 1970/1971 (Bolton et al., 1973)	Canadian Forces 1974 (McCann et al., 1975)	U. S. Air Force Women 1968 (Clauser et al., 1972)	U.S. Army Women 1977 (Churchill et al., 1977)	U.S. Army 1988 (Gordon et al., 1989)	U.S. Marine Corps 1994 (Donelson and Gordon, 1996)	NHANES (CDC, 2012)	CAESAR (Blackwell et al., 2002)
Foot Breadth, Horizontal	C	C	C	C	PC	C	C	C	C	C		
Foot Length	C	C	C	C	PC	C	C	C	C	C		PC
Forearm-Center of Grip Length									PC			
Forearm Circ, Flexed	PC	PC	PC	C			C	PC	C			
Forearm-Forearm Breadth				C				C	C			
Forearm Hand Length	C	C	C		C			C	C			
Functional Leg Length			NC		NC			NC	C			
Hand Breadth	C	C	C	C		C	C	C	C			
Hand Circumference	C	C	C	C			C	C	C			PC
Hand Length	PC	PC	PC	C		PC	C	CU	C			PC
Head Breadth	C	C	C	C	C	C	C	C	C			C
Head Circumference	C	C	C	C	NC	NC	C	C	C	C		PC
Head Length	C	C	C	C	C		C	C	C			C
Heel-Ankle Circumference		C	C	C	NC			C	C			
Heel Breadth		CU	NC					PC	C			
Hip Breadth	PC	PC	PC	PC			PC	PC	C			
Hip Breadth, Sitting	CU	C	NC	NC			NC	C	C			C
Iliocristale Height		C		PC				C	C			
Interpupillary Breadth	NC	NC	NC	NC				NC	C			
Interscye I	C	C	C	NC			C	NC	C			
Interscye II								PC	C			
Knee Height, Midpatella				PC				C	C			
Knee Height, Sitting	CU	CU	NC	C	NC			NC	C			C
Lateral Fem Epicondyle Height								C	C			
Lateral Malleolus Height				PC			CU		C			
Lower Thigh Circumference	PC	PC	PC						C			
Menton-Sellion Length		C	NC	C		C	NC	NC	C	C		C
Neck Circumference	C	C	C	NC	C	NC			C			
Neck Circumference, Base									C	NC	NC	NC
Overhead Fingertip Reach, Sit		NC	C					PC	PC			
Palm Length								CU				
Popliteal Height	NC	NC	NC	NC			NC	NC	C			
Radiale-Stylian Length				C			C	C	C			
Shoulder Circumference	C	C	C	C			C	C	PC			
Shoulder-Elbow Length	NC	PC	PC	NC				PC	C			

TABLE F-1 Continued

Dimension	U.S. Navy Aviators 1964 (Gifford et al., 1965)	U.S. Army 1966 (White and Churchill, 1971)	U.S. Army Aviators 1970 (Churchill et al., 1971)	U.S. Air Force 1967 (Churchill et al., 1977)	Royal Air Force 1970/1971 (Bolton et al., 1973)	Canadian Forces 1974 (McCann et al., 1975)	U. S. Air Force Women 1968 (Clauser et al., 1972)	U.S. Army Women 1977 (Churchill et al., 1977)	U.S. Army 1988 (Gordon et al., 1989)	U.S. Marine Corps 1994 (Donelson and Gordon, 1996)	NHANES (CDC, 2012)	CAESAR (Blackwell et al., 2002)
Shoulder Length	NC	NC	NC	NC			NC	NC	C			
Sitting Height	C	C	C	C	NC		C	C	C	C		C
Sleeve Length: Spine-Wrist	C	NC	C	NC		C	PC	C	C	C		NC
Sleeve Outseam							NC			C		
Span						C		C	C			
Stature	C	C	C	C	NC	C	C	C	C	C	PC	PC
Suprasternale Height	C			C			C	C	C			
Tenth Rib Height												
Thigh Circumference	C	C	C	C	C		C	C	C		NC	NC
Thigh Clearance			NC	C	CU		NC	PC	C			
Thumbtip Reach	PC	PC	PC	PC	PC	PC	PC	PC	C			PC
Tibial Height												
Tragion-Top of Head	PC	PC	PC	PC	PC		PC	CU	PC			
Trochanterion Height				C			NC	C	C			
Vertical Trunk Circ (USA)	NC	PC	NC	NC		C	PC	PC	C			
Waist Back Length (Omphalion)		CU	CU	CU					PC			
Waist Breadth	NC			C			NC	NC	C			
Waist Circumference (Omph)		C	C	C		C			C	C	NC	
Waist Depth	NC			C			NC	NC	C			
Waist Front Length, Sitting				NC								
Waist Height (Omphalion)		C	C	C					C	C		
Weight	C	C	C	C	C	C	C	C	C	C	C	C
Wrist Circumference	NC	NC	NC	C	C		C	C	C			
Wrist Height				C								

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APPENDIX G

DEMOGRAPHIC/BIOGRAPHICAL FORM
(Reprint of original)*

FOR OFFICIAL USE ONLY WHEN COMPLETED. MAY CONTAIN PRIVACY ACT INFORMATION

US Army Anthropometric Survey (ANSUR II)
Natick Soldier Research, Development & Engineering Center Biographical Questionnaire

Thank you for helping to update the Army's anthropometric database.

INSTRUCTIONS:

Please respond to the questions on the following pages by completely filling in the bubble that corresponds with your answer. Please do not use checkmarks or Xs.

Marking Instructions
Use a No. 2 pencil, only. Do not use ink, ballpoint pen, or felt tip pens.
Make solid marks that fill the response completely.
Erase cleanly any marks that you want to change.
Make any write-in responses on the lines or boxes provided.
Correct: ● Incorrect: ☑ ☒ ☓ ☔

1. Last Name: _____ First Name: _____
2. What is your gender? Male Female
3. What is your current rank / grade?

Enlisted	Warrant Officer	Officer
① Private	① W01	① 2LT
② PV2	② CW2	② 1LT
③ PFC	③ CW3	③ CAPT
④ CPL	④ CW4	④ MAJ
④ SPC	⑤ CW5	⑤ LTC
⑤ SGT		⑥ COL
⑥ SSG		⑦ BG
⑦ SFC		⑧ MG
⑧ MSG		⑨ LTG
⑧ 1SG		⑩ GEN
⑨ SGM		
⑨ CSM		
⑨ SMA		
4. Today's date: (mm/dd/yyyy) ____ / ____ / ____
5. Installation: _____

* The same form was used for ANSUR II pilots and soldiers

6. Component: Regular Army Army Reserve Army National Guard

7. Branch you are in:

- Combat Arms Combat Service Support
 Combat Support (CSS incl: Med, Vet, Dental, JAG, Chaplain, etc.)

8. Please identify your UIC by number: (ex: WJM5BO, W1D1AA, W6DW04)

9. Please identify your primary MOS: (ex: 11B; 19D; 79R; 13B; 15P; 25X; 38B; 68A)

10. Please identify the state, territory, foreign country or military installation where you were born. _____

11. Your Population Subgroup: (please mark all that apply)

- White, not of Hispanic Origin
- Black, not of Hispanic Origin
- Hispanic (please mark all that apply)
- Mexican Latin American: _____
- Puerto Rican Other Hispanic: _____
- Cuban
- Asian or Pacific Islander (please mark all that apply)
- Chinese Japanese Korean
- Vietnamese Filipino Samoan
- Guamanian/Chamorro Melanesian Micronesian
- Polynesian Other Pacific Islander: _____
- Other Asian: _____
- Native American (please mark all that apply)
- Eskimo Aleut U.S./Canadian Tribe(s): _____
- Other (please mark all that apply)
- East / Asian Indian Arab or Middle Eastern
- Caribbean Islander Other: _____

What single group do you usually select on military questionnaires that offer only the following options?

- _____ White Black Hispanic Asian Pacific Islander Amer. Indian/Alaskan Native

12. Please identify the state, territory, foreign country or military installation where your MOTHER was born. _____

13. Your MOTHER'S Population Subgroup. (Please mark all that apply.)

- White, not of Hispanic Origin
- Black, not of Hispanic Origin
- Hispanic (please specify) _____
- Asian or Pacific Islander (please specify) _____
- Native American (please specify) _____
- Other (please specify) _____
- Don't know

14. Please identify the state, territory, foreign country or military installation where your FATHER was born. _____

15. Your FATHER'S Population Subgroup. (Please mark all that apply.)

- White, not of Hispanic Origin
- Black, not of Hispanic Origin
- Hispanic (please specify) _____
- Asian or Pacific Islander (please specify) _____
- Native American (please specify) _____
- Other (please specify) _____
- Don't know

16. When did you return from your last deployment?

- Never deployed
- Less than 1 month ago
- 1-3 months ago
- 4-6 months ago
- 7-12 months ago
- More than 1 year ago

17. Where were you last deployed?

- Iraq
- Other _____
- Afghanistan
- N/A (I have never deployed)

18. Are you scheduled for deployment in the near future?

- Not scheduled
- Less than 6 months from now
- More than 6 months from now
- Don't know

Continued on other side...

Write-in answers to the following questions on the lines provided.
 Fill in the bubbles below each question to correspond to the numbers you enter on the line.
 For numbers which are only 1 digit, fill in a zero in the first column. (See example)

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19. Age _____

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20. Birthdate:

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21. Height:

Feet _____	Inches _____
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22. Weight:

Pounds _____
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23. Writing preference:

○ Right hand ○ Left hand ○ Either hand (no preference)

Please do not write in the area below this line



APPENDIX H

GLOSSARY OF ANATOMICAL AND ANTHROPOMETRIC TERMS

Acromion - tip of the shoulder

Acromial process - an oblong portion of the shoulder blade at the top of the shoulder

Anatomical position - a standard position of the body to which all anatomical directions (e.g., superior, medial, anterior) are referenced (see Figure H-1)

Anterior - pertaining to the front of the body; to the opposite of posterior

Axilla - armpit

Bi - a prefix denoting connection with or relation to each of two symmetrically paired parts

Biceps - used to refer to the two heads of a muscle; the term is most commonly used to refer to the large muscle on the anterior surface of the upper arm (biceps brachii).

Canthus - a corner or angle formed by the meeting of the eyelids

Coronal plane - any vertical plane at right angles to the midsagittal plane; divides the body into anterior and posterior divisions (see Figure H-1)

Deltoid muscle - the muscle that forms the flesh of the lateral side of the upper third of the upper arm

Distal - farther from the trunk of the body, as opposed to proximal (see Figure H-1)

Dorsal - pertaining to the back of the body or one of its parts [on the hand, its top surface as opposed to its palmar surface and on the foot, its top surface as opposed to its plantar (bottom) surface].

Epicondyle - the bony prominence at the distal end of the humerus and femur (bones)

Extend - to move adjacent segments of a limb so that the angle between them is increased, as when the leg is straightened; as opposed to flex

Femoral epicondyle - the bony projections on either side of the distal end of the femur

Femur - the thigh bone

Flex - to move adjacent segments of a limb in such a direction as to bring the two parts together, as when the elbow is bent; as opposed to extend

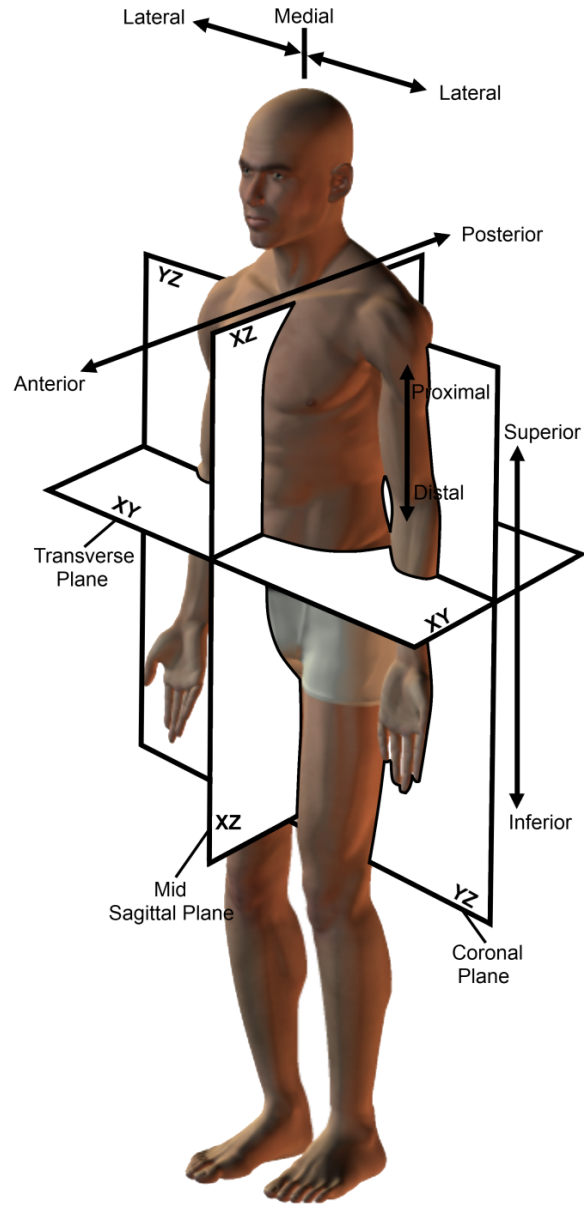


FIGURE H-1

Anatomical Position and Terminology

Frankfurt plane - the standard horizontal plane orientation of the head; the plane is established by a line passing through the right trigion (approximate earhole) and the lowest point of the right orbitale (eye socket)

Gluteal furrow - the crease at the juncture of the buttock and the thigh

Hyperextend - to overextend a limb or other part of the body

Iliac - pertaining to the ilium, one of the three fused bones that form one side of the pelvis

Iliac crest - the superior rim of the ilium

Inferior - below, in relation to another structure; lower (see Figure H-1)

Lateral - away from the midline of the body; as opposed to medial (see Figure H-1)

Malleoli - rounded bony projection on either side of the ankle; the lateral malleolus, on the outside of the ankle, is at the distal end of the fibula (one of the two bones of the calf); the medial malleolus, on the inside of the ankle, is at the distal end of the tibia (the shin bone)

Mandible - the lower jawbone

Mastoid process - lowest bony projection behind and below the ear—best felt immediately behind the earlobe

Medial - lying near or toward the midline of the body; as opposed to lateral (see Figure H-1)

Metacarpophalangeal joint - a joint (knuckle) formed by the juncture of a finger bone (phalanx) with the palm bone (metacarpal)

Metatarsophalangeal joint - a joint formed by the juncture of a toe bone (phalanx) with the foot bone (metatarsal)

Midsagittal - the vertical plane that divides the body into equal right and left halves (see Figure H-1)

Olecranon - the proximal end of the ulna (the elbow)

Omphalion - the navel

Orbit – the bony socket in which the eye rests

Palmar - pertaining to the palm side of the hand; as opposed to its dorsal surface

Patella - the kneecap

Phalanx - a finger or toe bone

Popliteal fossa - dorsal juncture of the calf and thigh; back of the knee

Posterior - pertaining to the back of the body; as opposed to anterior (see Figure H-1)

Proximal - closer to the trunk of the body; as opposed to distal (see Figure H-1)

Radius - the bone of the forearm on the thumb side of the arm

Scye - a tailoring term referring to the armhole of a garment

Sternum - the breast bone

Stylian - the lowest point at the bottom of the radius (bone)

Superior - above, in relation to another structure (see Figure H-1)

Supra - prefix designating above or on

Supraorbital ridges - the brow ridges above the eye sockets at the bottom of the forehead

Thelion - the center of the nipple on men

Tibia - the shin bone

Tragion - the juncture of the top of the cartilaginous flap of the ear with the head

Tragus - the cartilaginous flap of the ear near the earhole

Trapezius - the large muscle that originates on the neck and the upper half of the back and converges on the shoulder between midshoulder and acromion

Trochanter - a point in the center of the lateral side of the large prominence at the top of the thigh bone (femur), located on a sitting subject

Ventral - the front or inside surface

Vertebra - a bone of the spine; in humans there are 7 cervical (neck), 12 thoracic (chest), 5 lumbar (lower back), 5 sacral (fused), and 4 caudal (tail, also fused) vertebrae

Zygomatic arch - the bony arch below and to the side of the orbit of the skull extending horizontally along the side of the head from the cheekbone (the zygomatic bone) nearly to the external ear

Zygomatic bone - a bone of the face underlying the upper part of the cheek

Appendix I

Summary Statistics for Female Pilots Measured in ANSUR II (n=42), Weighted to Match DMDC Female Pilot Age/Race Frequencies

As discussed in Chapter III, too few female pilots were measured in ANSUR II to obtain reliable statistical values for ergonomic design and acquisition applications. In addition to the small sample size, all but one of the female pilots came from Ft. Rucker, which also raises the question of sampling bias since female pilots from operational aviation units are not represented. Further, samples this small may have body dimensions that are not normally distributed even though they might ordinarily be normally distributed in larger samples. As a consequence of these limitations, the actual female pilot data ARE NOT recommended for ergonomic design, statistical modeling, or other acquisition applications. The augmented female pilot database in the body of this report should be used instead.

The statistics in Table I-1 are provided for information only, and they were calculated using the sampling weights presented in Table 15.

TABLE I-1

Summary Statistics for 42 Female Pilots Measured in ANSUR II
(values in mm and kg)

Body Dimension	N	Min	Mean	Std. Dev.	Max
Abdominal extension depth sitting	42	163	217.1	34.35	306
Acromial height	42	1262	1346.3	55.15	1488
Acromial height sitting	42	292	312.7	14.56	352
Acromion radiale length	42	66	107.4	17.78	141
Ankle circumference	42	193	214.7	13.92	266
Axilla height	42	1175	1253.2	53.51	1393
Ball of foot circumference	42	208	229.1	11.12	264
Ball of foot length	42	164	181.2	9.90	200
Biacromial breadth	42	327	366.3	16.24	400
Biceps circumference flexed	42	247	307.1	35.09	392
Bicristal breadth	42	235	273.2	20.35	334
Bideltoid breadth	42	386	449.2	34.58	546
Bimalleolar breadth	42	64	67.4	3.08	76
Bitragion chin arc	42	284	308.4	12.80	342
Bitragion submandibular arc	42	261	288.4	13.15	322
Bizygomatic breadth	42	121	132.2	5.79	146
Buttock circumference	42	845	1006.5	77.41	1200
Buttock depth	42	173	226.2	28.10	303

Body Dimension	N	Min	Mean	Std. Dev.	Max
Buttock height	42	766	842.7	38.70	939
Buttock knee length	42	542	587.2	22.80	648
Buttock popliteal length	42	451	486.9	18.00	526
Calf circumference	42	310	369.5	27.97	444
Cervicale height	42	1314	1412.7	55.93	1550
Chest breadth	42	232	266.5	19.36	328
Chest circumference	42	798	939.2	93.73	1227
Chest depth	42	188	240.3	29.26	315
Chest height	42	1093	1187.3	55.95	1330
Crotch height	42	724	787.9	36.98	878
Crotch length omphalion	42	533	627.9	42.02	747
Crotch length posterior omphalion	42	289	343.3	24.02	388
Ear breadth	42	27	31.7	2.55	40
Ear length	42	54	61.8	3.96	68
Ear protrusion	42	16	20.4	2.29	26
Elbow rest height	42	185	241.2	23.57	292
Eye height sitting	42	705	766.4	23.88	818
Foot breadth horizontal	42	82	91.9	4.45	104
Foot length	42	222	245.2	13.21	271
Forearm center of grip length	42	292	316.7	16.23	355
Forearm circumference flexed	42	239	266.4	20.64	326
Forearm-forearm breadth	42	418	496.8	53.95	658
Forearm hand length	42	405	438.4	20.10	487
Functional leg length	42	962	1036.9	42.92	1133
Hand breadth	42	67	78.1	4.57	89
Hand circumference	42	163	186.1	10.54	214
Hand length	42	162	177.7	10.15	200
Head breadth	42	137	146.3	4.68	158
Head circumference	42	528	558.8	15.83	602
Head length	42	177	191.1	6.94	206
Heel ankle circumference	42	285	306.7	14.44	348
Heel breadth	42	56	66.2	4.74	78
Hip breadth	42	305	351.3	23.58	400
Hip breadth sitting	42	335	390.5	30.65	473
Iliocristale height	42	924	1001.3	45.83	1114
Interpupillary breadth	42	525	604.9	39.15	685
Interscye I	42	314	370.6	31.25	440
Interscye II	42	353	396.3	26.24	455

Body Dimension	N	Min	Mean	Std. Dev.	Max
Knee height midpatella	42	414	452.5	22.32	505
Knee height sitting	42	478	512.7	23.22	565
Lateral femoral epicondyle height	42	434	472.3	21.82	525
Lateral malleolus height	42	54	64.4	4.96	78
Lower thigh circumference	42	325	397.3	33.74	490
Menton sellion length	42	94	111.3	6.17	124
Neck circumference	42	294	328.4	21.27	378
Neck circumference base	42	333	374.8	22.99	445
Overhead fingertip reach sitting	42	1209	1313.5	57.09	1451
Palm length	42	98	106.8	5.73	118
Popliteal height	42	352	392.0	20.47	445
Radiale stylium length	42	224	240.5	11.32	264
Shoulder circumference	42	925	1032.4	55.93	1190
Shoulder elbow length	42	310	335.0	15.49	374
Shoulder length	42	118	135.0	8.62	152
Sitting height	42	810	873.4	29.05	937
Sleeve length spine wrist	42	757	810.1	30.14	882
Sleeve outseam	42	497	544.4	25.60	616
Span	42	1554	1657.8	76.03	1853
Stature	42	1548	1647.6	61.15	1782
Suprasternale height	42	1252	1346.4	53.96	1478
Tenth rib height	42	970	1054.5	48.55	1173
Thigh circumference	42	478	599.2	57.46	727
Thigh clearance	42	135	164.2	13.15	203
Thumbtip reach	42	655	735.2	51.72	857
Tibial height	42	394	436.4	21.73	485
Tragion top of head	42	114	126.8	6.20	141
Trochanterion height	42	778	846.3	37.52	935
Vertical trunk circumference USA	42	1402	1557.6	71.00	1806
Waist back length	42	400	427.2	16.71	460
Waist breadth	42	244	297.7	31.27	393
Waist circumference	42	677	852.5	100.95	1127
Waist depth	42	145	196.0	29.69	279
Waist front length sitting	42	312	357.0	19.79	410
Waist height omphalion	42	912	988.3	46.14	1089
Weight (kg)	42	48.8	67.0	11.74	105.9
Wrist circumference	42	142	156.2	8.47	182
Wrist height	42	723	806.3	36.79	897

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APPENDIX J

VALIDATION STUDIES OF METHODS USED IN THE CREATION OF AUGMENTED/SIMULATED FEMALE PILOT DATABASES

Background:

Large scale acquisition of anthropometric data on female pilots is always difficult because females are a small minority of Army pilots, and because pilots are geographically dispersed with their units. This creates a serious technological challenge because sex-specific design criteria for protective clothing & equipment and crewstations are very important in Army acquisition decisions, yet the sample sizes needed to provide design values with the statistical confidence and precision needed for acquisition trade-off decisions are virtually impossible to achieve. As a result, female pilot databases for engineering applications are nearly always simulated or augmented, comprising a combination of actual pilot measurements and measurements of military females who “could have been” pilots.

The statistical validity of simulated or augmented female pilot databases is an important consideration that must be scientifically evaluated given the serious human safety implications and taxpayer costs inherent in acquisition decisions. Because there are relatively large samples of male pilots usually available, a powerful approach to validation testing is to apply the methods used to simulate female pilots to male ground troops, and then compare those results against statistics from actual male pilots. Another approach is to apply the results of methods used to simulate female pilots using female ground troops against actual samples of female pilots. The latter approach, however, requires a reasonably large sample of actual female pilots, which is difficult to obtain for reasons already mentioned.

This appendix summarizes the results of two previous validation studies using the 1988 ANSUR data and presents the results of a new validation study using the 2012 ANSUR II data.

1988 ANSUR Female Pilot Database Validation:

In the 1988 ANSUR survey, 487 male pilots were measured, but only 8 female pilots could be accessed. Because there were too few female pilots to derive statistically valid design parameters, a female pilot database was created by selecting only those ANSUR females meeting the prevailing anthropometric requirements for Army flight training (also known as IERW-- Initial Entry Rotary Wing criteria: Span \geq 164 cm; Sitting Height \leq 102 cm; Crotch Height \geq 75 cm) and then using stratified random sampling afterward to match the race/age distributions of the contemporary Army female pilot population. The result was a female pilot database with n=334 subjects (Donelson & Gordon, 1991).

The validity of the 1988 anthropometric truncation/demographic matching approach used to create a female pilot database was tested prior to publication by applying exactly the same techniques to the ANSUR male ground troop database

(Gordon et al., 1989) to create a simulated male pilot database (n=1011). The resulting anthropometric distributions were then compared against those of the actual male pilot database (n=487) reported by Gordon and Donelson (1991). Since subjects in both databases were measured by the same measuring team in the same anthropometric survey, this situation provided a well-controlled test of the method's ability to replicate valid anthropometric distributions for pilots.

Simulated and Actual pilot statistics were compared using t-tests for all 132 head and body dimensions measured in the 1988 ANSUR survey. Of the 132 dimensions tested, differences between simulated and actual pilot means were statistically significant for only 12 dimensions. Note that 12 of 132 tests is 9%, relative to the 5% expected by chance alone after Bonferroni correction. Each of the dimensions for which a statistically significant difference was found is listed in Table J-1 below.

Table J-1
Significant differences after Bonferroni Correction for 132 t-tests

Dimension*	Mean (mm) Simulated Male Pilots (n=1011)	Mean (mm) Actual Male Pilots (n=487)	t value	Probability
Abdominal Extension Depth (1)	248.56	243.11	3.59	.000
Bimalleolar Breadth (13)	72.93	72.15	3.80	.000
Buttock Depth (24)	251.71	247.33	4.00	.000
Crotch Length Posterior (41)	392.62	386.10	4.42	.000
Heel Breadth (64)	68.94	67.83	4.50	.000
Shoulder Length (92)	151.97	154.15	-3.73	.000
Sleeve Length: Spine - Scye (95)	230.62	234.97	-5.38	.000
Thumb Breadth (105)	24.24	23.85	5.43	.000
Waist Height, Sitting (Omphalion) (121)	237.01	241.30	-5.07	.000
Waist – Hip Length (122)	179.50	183.99	-4.04	.000
Wrist – Center of Grip Length (125)	69.07	68.01	4.04	.000
Wrist – Wall Length, Extended (132)	747.79	739.01	4.61	.000

*Numbers in parentheses correspond to those in Gordon et al (1989) and Donelson and Gordon (1991)

As can be seen in Table J-1, all differences are of very small magnitude. This happens because ANSUR's large sample sizes permit reliable detection of small differences. Such differences may or may not have biological or engineering relevance. One way to judge the relative importance of statistically significant differences of small magnitude in large samples is to compare their magnitudes against those of the mean

absolute inter-observer error recorded for each dimension during data collection – which is a measure of “noise” in the database. Table J-2 compares the magnitudes of statistically significant differences against the actual interobserver error means reported for male ANSUR subjects by Gordon and colleagues (1989). Of the 12 dimensions with statistically significant differences, only 1 exhibits a difference that is substantially larger than one would expect due to observer error alone (Waist – Hip Length). The magnitude of the Waist – Hip Length difference between simulated and actual pilot database means is still relatively small: 4.5 mm, which is less than ¼ of an inch.

Table J-2

Magnitude of statistically significant differences compared to observer error

Dimension*	Simulated-Actual Difference (in mm)	ANSUR Males Mean Error (in mm)
Abdominal Extension Depth (1)	5.45	4.00
Bimalleolar Breadth (13)	.78	.62
Buttock Depth (24)	4.38	4.22
Crotch Length Posterior (41)	6.52	5.91
Heel Breadth (64)	1.11	1.06
Shoulder Length (92)	2.18	2.15
Sleeve Length: Spine - Scye (95)	4.35	6.24
Thumb Breadth (105)	.39	.20
Waist Height, Sitting (Omphalion) (121)	4.29	3.17
Waist – Hip Length (122)	4.49	1.92
Wrist – Center of Grip Length (125)	1.06	1.47
Wrist – Wall Length, Extended (132)	8.78	11.60

*Numbers in parentheses correspond to those in Gordon et al (1989) and Donelson and Gordon (1991)

The results of this study led Donelson and Gordon to conclude that the methods used to simulate the 1988 Female Pilot Database were sound, and so the simulated pilot database was published with the actual male pilot database in the ANSUR Aviator Technical Report (Donelson & Gordon, 1991) and used as the primary reference for Army pilot design and procurement decisions thereafter.

Validation of Simulated Databases Using Stature as a Weighting Criterion:

Something that concerned the creators (Donelson & Gordon, 1991) and users of the 1988 Female Pilot database was that the simulation method relied heavily on eliminating ground troop subjects who did not meet the IERW anthropometric criteria for flight training although it was widely believed that many female pilots had received waivers to IERW anthropometric requirements. No data were available at the time

regarding the extent of female pilot waivers, but analysis of the 1988 ANSUR male pilots indicated that only 5/487 or 1% of male survey participants did not meet all three anthropometric criteria for initial flight training. If in fact female pilots received waivers at a much higher rate, then it was possible that actual female pilots had smaller limb lengths than would be reflected in simulated female databases derived from a method based on compliance with the anthropometric criteria for flight training.

Fortunately, at USAARL (US Army Aeromedical Research Laboratory), Mr. Joseph Licina obtained funding for a landmark 1995 study that specifically focused on female pilots: the U.S. Army Female Aviator Anthropometric, Clothing, and Cockpit Compatibility Study. The anthropometric portion of this study (Gordon & Licina, 1999) included body measurements on n=78 female pilots, most of whom flew to Ft. Rucker specifically to participate in the study. Anthropometric data on a relatively large cohort of actual female pilots offered an unusual opportunity to extend and test the results of methods for simulating female pilots against a sample of actual female pilots (Gordon, 2000).

Data from the 1995 Female Aviator study indicated that at least 12% of the n=78 pilots studied were flying on waivers to the IERW requirements because they had crotch height measurements < 750 mm (Span was not recorded in 1995 so the percentage flying on waivers in 1995 may have been higher). This is a relatively high percentage of waivers because less than 1% of the 478 male pilots measured in the 1988 ANSUR survey were outside the three IERW anthropometric criteria. This result validated concerns that simulated female pilot databases based on strict elimination of military subjects failing to meet IERW criteria might overestimate the body size of actual female pilots. The 1995 Female Aviator study provided an opportunity to test an alternative approach to creating female databases for aviator design criteria: weighting subjects using centiles of the stature distribution of actual pilots. The reasoning behind this approach was twofold: 1) the IERW anthropometric criteria are based on Span, Sitting Height, and crotch Height – all of which are well correlated with stature, and 2) stature can, at least theoretically, be obtained from pilot medical records so that population stature distributions could be established for statistical weighting purposes. The new matching approach was tested twice: once using male 1988 ANSUR ground troops to simulate male 1988 pilots, and then using 1988 female ANSUR ground troops to simulate 1995 female pilots (Gordon, 2000).

With <1% of male pilots flying on waivers to IERW anthropometric criteria, the relevant question was whether the addition of subject weighting criteria based on stature centiles could improve on the results previously obtained using only IERW criteria selection. In this test, the ANSUR 1988 datapool of male ground troops (n=5079) was screened using IERW anthropometric criteria (n=2059 remaining) then weighted to match the ANSUR 1988 male pilot database (n=487) using 7 age categories (17-20, 21-25, 26-30, 31-35, 36-40, 41-45, 46-65), 6 race categories (White, Black, Hispanic, Asian, Native American, Other), and 10 stature categories (centiles of actual male pilots). Fifteen body dimensions important to cockpit and personal protective equipment design were studied in order to reduce the bonferroni adjustment for 132 body dimensions tested in 1988 and therefore make the t-test more sensitive to differences in the means. The results are reported in Table J-3, where it can be seen

that even with a more sensitive t-test, only one of the 15 body dimensions tested was significantly different: foot breadth horizontal, with a difference of .8mm between means, and a probability of $p=.0027$ (reported as .003 in Table J-3 due to rounding). The magnitude of mean difference, 0.8 mm, is slightly larger than the ANSUR 1988 observer error of 0.6 mm, but still smaller than the measuring device precision: 1.0 mm.

Table J-3

Results of 1988 Male Pilot Simulation Using Age, Race, and Stature Weighting

Dimension (mm)	Model (n=2059)		Pilots (n=487)		Two-sided test	
	Mean	S. D.	Mean	S. D.	t	P*
Bizygomatic Br	141.2	5.8	141.8	5.2	-1.90	0.052
Buttock Circ	998.1	59.3	991.5	55.0	2.25	0.024
Chest Circ	1013.1	68.7	1009.2	59.6	1.14	0.257
Crotch Height	836.5	40.2	841.8	42.3	-2.59	0.010
Foot Br Horizontal	100.9	5.4	100.1	4.8	2.95	0.003
Foot Length	269.5	12.5	268.5	11.8	1.67	0.095
Hand Length	193.4	8.7	194.5	8.5	-2.58	0.010
Head Circ	569.4	15.6	570.6	13.6	-1.55	0.120
Face Length	122.2	6.4	122.4	6.3	-0.48	0.633
Sitting Height	926.0	32.2	929.5	33.3	-2.13	0.033
Sleeve Outseam	603.0	27.4	601.4	29.9	1.11	0.268
Stature	1768.6	61.3	1771.0	64.8	-0.77	0.443
Waist Circ, omphalion	899.2	85.1	888.4	75.9	2.56	0.011
Waist Ht, omphalion	1061.4	45.9	1065.0	48.1	-1.52	0.129
Weight (kg)	81.1	10.9	80.0	9.6	2.03	0.042

*P values <.003 are significant at the .05 level after Bonferroni adjustment

A similar test was done using the 1995 Female Aviator study data to represent the target female pilot population, and the 1988 ANSUR ground troop females for pilot simulation. The validation test was limited to White females because 74 of 78 female pilots in the 1995 female aviator study were White. In addition, to avoid empty sampling cells in the target database, 4 age categories were used (21-25, 26-30, 31-35, 36-46) and 5 stature categories rather than 10. The 5 stature intervals were equally divided between the minimum of 1995 female aviator stature and maximum of 1988 female ground troop stature, using the reasoning that ground troop females shorter than actual female pilots would be too small to reach aircraft controls, but that ground troop females taller than actual female pilots would be able to reach aircraft controls (but none exceeded the IERW maximum for sitting height needed to ensure canopy clearance). Table J-4 reports those results.

Table J-4

Results of 1995 Female Pilot Simulation Using Age, Race, & Stature Weighting

Dimension (mm)	Model (n=836)		Pilots (n=74)		Two-sided test	
	Mean	S.D.	Mean	S.D.	t	P
Bizygomatic Br	131.1	5.0	131.5	4.7	-0.66	0.508
Buttock Circ	986.1	61.8	1000.4	65.8	-1.90	0.058
Chest Circ	924.6	70.0	930.4	65.6	-0.69	0.493
Crotch Height	775.9	39.9	774.8	31.9	0.23	0.818
Foot Br Horizontal	89.7	4.6	91.3	4.3	-2.88	0.004
Foot Length	244.6	11.2	244.2	11.4	0.29	0.769
Hand Length	179.5	8.1	179.3	10.4	0.20	0.843
Head Circ	546.7	14.0	563.2	15.7	-9.62	0.000
Face Length	113.4	6.2	114.8	5.8	-1.87	0.062
Sitting Height	879.5	30.3	883.0	28.6	-0.96	0.339
Sleeve Outseam	549.1	27.2	546.1	22.2	0.92	0.357
Stature	1663.3	60.3	1666.3	54.3	-0.41	0.679
Waist Circ, omphalion	816.7	91.9	818.2	82.7	-0.14	0.892
Waist Ht, omphalion	997.6	45.4	1001.4	40.7	-0.70	0.487
Weight (kg)	64.7	9.0	64.3	8.8	0.33	0.740

*P values <.003 are significant at the .05 level after Bonferroni adjustment

As can be seen in Table J-4, the only significant difference between the 1995 female pilots studied and the simulated database is in Head Circumference, and the difference between means is substantial: 16.5 mm, when the ANSUR 1988 observer error mean for Head circumference was 1.3 mm. It is possible that female pilots do have larger heads than ground troops, as previous small scale studies at USAARL have reported that pilot head circumferences were larger than those reported in the ANSUR 1988 Technical Reports (Gordon et al., 1989; Donelson & Gordon 1991). Another possibility is that head circumference measurements were done differently in the USAARL 1995 study whenever hairstyles influenced the measurement.

The test results for a modified pilot simulation method utilizing stature in subject weighting was reported by Gordon (2000) and suggested the following conclusions: a) for males, when reliable stature data on pilots can be obtained, the use of stature as a weighting criterion along with age and race can improve results based on demographic weighting alone; b) for females, when reliable stature data on pilots can be obtained, the use of stature as a weighting criterion along with age and race is a feasible approach to simulating female pilots, and preferable to the use of IERW anthropometric criteria, which are frequently waived in the case of female pilot candidates.

Validating an ANSUR II Database for Female Pilot Design Criteria:

As mentioned previously in Chapter III, the ANSUR II survey obtained anthropometric data on 42 female pilots, which is a great improvement over the small number of female pilots measured in the ANSUR 1988 survey, but still far too small a

sample on which to base design criteria. In addition, 16 of 42 female pilots (38.10%) had at least one body dimension that was outside the IERW anthropometric criteria for flight training, indicating that IERW criteria should definitely not be used in developing a female pilot design database. Instead, since reliable stature data for the contemporary female pilot population proved far more difficult to obtain than previously thought, actual minimum values for the measured female pilots (n=42) were used as the lower limits for Crotch Height and Span criteria. Two other considerations contributed to the methods used in developing a female aviator design database that are described in Chapter III. Firstly, weight for height and body fat limits have not been stringently enforced in the past decade due to the need to retain experienced military personnel for combat operations in Iraq and Afghanistan; this has resulted in substantial increases in mean body weight and BMI in Army personnel (Gordon et al., 2008) and USAF pilots (Choi et al., 2009). Preliminary studies and anecdotal evidence suggest that weight increases are greater in enlisted personnel than in officers. These facts suggested that only officers/warrant officers be considered eligible for the female pilot database, and that their BMI maximum be no greater than actually measured female pilots. Secondly, since 42 actual female pilots were measured, it made sense to create an augmented female pilot database that included all female pilots in addition to ground troops who could be pilots, rather than creating a completely simulated female pilot database that may or may not have included all the actual female pilots. Table J-5 lists the criteria.

Table J-5
Criteria for Inclusion in the Augmented Female Pilot Database

Inclusion Criteria	Selection algorithm(s)	Result
Actual Female Pilots	Include all	n=42
Non-Pilot Females	No missing data	
Rank	Officers & Warrant Officers	
Span	Span \geq 1554*	n=353
Sitting Height	Sitting Height \leq 1020	
Crotch Height	Crotch Height \geq 724*	
Body Mass Index	BMI \leq 36.2*	

* Selection value based on actual min/max of ANSUR II female pilots rather than on anthropometric limits in AR40-501.

Table J-5 summarizes the methods used in selecting subjects for the ANSUR II female pilot database that are discussed above. After selection, the subjects were weighted by age and race to match prevailing DMDC female pilot census data (see Table 17) before summary statistics were calculated.

Methods for validation testing of the female pilot database were similar to previous validation studies in that statistics from actual male pilots were used to compare to those obtained from male ground troop subjects selected and matched using the same criteria that had been used to create the female pilot database. One notable exception to this approach in the case of the ANSUR II female pilot database validation is important. Instead of including all the actual male pilots in an augmented database as was done with the ANSUR II female pilot database, only male ground troops were included in the simulated database used in validation testing. The reason for this was that the large numbers of actual male pilots measured in ANSUR II (n=977) would have dominated (977/1419 = 69%) a simulated male pilot database, whereas the small number of female pilots measured (42/395) represented only 10.6%. By excluding all actual male pilots from the simulated male pilot validation test sample, the validation test was more conservative and more informative than it would have been otherwise. As in previous studies, the simulated and actual pilot databases were weighted by age/sex/race to match prevailing DMDC Army census data on pilots. Results are shown in Table J-6.

Table J-6
Validation Test Results for ANSUR II Female Pilot Database Methods

	Simulated Male Pilots (n=442)		Actual Male Pilots (n=977)		t-tests, unequal variance		
	mean	sd	mean	sd	Δ(mm)	t	p
Stature (mm)	1771.8	66.19	1775.0	65.17	3.2	.8391	.4015
Weight (kg)	87.52	11.607	88.22	12.614	0.7	1.0017	.3167
Span (mm)	1815.5	78.41	1809.7	75.49	-5.8	-1.3301	.1837
Sitting Height (mm)	927.7	33.87	928.6	33.76	0.9	.4680	.6399
Crotch Height (mm)	853.4	43.81	860.3	41.93	6.9*	2.8198	.0049
Chest Circ (mm)	1081.0	70.89	1082.1	77.78	1.1	.2477	.8044
Waist Circ (mm)	956.3	89.73	964.4	95.62	8.1	1.5122	.1307
Buttock Circ (mm)	1028.3	59.75	1033.3	64.96	5.0	1.3812	.1674

* ANSUR II male MAD interobserver error for crotch height was 6.2 mm

As can be seen in Table J-6, only one of the eight critical sizing/design dimensions tested was significantly different between the actual male pilots and the simulated pilot database: crotch height. The magnitude of the crotch height mean difference was 6.9 mm, whereas the ANSUR II male observer error mean was 6.2 mm. So the difference, while statistically significant, is not large in a practical sense. It can be concluded that the ANSUR II augmented female pilot database is sufficiently reliable

for use in all design decisions related to female pilot cockpit criteria and protective clothing design.

It is important to note that obtaining reliable stature measurements for *all* Army female pilots in the 2012 population proved more difficult than anticipated, so weighting of the augmented female pilot database using centile stature data from actual female pilots was not possible for the ANSUR II female pilot database. Because it is unlikely that females will comprise a large number of Army pilots in the near future, creation of engineering databases representing the female pilot population is likely to remain a challenge for some years. Thus it would be highly desirable to conduct a future Army research study that directly compares the relative importance of all the selection criteria and weighting approaches described in recent studies in order to recommend an optimal combination of these to maximize the reliability of future Army female pilot databases.

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