To Find Height Of Individual From The Length Of Ulna In Western Maharashtrian Population.

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ABSTRACT:
It is a known study of bones conveys information regarding race, sex, age, and height of a person. The present study fact that anthropometric is aimed to find stature from the length of ulnar bone by a regression formula. The study is conducted in the state of Maharashtra. As Maharashtra is a vast land divided into three big regions, viz; Marathawada, Vidharbha and Western Maharashtra. We have preferably chosen the Western region of Maharashtrians. The subjects consisted of 200 medical male and female students. The age group considered was between 20 to 30 years. The students with obvious limb deformity were not included in the study. The length of ulna is measured by asking the subject to flex the elbow joint. The flexor surfaces of arm and forearm made an angle of 90 degree, and keeping the forearm in midprone position. The two points were marked with skin marking pencil, one on the tip of olecrenon process and the other on the styloid process of ulna, and the distance between the two were measured with the help of spreading caliper in centimeters. The standing height in the subject was recorded with an anthropometer. The subject was asked to stand in anatomical position, barefoot, feet together, hands by the side of the body with trunk braced and gaze at the horizon. The results were processed and we tried to find a formula between length of ulna and an individual's total stature. And it was found out that both length of ulna and individual's stature has a definite correlation.

INTRODUCTION

It is impressive and instructive how the layperson tends to over-estimate the stature represented by the gleaming skeleton as it is being progressively and carefully exhumed. Time and again ! I have heard a bystander exclaim, "That one must have been a giant".

As described in old mythology Pliny believed mortals are becoming shorter from generation to generation and this thinking persisted for a long time: but W M Krogman(1941) has got a different point to prove, according to whom people are taller today than before. Anthropometry is not something ephemeral. It will be practiced as long as man is interested in the scientific study of his kind. The estimation of height has been done by various workers on various parameters, Jean Joseph Sue(1755), Paul Broca (1859), Paul Topinard (1885), Mendes Correa A. A.(1932), Bretinger E (1937). Hrdlicka (1939). W.M.Krogman (1941) suggested taking more than one long bone for calculating the stature. Different workers have derived their own formula for calculating the height of individual's from long bones, but no universally applicable formula has been derived. Side is not as significant, instead age of subject is very important. In this study, we tried to find out height of an individual from length of ulna in western region of Maharashtra both in males and females separately.

AIM OF STUDY

It was observed that western formulae were not suitable for Indian population, they involve 5-8% of errors. These were due to climatic changes and life style, living conditions, leading to differences in the overall stature of an individual. So specific formulae were necessary for Indian population.

The aim of the study,

1. To correlate and derive a regression equation between the length of ulna and stature of an individual in Maharashtra's western part.
2. Sidewise comparison of length of ulna and
3. Differences in male and female statures from the length of ulna.

Genderwise comparison of various variables Fig (1)

MATERIAL AND METHOD

Equipments used are as follows:

I) Anthropometer   II) Spreading caliper   III) Skin marking pencil.

The subjects consisted of 200 male and female medical students. The age group selected was between 20 to 30 years, from western region of Maharashtra. Medical students were selected due to easy availability. Measurements were taken at a fixed time, to avoid diurnal variations. Any obvious deformity or limb defects were not included in the present study. The height of the

Variable	Group				Unpaired T-Test Applied		
	Male		Female		T-Value	P-Value	Significant
	Mean	SD	Mean	SD			
Age (yrs)	25.16	2.74	25.48	2.73	-0.826	0.410	Not Significant
Height (cms)	173.8	8.80	157.6	7.98	13.611	3.30E-30	Significant
Ulna (right side)	28.31	2.33	25.75	1.61	9.065	1.20E-16	Significant
Ulna (left side)	28.23	2.33	25.65	1.63	9.083	1.10E-16	Significant

subject was measured by Anthropometer in

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anatomical position. The length of ulna is measured by asking the subject to flex the elbow joint. The flexor surfaces of arm and forearm made an angle of 90 degree, and keeping the forearm in midprone position. The two points were marked with skin marking pencil, one on the tip of olecrenon process and the other on the styloid process of ulna, and the distance between the two was measured with the help of spreading caliper in centimeters.

OBSERVATION AND RESULTS

Fig-(1) shows, that the difference in height between male and female works out to be statistically significant. (p = 3.30E-30). Difference in length of ulna of male and that of female is statistically significant. (p = 1.20E-16) and (p = 1.10E-16)

Correlation – Coefficient

PARAMETERS (MALE)	CO-EFFICIENT
AGE AND HEIGHT	-0.250 P = 0.012
ULNA (Right Side)	0.844 P = 3.20 E-28
ULNA (left side)	0.851 P = 4.10E-29

FIG (2)

PARAMETERS (FE MALE)	CO-EFFICIENT
AGE AND HEIGHT	0.032 P = 0.750
ULNA (Right Side)	0.720 P = 3.00 E-17
ULNA (left side)	0.702 P = 4.30E-16

FIG (3)

FIG (2) suggests that, Correlation- coefficient (r) between height and length of right ulna is 0.844, while same for the left side is 0.851, in males.
Similarly, FIG (3) shows, in females also Correlation-coefficient (r) between height and

length of right ulna is 0.720, while same for the left side is 0.702.
Age has no correlation with height while height shows positive and significant correlation with ulna on right and left sides.

Regression Equation

$X = a + by$
For males: $X = a + by_1$
X = Stature of an individual
a = Intercept
b = Regression-Coefficient
$Y_1 =$ Length of ulna in males

Estimated values of regression co-efficient are found to be statistically significant at 5 % level of significance for right as well as for left ulna. Estimation of stature from length of ulna of right and left sides can be attempted by substituting values of right ulnar length and left ulnar length measured from the subjects. Similarly, for females it as follows:

For Females $X = a + by_2$

DISCUSSION AND CONCLUSION

Anthropometry conveys information regarding race, sex, age and height of a person. This information is of interest to the Anatomist in the academic field. It is also helpful in medico-legal work. Racial and ethnic variations are reported to have an effect on the stature and length of long bones in an individual. There are no universally applicable formulae to express relationship between stature and long bones of an individual. Due to climatic variations regression formulae also differ from region to region. Hence to derive a suitable formula for this particular region, this study was conducted. Also, in the past, various workers significantly proved correlation between stature and different parts of body, work was done mostly on lower extremity long bones. It was observed that quite less work was done on

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superior extremity bones. On the basis of previous studies performed by Prabha Badkur and Surinder Nath[70], have used 288 ulnae belonging to 82 male and 62 female documented skeletons. They found bilateral variation in the fragmentary measures of ulnae were non-significant while the sex differences are highly significant at 1% level. Keeping this in view, separate regression equations have been formulated for both sexes. In the present study the correlation co-efficient is between height and length of ulna in males is 0.844 and in females is 0.720, which is much more significant. From the above discussion it is observed that if (height of a person or total length of ulna) either of the measurement is given than the other component can be calculated and this can be use for medico-legal investigation and anthropometry.

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