

Prediction of stature using hand dimension among Chennai population

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ABSTRACT

Introduction: Stature is an important anthropometric parameter that decides the physical identity of an individual. It is also a genetically inherited character. Stature plays a crucial role in many forensic investigations. This study was performed to predict the stature of an individual using hand dimension. **Materials and Methods:** The hand dimensions of Chennai populations of both sexes were measured using Vernier caliper. The data obtained were expressed as mean \pm standard deviation. All the average values were plotted graphically for easy interpretation. **Results:** The average height of male and female was estimated. Mean and standard deviation of stature and hand length was calculated. Correlation was found by plotting a graph with the collected values. **Conclusion:** The present study depicts a significant correlation between the stature and hand dimension of an individual. The data are very essential for identifying of war casualties and medicolegal purpose.

KEY WORDS: Hand dimension, Medicolegal cases, Morphological variations, Stature

INTRODUCTION

Stature is defined as the natural height of a person. The stature and the sex are the two main factors in determining the physical uniqueness of a person.^[1] Stature is influenced by genetical features, environment, nutrition, climatic conditions, etc.^[2,3] The height of an individual can be detected from any of the available body parts. According to the Vitruvius Man drawn which was proposed by Leonardo da Vinci, if their symmetry in structure, one can detect the morphometry of one of its parts based on the dimension of the other body part.^[4] It is one of the features which checks the normal growth of an individual.^[5]

This stature estimation using hand dimension greatly helps in solving many medicolegal cases. The forensic investigation mainly makes use of this factor to become a conclusion in bringing out the biological profile of an individual.^[6] This also indicates the genetic inherent character. The stature differs from a

living individual and dead individual.^[7] Many studies have attempted to calculate the height from separate bones, foot length, lower limb length, etc.^[8] There are two ways of estimating the height of a person: The anatomical method and mathematical method. The anatomical method is by measuring the height of a full skeleton. The mathematical method is by calculating the height using certain formulae. The mathematical method is most commonly used in assessing the height in case of dismembered body part.^[9,10]

The stature indicates the normal human being. Hence, any abnormalities can be identified with this parameter, for example, dwarfism. It is a medical condition caused due to hormonal imbalance in growth hormone. Dimensional relationship has brought attention of the anatomist, scientist, and anthropologists, but still, no study can reveal the exact height due to some factors.^[11] Despite the correlation between the height and hand length, it varies from one ethnic group to another ethnic group. People still have a taught that a person with long fingers is usually tall, but it may mismatch sometimes.^[6] Stature is also a part of body mass index which helps in checking the proper diet of an individual. The hand palm area represents 1% of the body surface.^[5]

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Many recent studies have selected this field in bringing out correlation between the stature and various parts of the body. Stature has turned to the center of focus of the anthropologists.^[12] The stature has been estimated using long bones, foot dimension, hand measurement, radius and ulna measurement, head measurement, phalanges measurement, etc.^[4,10] Hence, it is important to bring a significant correlation between stature and hand dimension to bring out a qualitative measurement to solve many critical aspects.^[2]

MATERIALS AND METHODS

The present study was conducted in Chennai population with sample size of 100 comprising with 50 males and 50 females in the age group of above 18 and below 30. The stature of an individual was measured as the vertical distance from the vertex to the floor with their shoes off using standard tape. The hand dimension was estimated by placing his/her hand on the table with fingers together and the thumb abducted (from the proximal crease line to the tip of the middle finger) using sliding caliper. The data were properly collected and compiled for statistical analysis.

RESULTS

The present study shows that the average height of male was found to be 1724 ± 4.417072 (mm), and for the female, the average height was found to be 1621 ± 3.98979 (mm). The average hand length (from proximal crease line to tip of the middle finger) of male was found to be 187.25 ± 0.372712 (mm), and for the female, the average hand length was 173.6 ± 0.496143 (mm). Hence, there is a positive correlation between hand dimension and stature. The measurement of the correlation between stature and hand dimensions in male and female is shown in Figures 1 and 2.

From Figures 1 and 2, it implies that there is a significant correlation between hand dimension and stature of an individual.

DISCUSSION

Prediction of stature of an individual is a worthwhile parameter in suspecting the criminals. It also helps in the forensic and anthropometric studies. Stature of the criminal can be detected from the hand measurement available at crime scene which will be speaking evidence by itself.^[13-15]

This study revealed a positive correlation between the stature and hand dimension of a person. The hand dimension of male is larger than the female. Hence, the stature of male was taller than the female. From this, it is possible to estimate the stature using hand dimension in both male and female.^[16]

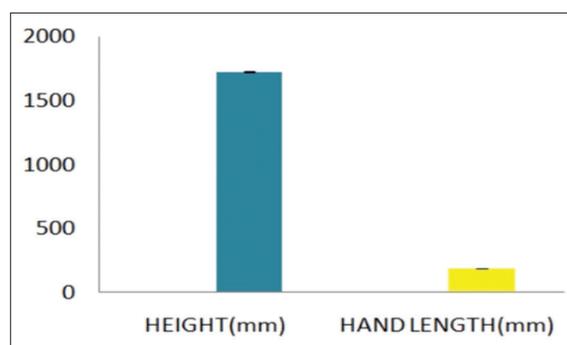


Figure 1: Correlation between stature and hand dimension in male

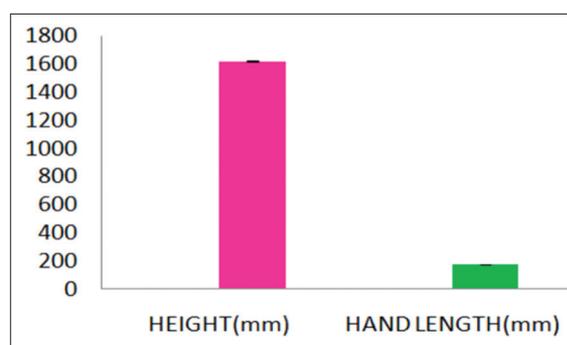


Figure 2: Correlation between stature and hand dimension in female

Recent studies also show a positive relation between the stature and hand length. Not only the hand length but also the foot length, long bones, and head length were also taken into account for the estimation of stature.^[17,18] This study also shows about the average height and hand length of male and female in Chennai population. This study may not be applicable for the physically challenged population. Hence, this study will be a start-up for establishing more significant correlation between the stature and hand dimension in human population.^[19,20]

CONCLUSION

From the present study, it is apparent that the prediction of stature from the hand dimension in both male and female showed a positive correlation that may be helpful for those who work in this area, especially in the various medical disciplines and anthropologists.

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