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Anthropometric Determination of Radio- Humeral Index in Jammu Region

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Abstract
Anthropology is the branch which specific deals with the measurements related to the human body. Anthropometry measurements are very useful to estimate stature and bone length from skeletal remains. It also has an important role in the identification of missing person in the medico legal investigation. Most of the studies conducted on the human anthropometric data are from foreign land. The present study was conducted in Jammu region keeping in view that for such studies there should be a specific survey of individual of a particular geographical area as these anthropometric values are effected by diet, climate, sex, race and other factors.
40 sets of bones of upper extremity were studied to find out the Radio-humeral index in the mixed population of the Jammu region for medico-legal purposes. The study was based on the criteria employed by Martin and Saller. To find out the types of forearms in human being with bilateral difference if any exist. The formula used to find out the index is:-
Radio-humeral index= (Maximum length of radius x 100) / Maximum length of humerous.
It has been observed that majority of population has been mesocerish (Medium forearms) in Jammu region.
Keywords: *Anthropometry, Humerii, Radii and Jammu Region, Radio Humeral Index (R H Index).*

Introduction

Anthropologist have developed number of method describing the morphology of a man, these measurement are defined on the basis of anatomical landmarks. They are useful in comparing various kind of men living in different geographical region, racial comparison is also made on these basis. The development of human being is also assessed by anthropometric techniques and various norms have been charted out. Anthropologist are playing an important role in the forensic science by providing data for various bones of the body. Long bone are most commonly used for identification of unknown and unidentified bodies[1]. Anthropometric measurements are very useful to estimate stature and bone length from the skeletal remains [2]. It also has an important role in finding out of the missing person in the medico-legal investigation [3]. Long bones of arms provide data for sex determination and estimation of the stature of the body [4]. While doing the forensic identification analysis, even the skeletal remains of the individual provide data in identifying the race to

which the bone belongs.[5] since these measurements are influence by the racial dietary and climatic factor, it is important to have these data from a particular geographical area. Attempts have also been made in the past to find bilateral a symmetry in the long bone of upper and lower limbs and limb dominants on the basis of girth, muscles, weight and texture of bones a[6,7]. Data in Punjabi race have been published on the basis of morphology of upper arm bones of adult men involved in different occupational groups by[8]. In the presence study Radio-Humeral Index has been determined as per the given formula. The data collected is Mesocerish in the Jammu region. This will further help forensics expert to identify the race, sex and regional belongivity of the person whose bones are under investigation. Data from two sides compared with the bilateral differences noted.

Material and Methods

The present work was carried out on the humerii and radii of 40 sets of cadaveric bones from the department of Anatomy, Govt. Medical College Jammu. Each set contained two bones of right side and two of the left side. Permission for the ethical committee was taken before the study. These paired bones were belonging to one cadaver.

Instrument Used:

An Osteometric Board
Vernier Callipers
Tape line
Adhesive tape

To reduce the inter observer and intra observer error all measurement were taken twice by the same author. Each humerus was positioned with the help of adhesive tape so that it shaft axis was aligned with the horizontal plane of the osteometric board.

Maximum Length of Radius: it is the greatest length between the most proximal point on the margin of head of radius and the tip of the styloid process.

Maximum Length of Humerus: It is the straight distance between the highest point of the head of the humerus and deepest point of trochlea.

Radio Humeral Index (R H Index) was determined by the following formula

$$\frac{length\ of\ Radius}{length\ of\ Humerus} \times 100 = Radio\ Humeral\ Index$$

The data such obtained was compiled and analyzed statistically and tabulated.

Observation

This study comprise of 40 sets of bones each sets has two bones of upper arm i.e Radius and humerus of the left and the right side. The cadavers were from the Jammu region. average length of humerii of right side was 86.36 cm and average length of right radii were 66.29 cm, whereas average length of left side humerii were 86.36 cm and average length of left radii were 66.16 cm. The mean R. H Index of the right side is 76.7 cm and of left side is 76.6 cm. This is shown in table I

Table I showing R H Index in Jammu region

Right Arm			Left Arm		
Average length of humerus in cm	Average length of radius in cm	R.H index	Average length of humerus in cm	Average length of radius in cm	R.H index
86.36	66.29	76.7	86.36	66.16	76.6

Table II: Shows the mean Radio- Humeral index of right side 76.7 and left 76.6. standard deviation is 2.83 on right side and 2.86 on left side, the mean coefficient of variations is 3.69 right side and 3.86 on left side. The standard error of mean

is 0.44 right side and 0.45 cm on left side which is not significant statistically.

Table II: showing the R H Index, Standard deviation, co-efficient variation and standard error of mean

Sr. No	Particular	Right	Left
1	Mean Radio Humeral Index	76.7	76.6
2.	Standard Deviation	2.83	2.86
3.	Co-efficient of variation	3.69	3.86
4.	Standard error of mean	0.44	0.45

Martin and Saller on the basis of R. H index divided individual into three categories:-

1) Brachycerish (Short forearms):- In these R.H. Index is less than 75.
2) Mesocerish (Medium forearms):- In these R.H. Index is between 75-79.9.
3) Dolicocerish (Long Forearms):- In these cases R. H Index is 80 and more than 80.
   The present study reflects the data of the population of Jammu region which is predominantly mesocerish (Medium forearm).

Discussion

The pattern of long bone documented in this study are similar to those reported by other researcher[8]. The long bones are very useful to estimate the stature, bone length from skeletal remains and has an important role in identification of missing person[2] This identification helps in medico-legal investigations[3], our study which is unique in the northern region of India , Jammu region shall prove to be of value to the forensic experts in identifying the missing, mutilated and unidentified bodies as has been documented by the above author. Anthropologist are playing an important role in the forensic investigation by providing data from various isolated long bones or their fragments. This forensic identification has an high accuracy in determining the sex of the cadaver as seen and is concurrent with the findings of[4]. Present study will help in identifying the race of the bone and in-turn shall be of help full to the forensic experts dealing with medico-legal cases[5] has similarly identified the race from the skeletal remains. Since these measurement are influenced by racial dietary, climatic and occupational factor,

it is important to have these data from particular geographical area[8]. The present study is the only study conducted in the geographical area of this region. The observation made in this study showed that the population of Jammu region is predominantly Mesocerish (Medium forearms). The Raido Humeral index falls in this Mesocerish category i.e., 76.6 to 76.7 which has been observed and classified into three groups by[9]. In the present study the average length of humerus of right side is same that of the left side other long bone radii has more average length of right side as compare to left side also found the similar results in the long bones.

Conclusion

The study of the long bones of upper arm help in finding out the identity, sex and the race of the individual of particular geographical region. The Radio Humeral index when obtained of such particular regional population provide an addition parameter in the medico-legal investigation thus helping the forensic expert to conclude investigation accurately.

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