

## Estimation of Stature Using Intermastoid Distance

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### ABSTRACT

The mastoid process is a bony pyramidal projection from the posterior section of the temporal bone. The superior border of the mastoid process of the temporal bone articulates with the parietal bone. The posterior border articulates with the occipital bone, and the anterior border is merged with the descending portion of the squamous segment of the temporal bone. The aim of the study is to determine stature from the intermastoid distance. This study was conducted among 30 males and 30 females studying in Saveetha Dental College. The measurements of inter mastoid distance were measured using a spreading caliber instrument and the height of each person was also measured using standard height measurement frame. The measurements were noted for all the study participants and then it was tabulated, using a linear regression calculator appropriate formula was calculated. For males,  $Y=137.39+2.81X$ , the correlation coefficient was found to be 0.578, hence having moderate correlation. For females,  $Y=155.39+0.49X$ , the correlation coefficient was found to be 0.394, hence having moderate correlation. Where,  $Y$  is height in cm and  $X$  is inter mastoid distance in cm, The result shows when statistically comparing the data between males and females, the intermastoid distance was a moderately reliable measurement for stature estimation in both males than in females. From the present study it is found that inter mastoid distance have stature determining property.

**Keywords:** Stature estimation, Mastoid process, Intermastoid distance, Linear regression equation

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### INTRODUCTION

Estimation of stature is taken as a crucial parameter in medico-legal and forensic examinations [1]. Estimation of stature is an important factor in the identification of the deceased from unknown fragmentary and dismembered remains. The skull sometimes is the only remain available for identification [2]. Estimation of stature is a crucial parameter in identification of commingled, mutilated and skeletal remains in forensic examinations [3]. Legal issues, like mass disaster situation—plane crashes, traffic accidents, genocide, natural disasters, or when unknown bodies are recovered, the services of forensic anthropologists could also be required for individual identification. Estimating height or stature is one of the key

elements within the human identification process. A definite biological relationship exists between the body height and all parts of the body including the head, long bones, and trunks [4]. Determination of the stature of the person helps in the investigation an individual in a mass disaster [5]. Estimation of stature is a crucial step in developing a biological profile for human identification. It's going to provide a valuable indicator for an unknown individual in a population [6]. In medico-legal autopsies, establishing the personal identity of the victims is often required. Estimation of stature from extremities and their parts plays a crucial role in identifying the dead in forensic examinations [7]. In forensic investigation, identifying an individual is difficult in mass destruction. So as to eliminate these difficulties, new methods are being developed [8]. Personal identification is an important part of the investigation in cases of mass disasters [9]. Stature estimation was previously also done using physiognomic facial length [10].

With a rich case bank established over 3 decades we have been able to publish extensively in our domain [11-21]. Based on this inspiration we aim to estimate the stature using inter-mastoid distance in male and females.

**MATERIALS AND METHODS**

This study was conducted among 30 males and 30 females who were studying 1st year Dental in Saveetha Dental College of age group 18 to 20. The study was approved by SRB of Saveetha Dental College & Hospitals and after getting informed consent the measurement of intermastoid distance was taken using the spreading caliber and also the height of each person was also measured using standard height measurement frame. The measurements were tabulated for all the study participants and a linear regression equation was calculated using the data.

**RESULTS AND DISCUSSION**

Using the data mentioned in Table 1, the linear regression equation was calculated to be

For males,  $Y=137.39+2.81x$

Where, Y is height in cm and X is inter mastoid distance in cm,

The correlation coefficient was found to be 0.578, hence having moderate correlation

For females,  $Y=155.39+0.49x$

Where, Y is height in cm and X is inter mastoid distance in cm,

The correlation coefficient was found to be 0.394, hence having moderate correlation.

The result shows when statistically comparing the data between males and females, the intermastoid distance was a moderately reliable

measurement for stature estimation in both males than in females.

The skeleton is one part of the body that resists all environmental factors for maximum time and thus can be used as a valuable tool for identification. Stature is a parameter that can be estimated even in mutilated and dismembered body parts as well as in fragmental remains. Each mastoid parameter is discussed by comparing them with the findings of previous workers. Mastoid process has been selected because it is well preserved and the most protected part of a fragmentary skull. The present study has provided a baseline data for stature estimation from different parts of the body.

The stature estimation can be done by many parts of the skeletal frame. Many previous studies have confirmed the presence of a positive correlation between several different body parts and stature. In the study conducted by ozaslan et al. stature estimation from various body parts was done using anthropometric technique and by regression analysis which is similar to our present study [22]. In the study conducted by Menezes et al. estimation of stature from vertebral column length was done using regression analysis [23]. In the study conducted by Jee et al. and pearson correlation coefficient was used for assessing the relationship between the stature and hand/foot dimensions which was unique in this study. Estimation of stature from finger and phalanges length in Korean adolescents [24]. The study used an anthropometer to take measurements and it also consists of both simple linear regression analysis and multi linear regression analysis which lacks in our present study. Estimation of stature from foot dimensions among North Indian populations by Kumar et al. [25]. In the present study the mean values of men were higher than women. We found that there is moderate correlation between the stature and intermastoid distance in both males and females, we have observed that the intermastoid distance also has the stature determining property. The limitations of our present is it was done in a smaller population and within a limited age group of 18-20, in future an extensive study with a large population with a different group can be done to get better interventions in the results.

**Table 1: Values of Regression equation for estimation of height (Y) from intermastoid distance (X) in male and females, a and b are constant.**

	Male	Female
n	30	30
Mean value of Intermastoid distance (X)	12.11	11.06
Mean value of Height (Y)	171.51	160.83
Correlation Coefficient (r)	0.578	0.394
a	137.39	155.39
b	2.81	0.49

Regression Equation is calculated using the formula  $Y= a+bX$   
 Where, Y is height, X is intermastoid distance, a and b are constants values from the results

### CONCLUSION

The present study concluded that the male samples had better correlation than females and the inter mastoid distance is moderately reliable measurement for the estimation of stature. So it is proved that the inter mastoid distance can also be used in estimation of stature.

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### CONFLICT OF INTEREST

The author declares that there is no conflict of interest in the present study.

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