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Anthropometric Profile and Its Influence on the Vital Signs of Baja California College Students

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***Abstract*—**An anthropometric study applied to 1,115 students of the Faculty of Chemical Sciences and Engineering of the Autonomous University of California. Thirteen individual measurements were taken in a sitting position. The results obtained allow forming a reliable anthropometric database for statistical studies and analysis and inferences of specific distributions, so the opinion of experts in occupational medicine recommendations may emit to reduce risks resulting in an alteration of the vital signs during the execution of their school activities. Another use of these analyses is to use them as a reliable reference for future deeper research, to the design of spaces, tools, utensils, workstations, with anthropometric dimensions and ergonomic characteristics suitable to use.

***Keywords*—**Anthropometry, vital signs, students.

I. Introduction

THE dimensions of the human body have been a recurring theme throughout the history of mankind; a widely known example is that of the drawing of Leonardo da Vinci, where the figure of a man is circumscribed within a circle, where it described the proportions of the "perfect" human being and a picture. However, the differences between the proportions and dimensions of human beings did not allow finding a precise model to describe the size and proportions of the human [1].

We know that not all humans have these proportions so we need to make population anthropometric studies to identify the range of varieties in the proportions of the body. Anthropometric studies are an essential part of the ergonomics and refer to the measurements of the human body to know its size, shape, proportions of its members, in order to know your muscle strength and ability to work under specific conditions.

These studies are required to determine the physical size at the time of designing equipment and tools of production processes or security, industrial and architectural spaces suitable for a given population, whether male or female, or taking into account age. Anthropometric studies in Mexico are very scarce, and the sources of information on the subject, only are measures that in the particular case of the city of Tijuana, Baja California, for a population of young adults [between 17 and 26 years old], is not. Anthropometric study refers to this population in specific, including both sexes within this age range. He is recognized as profile anthropometric, to the basic body measurements of a studied population data set. He was the corresponding descriptive statistics for data according to age and sex. The range of observed ages ranged between 17 and 26 years of age.

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II. Anthropometric Evaluation

The work is proposed as a prospective pilot study supported in the direct observation and recording of measurements; a measurement module was installed in the laboratory, 104 building 6G of the school of chemical sciences and engineering of the UABC Tijuana campus. Were trained group of individuals to develop their job, understand work rules and procedures for filling the anthropometric card. Although the data submitted and obtained in the school 2013-2 cycle, the team continues to capture measurements permanently. These data are being incorporated in the database.

A. Scientific Validity Methodologies Used

The protocol proposed by the ISAK is used for this study. In the case of an industry maquiladora with which our University has a specific agreement of a collaborating anthropometrist's team obtained access only to perform protocol restricted profile of 13 variables [1].

Protocols for dimensioning of the equipment design are likewise taken Coupled-Pheasant since data are easily combinable. They have clear restricted profile must develop a format for recording data. In the literature there are many choices of formats, you can use several of them; however, more importantly the technique to be used for the lifting of the measurements. The sequence of measurements must be strictly adhered to reduce the time and that the quality and clarity of the work be best. Once data are captured in a format [or calculation template] is the corresponding statistical treatment for the generation of the percentiles, also another template can be used for data conversion. Finally, anthropometric tables that are generated will allow calculating the values required by the designs of the stations [2].

B. Software

i. *Somatotype - calculation and analysis V1.1.* A new program of the PDF platform easy to use comprehensive designed to calculate individual somatotype / group, import and export data from somatotype. Displays reports,

statistics, somato-plots, categories and comparisons of individuals / groups.

ii. *HC_ Stype Calculation - 03.xls.* A simple program to calculate the somatotype of Heath Carter Anthropometry. Useful for individual data or group.

iii. *LifeSize. V1.0.* developed by T. Olds and K. Norton. It is a tool that helps in collecting and anthropometric analysis has a database containing the rules of Somatotype, body fat and skin folds for the general population and specific sport groups. It is an explorative and interactive educational tool for students Anthropometry. Is what is used in this work [3]

iv. *B.O.R.I.S.* Developed by Pedro Alexander. Is software in Spanish for anthropometric evaluation including Somatotype.

C. Data Extraction

This activity was carried out using the ISAK Handbook of Ki anthropometry. The samples were reviewed separately. As we know that there will be technical errors in the measurements is estimated 5% tolerance in the measurement of the folds and 2% for the rest of the measurements of the human body. Taking advantage of the amount of data, defined Somatotype [average] each of the built-in groups and the coefficient of dispersion between groups [SDD], the analysis is complemented by a statistical procedure.

The data are studied through the software SPSS 13.0 and 16.0 MINITAB. It hopes that the Kolmogorov-Smirnov test results reveal a normal distribution in all of the captured variables, therefore are relied on the Student T test to establish differences between the groups. A correlation analysis is generated to determine the type and level of relationship between the variables.

Any case, established a confidence interval of 95% for all cases. Although there is no specific consensus of determined procedure must be followed for the analysis and construction of the somato-Charter, here is used the calculation: Heath-Carter [http://www.somatotype.org/] attempting to always numerically describe the morphological configuration of women workers at the time of be studied.

Developers ensure that the type of people is influenced by external aspects such as: age, gender, growth, physical activity, food, environmental factors, socio-cultural environment and race. Thus, following the Protocol, Somato-letter is generated after obtaining the somatotype indexes [EN, ME, EC].

They are calculated two ordinates [x; and y]:

$$x = EC - EN; y = 2ME - (EC + EN) \quad (1)$$

With this somatotype can be located on a flat die. The author [8] refers us to a brief explanation of this concept when he mentions that an EC > in, gives a positive result in the x axis; to the right, indicating greater mass.

While moving to the left suggests more subcutaneous adiposity. To the axis of the Y and the supremacy of the ME on the EC and in takes the result towards the positive side indicating greater muscle bone mass. More full-bodied, a higher value on axis and.

III. Resources Used

He was the lifting of data with the support of a group of students of Industrial Engineering, who have studied the subjects of probability and statistics, Industrial statistics, ergonomics, engineering methods and study of the work and the materials related to the topic, forming a team of 19 people, three of them close to graduating career [two undergraduate and one graduate - conacyt scholarship]. Eleven of these research assistants are members of the first [Chapter University] CAPUNI of the SEMAC at UABC. Among the main objectives of this group is the spread the culture of prevention through the implementation of this type of work and its publication in scientific journals [6]. In addition to collecting data, measurements and statistical analysis of the same, they supported in the structuring of this writing. The measurements were made using materials and equipment listed below.

Data in formats printed, emptying the information in a database in Excel were collected.

IV. Theoretical Framework

Action research corresponds to the new way of conceiving the teaching and learning, characterized these as active productions full of meaning for the learner. Your proposal is a guide and not a recipe to be done mechanically; it dominates the rationality of the actions involved in the investigation - action or participatory research, fundamental about learning, teaching and assessment practices [4].

Before teachers who feel threatened by the theory, as something alien elaborated by experts, the research shows that knowledge is part of the practice; also the research-action retrieves the sense of usefulness of the knowledge for the teachers themselves [5].

For teachers, the theory is a challenge to their own knowledge; from there the way is to establish a dialogue between knowledge. However, the risk of the epistemological subordination of professors to the University culture is present. For Elliot, the research aims to improve the practice and not make the production of knowledge an end in itself; in this way, the production of knowledge is subordinate to the improvement of the practice.

Action research is not a solitary activity of teachers, but it involves groups or communities, which must reflect on curricular structures that shape the pedagogy.

Some authors [8] have made contributions of practical guides for research in this field reformulating the model, made a proposal that part to identify a general idea, it continues in recognition and discovery of facts, the realization of a general planning and subsequent implementation and evaluation processes, operating in a spiral.

In this model, it is possible to revise the initial idea and open to new discoveries. This model is the theoretical core of the developed research involving students as researchers

elements that can obtain certain information and reliable for the development of practices in its ergonomics-related subjects.

The reader should know that a technique which forms an integral part of the Ki anthropometry, also known as anthropometric technique and is used to capture different dimensions of the human body with the objective of estimating body composition [CC] through a protocol of measurement as well as the implementation of various equations for the estimation of the CC. This is a doubly indirect method, as well as the assessment of body composition techniques most used in practice [5].

An anthropometric analysis in the manufacturing field gives the opportunity to control those parameters physicists-anthropometric that limit physical performance and productivity. In the next section the author describes succinctly aspects to consider before doing fieldwork for a study of this nature, information itself that must socialize with all employees.

A high sense of responsibility by the executors of the measurements is required since it is known personal aspects of persons, aspects that not all people are willing to be valued by anyone.

A. Basic Considerations

The subject will collaborate must be informed of all measures that would be taken, then must fill out and sign a form verifying that they are in accordance with the activities; for example: which should occur with the least amount of clothing possible, very necessary activity as part of the experimental protocol.

Once the physical conditions are to start, the first thing that will be done is demographic marking and measuring session. [Scan will begin marking the anatomical landmarks and anthropometric references needed for the study. Measures shall be taken in a practical and comfortable order as for example which marked the anthropometric returns].

To achieve the above, this subject should be kept upright, relaxed, comfortable arms at the sides, and the feet slightly apart [sometimes must collect completely feet]. The anthropometrists should move freely around the subject free-form measuring instruments to handle comfortably and efficiently. Some other basic considerations, [3]:

i. The exploration will take place in a sufficiently wide room and a comfortable temperature. The studied subject will be barefoot and with the minimum possible clothing (clothing), as shorts.
ii. Body weight and height measures suffer variations throughout the day, so it is desirable to make them in the morning.
iii. With the aim of allowing comparisons of measurements in any population group, will take place at right hemi-body. However in cases of limitation physical or dominance in the development of any limb, must be taken in hemi-body not dysmorphic.
iv. Material will be calibrated and verified for accuracy before taking action.
v. Measurements should be repeated at least twice, and take a third if necessary. In the first case, the media is used and the second median. It is recommended to be able to get help from a scorer.

B. Data Collection

For the study was required as part of the profile of this auxiliary [note taker-helper] know the techniques of measurement, since it must be able to verify the accuracy of the location of the site, and ensure the correct sequence of the points to be measured from the demographic dialing. It should be aware that there will always be errors in the measurements although the rules and procedures are followed to prevent them.

The most common causes is a miscommunication between members of the team of anthropometrists, ambient noise, etc. To minimize errors, the note taker-helper may be repeated aloud the data which the anthropometrists has captured. Sometimes the measurements can be repeated and even take a third time. In the first case, the average value is used. In the second case the median for data analysis.

For that reason it is very important that the personnel assigned to the tasks of measurements take the required courses to achieve certification in this discipline. The effects do not result in a bias in the data, even when it comes to interpreting measurements.

C. Equipment Anthropometric

The following items of equipment are essential for the anthropometrist's tools.

1. Anthropometric Tape

It is used to measure perimeters. It is recommended that a tape is calibrated in centimeters and millimeters. In addition to measuring perimeters, it is also necessary to accurately locate different sites of skin folds, and mark the distances from the points or bony anatomical references.

Fig. 1 Anthropometric tape

2. Stadiometer

Used to measure height and sitting height. It is usually fixed to a wall, so subjects can align vertically in the right way.

Fig. 2 Stadiometer

3. Scale

The use of electronic scales is recommended. Only must watch your ability. Also make sure that the equipment is calibrated at all times to avoid measurement errors.

Fig. 3 Balance

4. Anthropometer

This instrument is used to measure the vertical heights between locations or specific anatomical references in the subject and the floor or surface where sits.

Fig. 4 Anthropometer

5. Segmometer

Used for segmental length measurements. The Segmometer is designed to be used in replacement of the Anthropometer, although it is not suitable for measuring large bone diameter.

Fig. 5 Segmometer

6. Skinfold

It is used for measuring skin folds. Must be well calibrated or otherwise tide measurements will be incorrect.

Fig. 6 Skinfold

D.The Anthropometric Profile

According to the International society for the advancement of Ki anthropometry [ISAK], is taken as a general rule that there are two 'profiles' anthropometric general application commonly used for anthropometric evaluation, referred to as restricted and full profiles. In this work the authors have opted to develop the Protocol for profile restricted according to the resources which are the conditions imposed by the company.

From country to country, some ways to describe segments to measure may vary; however, to promote standardization adopted the concepts by the ISAK [9]. It is important that those involved in the measurements have a clear mental protocol description anthropometric measurements because it depends on standardization, homogenization, and accuracy as they are the only guarantee for the validity, reliability and objectivity of the data collected and represent a scientific reassurance in the development of this research.

E. Restricted Anthropometric Profile

In addition to height and weight, this restricted profile requires the following measures now denoted.

TABLE I
RESTRICTED ANTHROPOMETRIC PROFILE

Skin folds		Perimeters	Diameters
Triceps	Abdominal	Arm (relaxed)	Humerus
Sub-scapular	Thigh (front)	Arm (bent)	Femur
Biceps	Medial calf	Waist (minimum)	
Crestiliac	Armpit medial	Buttocks (hip)	
Supra-Spinal			Calf (maximum)

F. Total Anthropometric Total Profile

In addition to height and weight, this total profile requires the following measures.

TABLE II
TOTAL ANTHROPOMETRIC PROFILE

Folds	Perimeters	Length	Diameter
Triceps	Head	Acromial-radial	Biacromial
Sub-scapular	Neck	Radial styloid	Biliocres-tydeus
Biceps	Arm (relaxed)	Medioestiloideadactiloidea	Transverse chest
Crest-iliac	Arm (bent)	Ileospinal to the floor	Anteropost chest
Supraspine Abdo	Forearm (max)	Trochanter to the floor	Humerus
Thigh (front)	Doll estiloidestal	Trochanter-tibial side	Femur
Medial calf	Chest mesoesternal	Tibial side to the floor	
Armpit medial	Waist minimum	Medial tibial-ankle	
	Buttocks (hip)	Length of the foot	
	Thigh 1cm of the buttock	Sitting height	
	Thigh med troc-tib-lat		
	Calf (max)		
	Ankle (minimum)		

G.Definitions of Some Fundamental Lines of Anthropometric and Ergonomic Parameters

Below are described according to the ISAK [9].

1) Yuguloxifoidy. D. straight between the fork of the sternum and the tip of the Appendix xiphoid.
2) Epigastric. D. straight from the epigastrium to the pubis.
3) Xifo-epigastric. D. of xiphoid appendage and epigastrium.

4) Upper limb (up to the wrist). D. from the birth of the arm (shoulder) to the styloid process of the wrist with the outstretched arm.
5) Lower limb (up to the malleolus). D. of the trochanter to the malleolus.
6) Transverse chest diameter. D. longitudinal anteropost chest measured at the height of the nipples.
7) Diameter Antero-posterior chest. D. internal chest measured between the breastbone and the dorsal 6th.
8) Hypochondriac transverse diameter. D. longitudinal anteropost chest measured at the height of the hypochondria.
9) Diameter hypochondriac anteropost D. internal chest measured at the height of the hypochondria.
10) Diameter bi-crestilic. D. internal measured between the iliac crests.
11) Stature (height). D. vertically from the ground to the vertex, taken on a person's foot, upright and with the front-facing view.
12) Height from floor to eyes. D. vertical floor to the outside corner of the eye, taken a person's foot, upright and with the front view.
13) D. vertical from floor to shoulder in standing position. Height from floor to shoulder
14) Height ranging from the floor to the union of arm and forearm. Height from floor to elbows
15) Minimum of arm. D. horizontal from the back of the seat to the vertical axis of the hand with the arm parallel to the middle line of the trunk and the forearm and clenched fist forms an angle of 90 ° with the arm.
16) Maximum range of arm forward. D. horizontal from the back of the seat until the vertical axis, to that occurs in the hand with a closed fist and holding an axis, when the individual has the outstretched arm.
17) Wide elbow to elbow. D. which separates the lateral surfaces of the elbows, measured when they are bent, slightly supported the body
18) From seat elbow. D. vertical from the seat to the elbow in 90 ° position.
19) Thigh from the seat height. D. vertical from the surface of the seat to the top of the thigh, next to the abdomen.
20) Sacro-poplitea distance. D. horizontal from the outer part of the sacrum to the back of the knee.
21) Distance sacro-rotula. D. horizontal from the outer part of the sacrum to the front face of the kneecap.
22) Width of hips. It is horizontal between the hips and sitting as far as.
23) Popliteal height. D. vertical from floor to the immediately posterior region of the knee with the seated individual, erect trunk and legs at 90 degrees.
24) Height of the thigh from the ground. Vertical D. with the subject seated from the ground to the top of the thigh.
25) Lower limb (up to the malleolus). Vertical D. ranging from root of the thigh to external malleolus.

Although it is not the main objective of this work, the capture of these segments used to calculate also the Somatotype, body fat relative to [using a regression equation], the area index is body surfaces, the body mass index, ratio of waist to hip, distribution patterns of fat and perimeters corrected by skinfold measurement, estimating the bone mass muscle, fat and residual [7].

In addition, can be a parallel study of proportionality; comparative studies among several populations that are of interest. There is a great opportunity for analysis only performs an anthropometric study.

On the other hand, applies also the somatotype anthropometric technique that offers a quantitative synthesis with very specific mathematical interpretation. This deals with three indices which refer to endomorphic, mesomorph and ectomorph components.

When these three elements are known, you can generate multiple comparative analysis, planning and evaluation of different populations with ergonomic approaches or biomechanical.

To achieve a proper interpretation should be understood the somatotype indexes since it is through them that the values can be classified as low, moderate, high and extremely high. A brief description would be that expressed by Marin, 2004 in the above table. The study by this research group, [3 academics], auxiliary nineteen for the capture of data [students] in Industrial Engineering from the Autonomous University of California, with the support of the company [two internal collaborators] is of type: transversal observational prospective not experimental. The results of the measurements are displayed taking into account that they are only averages [12].

TABLE III
CLASSIFICATION OF SOMATOTYPE

	Endomorphism: [IN]Rel.: relative fat and carving.	Brussels-jmruyss@ULB.AC.be : [I] rel.: bone-muscle strength / size.	Ectomorph: [EC] rel.: weight with size.
Under 0-2.5	Low relative adiposity, low fat subcutaneous, with visible muscle and bone contours.	Under related skeletal muscle development; bone narrow diameters; narrow muscle diameter; small joints in limbs.	Relative linearity, high volume per unit of height; round; relatively bulky limbs.
Moderate 2.5-5.5	Moderate relative adiposity; subcutaneous fat covers contours muscle and bone; softer appearance.	Moderate development skeletal muscle; greater muscle volume, with the bones and joints of bigger dimensions.	Moderate relative linearity; less volume per unit of height; more stretched.
High 5.5-7.5	High relative adiposity; abundant subcutaneous fat; roundness in trunk and extremities; increased accumulation of fat in the abdomen.	High development on skeletal muscle; large bone diameters; muscles of large volume; large joint.	Moderate relative linearity, low-volume per unit of height.
Very high ≥ 7.5	Relative adiposity is extremely high; very abundant subcutaneous fat and large amounts of fat in the abdomen and trunk; very proximal limb fat concentration.	Development on skeletal muscle extremely tall and bulky; skeleton and large joints. Muscle or skeletal mass can prevail, the development is not always similar.	Extremely high relative linearity; very stretched; thin as a pencil; minimum volume per unit of height.

TABLE IV
METHODS FOR STATISTICAL ANALYSIS OF SOMATOTYPE

	Individual analysis	Analysis by groups
Coordinates 'X' "AND"	SDD (dispersal distance of the) Somatotype). Uses the X, and individual to a Somatotype reference = no.	SDI (Somatotype Dispersion index) = (Σ SDD) /n =
		SDDSM (distance between Somatotype dispersion) INDEX "I" SM1 and SDI1 Vs. SM2 and SDI2
Component of somatotype	SAD (morphogenetic distance of the) Somatotype). You use the Endo, Meso and Ectomorph = individual number regarding a somatotype reference	SM = (Endo - Meso - Ecto)
		SAM (Dispersion medium morphogenetic of the) (Somatotype) = (Σ SAD) /n

V. ANTHROPOMETRIC PROTOCOL

The reader can access the databases generated by applying directly to the authors. 25 sessions were held in blocks of 35 on average people to explain to them what the study. Measuring elements are mostly portable and it represented no problem transporting them.

He was an agenda of measurement in agreement with academics so that they facilitate the process of measurements and you allow your students participate in the project providing their personal data.

All sessions are scheduled at different times and under the right conditions for a work of this nature, that is, to ensure a suitable environment: quiet, private, illuminated, tidy and clean; with subjects measured previously informed of the activity [10].

Measurements were made using an Anthropometer and position of foot, back to the wall, were without shoes with heels together and separated 5 cm from the wall with separate of the feet at an approximate angle of 60 degrees, with light clothing (jeans or similar, underpants, shirt or blouse), supporting the buttocks back and head to the wall staring in front of form the corner of the eye and the ear, forming a line perpendicular to the wall [11].

The analysis of data is filtered further to highlight the selected measures being as follows:

1) Weight [P]. Subjects must wear light clothes, emptying their pockets and remove heavy objects as: shoes, equipment protection, tool, ornaments, etc.
2) Stature [E]. Recorded in millimeters. It is the distance from the floor to the top of the head.
3) Height of the eye [AO]. Recorded in millimeters. Taken of the inferior and lateral edge of the ocular orbit eye, to the floor.
4) Height of the Chin [AM]. Recorded in millimeters. It is taken from the bottom of the Chin to the floor.
5) [AH] shoulder height. Recorded in millimeters. Taken from the central point of the shoulder (Center of rotation of the shoulder or acromion) to the floor.
6) The elbow [AC]. Recorded in millimeters. Placing the elbow of the subject at a right angle, with the arm parallel to the sagittal plane (in the radial point) and is measured at the floor.
7) Lower height of pressure standing [AIP]. Recorded in millimeters. The subject leaves its pendulum and parallel to the sagittal plane, arm hand wielding a pencil parallel to the horizontal plane and the height from the floor to the tip of the pencil is measured.
8) Height to the trochanter [at]. Recorded in millimeters. Taken to the edge of the greater trochanter.
9) Maximum vertical range [AMV]. Recorded in millimeters. A metal measuring tape is fixed to the wall and placed the subject in front of it, wielding a pencil, while the tips of its feet are placed at 5 inches away. You are prompted that you place the tip of the pen on the measuring tape, taking care that not you stretch or lift the feet of the floor. The site where reaches the tip of the pencil is the measure that is recorded. In the case of obese people or with body disorders, will be placed is feet so that any part of your body comes into contact with the wall.
10) Maximum range of pressure fine [AMPF]. Recorded in millimeters. The subject is placed back with heels on the wall; upper extremity extends until it is parallel to the horizontal plane and the thumb and index finger contact. The distance is measured from the wall up to the most distant point of the thumb, at the designated position.
11) Scope of pressure force [APF]. Recorded in millimeters. The subject is placed in a manner equal to the previous measure, but extends in pronation forward, hand holding a pencil in your fist. The measurement is the distance between the wall and the tip of the pen.
12) Maximum depth of the body [PMC]. Recorded in millimeters. Placed the subject of standing with back supported on the wall and the arms loose, parallel to the sagittal axis. The measurement is the distance from the wall to the earlier point of the body; this is (chest or abdomen).

VI. RESULTS

A. General Population

TABLE V
TOTAL MEASUREMENTS

Total number of women	337
Total men	778
Respondent total	1115
Average women	25, 32
Average of men	74, 68
Age Max	26

TABLE VI
DISTRIBUTION OF AGES

Age years	Total	Age years	Total
17	8	22	132
18	126	23	111
19	158	24	89
20	278	25	3
21	201	26	9

TABLE VII
RESTRICTED PROFILE MEASUREMENTS

	Media	Max.	Min	Medium	MOD	DS
P	70,70	100,00	47,40	70,00	91	12.32
E	1712	1904,00	1480,00	1724,00	1690	80,11
AH	1521	12970,00	1193,00	1370,00	1365	1307,05
AC	1072	1739,00	109,00	1085,00	1095	185,81
ACi	1038	1157,00	912,00	1034,00	1075	49,88
AO	1593	1810,00	1061,00	1601,00	1565	105,89
AM	1493	1664,00	1291,00	1500,00	1530	80,33
AIP	764	1736,00	220, 0	752,00	740	134,21
EN	901	1875,00	788,00	893,00	935	118,15
AMV	1976	2272,00	204,00	2025,00	2025	259,85
AMPF	782	890,00	620,00	790,00	830	54,17
APF	722	830,00	250.00	730,00	750	72,52
PMC	255	355,00	190,00	244,00	240	36.37

TABLE VIII
QUARTILES OF THE GENERAL POPULATION

Quartiles	#1.	#2.	#3.	#4.
P	62,90	70,00	78,00	100,00
E	1664,00	1724,00	1765,50	1904,00
AH	1323,00	1370,00	1424,00	12970,00
AC	1037,00	1085,00	1123,00	1739,00
ACi	1002,50	1034,00	1075,00	1157,00
AO	1533,00	1601,00	1658,00	1810,00
AM	1440,00	1500,00	1538,50	1664,00
AIP	727,50	752,00	792,00	1736,00
EN	860,00	893,00	921,50	1875,00
AMV	1929,00	2025,00	2080,00	2272,00
AMPF	750.00	790,00	815,00	890,00
APF	699,50	730,00	760,00	830,00
PMC	230,00	244,00	277,50	355,00

TABLE IX
CALCULATION OF PERCENTILES

Percentiles	P-5	P-10	P-15	P-20	P-30	P-40	P-60	P-70	P-80	P-85	P-90	P-95
P	51.90	53.94	55,70	58,70	65.00	67,02	73,70	76.40	83,40	85,30	87,18	91.00
E	1569,90	1598,20	1617,00	1645,00	1690,00	1705,60	1734,60	1754,20	1770,00	1787,50	1810,80	1830,30
AH	1269,90	1276,60	1293,90	1312,80	1333,80	1361,60	1386,60	1405,60	1430,00	1449,10	1461,80	1498,20
AC	995,40	1004,00	1014,70	1032,20	1055,00	1070,20	1095,80	1105,00	1129,40	1144,60	1157,20	1179,90
ACi	965,30	976,80	989,40	995,60	1012,40	1020,00	1052,00	1072,60	1083.20	1088,00	1102,60	1114,10
AO	1454,50	1468,20	1497,40	1523,20	1565,00	1575,00	1627,20	1651,20	1665,80	1702,10	1713,40	1724,10
AM	1368,90	1379,00	1403,00	1425,20	1454,40	1480,80	1514,40	1530,00	1564,20	1576,50	1596,80	1629,50
AIP	673,80	705,60	718,20	722,20	736,20	741,80	769,00	782,80	798,40	806,50	816,00	834,30
EN	824,10	834,80	840,00	851,00	871,20	884,20	904,00	917,60	925,00	928,60	935,60	950,00
AMV	1720,90	1848,60	1860,70	1891,60	1958,80	1998,40	2051,60	2067,00	2100,00	2121,20	2155,00	2210,30
AMPF	699,00	720,00	725,00	733,60	755,00	770,00	799,00	810,00	830,00	830,00	844,00	880,00
APF	634,50	654,00	670,00	688,80	700,00	720,00	750.00	755,00	767,00	776,50	786,00	805,50
PMC	214,50	220,00	220,00	228,00	232,00	240.00	259,00	268,00	284,00	296,50	302,00	330,50

B. Results of Male Population

TABLE X
[MALE] RESTRICTED PROFILE MEASUREMENTS

Men	Media	Max.	Min	DS	Fashion
P	74,07	100	52	10.54	91
E	1743,03	1904	1633	56.12	1690
AH	1395,78	1772	1270	73,66	1365
AC	1123,86	1739	1000	118,81	1095
ACi	1049,08	1157	950	44.81	1075
AO	1621,58	1810	1061	100,01	1565
AM	1521,53	1664	1360	64,96	1530
AIP	758,19	890	220	84,40	750
EN	897,90	980	793	37,33	925
AMV	2034,95	2272	1050	163,09	2025
AMPF	797,59	890	690	43,60	830
APF	736,44	830	250	74,96	755
PMC	252,42	335	190	33,42	240

TABLE XI
QUARTILES OF THE MALE POPULATION

Quartiles	#1.	#2.	#3.	#4.
P	66.6	74	83.5	100
E	1705	1740	1775	1904
AH	1360	1385	1428	1772
AC	1070,5	1096	1137	1739
ACi	1013,5	1052	1083,5	1157
AO	1573	1630	1666	1810
AM	1476,5	1515	1566	1664
AIP	740	762	797	890
EN	877,5	900	925	980
AMV	1998	2050	2103	2272
AMPF	769	800	830	890
APF	717,5	750	767,5	830
PMC	230	244	277,5	335

TABLE XII
PERCENTILES OF THE MALE POPULATION

Percentiles	P-5	P-10	P-15	P-20	P-30	P-40	P-60	P-70	P-80	P-85	P-90	P-95
P	57,99	60,92	64,76	65.3	67,22	70.2	75.1	78.6	84.7	86.5	87,94	91
E	1657,6	1674	1690	1693	1708,8	1728,4	1754,6	1770	1788	1803,7	1818,6	1833,7
AH	1310,3	1322,2	1330,9	1330,9	1364,4	1371	1394	1419,8	1441,6	1457,9	1469,8	1498,2
AC	1034,3	1041,8	1058,5	1066,8	1075,4	1088,4	1105	1126,2	1148	1158,8	1175,6	1234
ACi	986,9	994,2	999,1	1008,4	1015,8	1034,2	1067,6	1075	1088	1095,6	1106,4	1115,4
AO	1529,4	1538,6	1565	1569,4	1586,6	1603,4	1650	1662,4	1697,6	1708,5	1716,6	1727,7
AM	1427,8	1450	1454,7	1466,2	1486,6	1501,4	1530	1558,2	1577	1591,8	1608,8	1634,5
AIP	701	31 °	722,4	736,8	746,2	752,4	774.6	792	802	812,9	820	834,3
EN	834,9	839,2	853,4	871,2	884	893,2	913,4	921,6	925	931,5	935,6	950
AMV	1894,7	1942,8	1967,8	1995,4	2005	2032,4	2064,6	2088	2121,6	2134,6	2180,4	2213,1
AMPF	729,5	734,8	755	762	780	790	805	815	830	835	860	880
APF	670	697,2	700	710	720	731	755	760	777	781,5	790	811
PMC	209	215	220	225	230	240	259	268	280	290	300	311

C. Results Female Population

TABLE XIII
[FEMALE] RESTRICTED PROFILE MEASUREMENTS

Women	Average	Max.	Min	DS	Fashion
P	60,74	98,00	47,40	12.01	51
E	1621	1750,00	1480,00	70,45	1610
AH	1306	1430,00	1193,00	57,32	#N/A
AC	1035	1130,00	948,00	48,63	1000
ACi	1004	1110,00	912,00	49,95	1020
AO	1510	1715,00	1385,00	75,18	1465
AM	1410	1526,00	1291,00	62,04	#N/A
AIP	729	800.00	664,00	33,92	725
EN	912	1875,00	788,00	230,01	855
AMV	1894	2088,00	1684,00	114,19	#N/A
AMPF	737	880,00	610,00	57,52	750
APF	681	770,00	615,00	44,70	690
PMC	264	355,00	220,00	43,76	240

TABLE XIV
QUARTILES OF THE FEMALE POPULATION

Quartiles	#1.	#2.	#3.	#4.
P	52,95	55.5	67.5	98
E	1573,75	1610	1657,5	1750
AH	1273	1292,5	1334,5	1430
AC	1003,75	1022,5	1071,25	1130
ACi	974	1010	1027,75	1110
AO	1463,75	1491,5	1536,25	1715
AM	1370,75	1395,5	1439,75	1526
AIP	717,5	727.5	741	800
EN	837,75	860	888,5	1875
AMV	1848,25	1869	1972,5	2088
AMPF	700	732,5	756,25	880
APF	647,5	685	710	770
PMC	235	245	277,5	355

TABLE XV
PERCENTILES OF THE FEMALE POPULATION

Percentiles	P-5	P-10	P-15	P-20	P-30	P-40	P-60	P-70	P-80	P-85	P-90	P-95
P	49,87	50.9	51	52,44	53,49	54.6	59,38	1614	69,535	69,535	72,38	76,91
E	1532,25	1565,6	1569	1569,8	1575	1597,4	1614	1299,4	1712,1	1712,1	1724,4	1729,1
AH	1256,65	1264,5	1268,4	1268,4	1274,7	1278,8	1299,4	1035,4	1362,7	1362,7	1362,7	1423,35
AC	970,8	995,4	999,7	1000	1008,5	1014,2	1035,4	1020	1091,5	1091,5	1091,5	1123,35
ACi	927,2	937	1454,25	967,8	976,7	991,4	1020	1517	1048,4	1050,8	1048,4	1081,5
AO	1423	1447,5	1368,85	1459	1465	1478,6	1517	1413,6	1578,9	1582,8	1578,9	1615,25
AM	1323,3	1363,7	698,95	1369,8	1373,8	1383	1413,6	732	1487,25	1489,5	1487,25	1510,8
AIP	671,6	690,9	823,65	708	720	725	732	874,4	755,75	759,5	755,75	787,65
EN	804,15	814,9	1777	829,8	843,5	855	874,4	1884,4	901,5	903	901,5	996,25
AMV	1722,95	1756,5	698,5	1830,4	1853,5	1858,8	1884,4	750	2044,35	2045,7	2044,35	2068,05
AMPF	662,25	687,5	634,25	700	31 °	723	750	690	773	776	773	832,5
APF	624,5	629,5	230	639	650	655	690	254	731,5	733	731,5	751
PMC	220	229	1268,4	234	235	240	254	254	331,5	331,5	331,5	340,75

VII. CONCLUSIONS AND RECOMMENDATIONS

The knowledge of the data obtained will allow us to develop other inferences such as for example the calculation of the body mass index among others, which can be used to determine the degree of nutrition which presents the population studied. The data will be a secure base for the determination of dimensionless measures of spaces and educational or industrial appropriate for the population of young people aged 17 to 26. The most important conclusions:

1) The increase of the height is proportional to the age of the population, though this increase is greater in the strip of 18 to 22 years, age at which stops the body growth.
2) Somatotype enables you to determine the physiological constitution of a population, but not its texture, for this case is necessary know the IMC and the perimeter wrist.
3) The reliability of anthropometric tables is determined by the security that is in the acquisition of data.
4) The results of the study of the anthropometric values were developed under the scientific parameters and conditions commonly accepted reliability; so it may be considered as reference for their practical application in the activities where the dimensional relationships are configured as a relevant factor in the solution.
5) Variability of the human Constitution is presented both in the same individual and between individuals, which limits the possibility of designing hard-and-fast rules to determine the anthropometric data of a population.
6) Most of the population is mesomorph - endomorph, which means a good skeletal muscle development and large joints, but with a bit of fat in certain areas of the body.
7) The search for takings of anthropometric measures that lessen the physical contact and time on sample acquisition would cover a larger target population.
8) Anthropometric and somatotype metric studies of populations should be constantly allowing them to evaluate the characteristics of a population from the point of view of the level of nutrition, of the economic development of each population and the risk of the derivative to obesity or overweight, among others, as well as similarly allow a better conception and development of objects intended for man. It is important to note that this information can be used for the design of tools and work spaces. The design of policies to safeguard the physical integrity of workers in the State of Baja California primary.

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