

Estimation of Stature from Odontometric Measurements

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ABSTRACT

Estimation of stature is taken as a crucial parameter in medico-legal and forensic examinations. Determination of the stature of the person helps in the investigation of an individual in a mass disaster. Odontometric measurements were previously studied as an aid for gender determination. The aim of this study was estimation of the stature from maxillary and mandibular intercanine distance. This study was conducted among 30 females who were studying 1st year BDS in Saveetha Dental College of age group 18 to 20. The measurement of maxillary and mandibular intercanine distance was taken using the digital vernier caliper and also the height of each person was also measured using standard height measurement frame, from collected data linear regression equation was calculated for maxillary intercanine distance as, $Y = -1.10X + 162.20 + 5.38$ cm, the correlation coefficient was found to be -0.056 , hence having no correlation and for mandibular intercanine distance, $Y = 2.52X + 150.23 + 6.38$ cm, the correlation coefficient was found to be 0.415 , hence having moderate correlation. Where, Y is height in cm and X is mandibular intercanine distance in cm, from our study it is found that maxillary intercanine distance does not have any correlation with stature but the mandibular intercanine distance showed moderate correlation to the stature of the female subjects examined.

Key words: Maxillary intercanine distance, Mandibular intercanine distance, Stature estimation, Odontometric measurements

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INTRODUCTION

Estimation of stature is taken as a crucial parameter in medico-legal and forensic examinations [1]. 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 [2]. Determination of the stature of the person helps in the investigation of an individual in a mass disaster [3]. Previously stature was estimated using mandibular width [4] length of mandible [5], Nasal height and breadth [6] and Physiognomic and morphological facial length [7].

The human dentition has different forms of teeth in which deciduous teeth have 20 and permanent teeth have 32 teeth [8] for each and

every individual human teeth are in different shape and size [9]. The shape and size of the teeth depends upon the facial form and size of the maxillary and mandibular arches and the development of the face according to their genes [10]. It has also been observed the size and shape of the teeth depends upon the development of the individual, it can also vary from person to person depending on their skeletal development [11]. Odontometric measurements of intercanine and intermolar width of maxilla were previously studied as an aid for gender determination [12]. Studies were also done to compare and evaluate whether the stature of an individual had any clinical correlation with the odontogenic feature of the individual [13]. Previous studies were done to compare the facial form to the size of the teeth [13,14], few other studies were performed for correlation to the zygomatic width and the intercanine distance [15].

Previously our department has published extensive research on various aspects of dentistry [16-26], this vast research experience

has inspired us to do research about the stature estimation from maxillary and mandibular intercanine distance.

MATERIALS AND METHODS

This study was conducted among 30 females who were studying 1st year BDS 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 maxillary and mandibular intercanine distance was taken using the digital vernier caliper and the height of each person was also measured using standard height measurement frame. Measurements were made from the one side of the canine tip to the canine tip of the other side for both the arches (maxillary and mandibular teeth). The measurements were tabulated for all the study participants and a linear regression equation was calculated using the data.

RESULTS AND DISCUSSION

Regression Equation is calculated using the formula $Y = a + bX$.

Where, Y is height, X is intercanine distance, a and b are constants values from the results.

Using the above data (Table 1), the linear regression equation was calculated to be

For maxillary intercanine distance, $Y = -1.10 X + 162.20 + 5.38 \text{ cm}$.

Where, Y is height in cm and X is maxillary intercanine distance in cm.

The correlation coefficient was found to be -0.056, hence having no correlation.

For mandibular intercanine distance, $Y = 2.52X + 150.23 + 6.38 \text{ cm}$.

Where, Y is height in cm and X is mandibular

intercanine distance in cm.

The correlation coefficient was found to be 0.415, hence having moderate correlation.

The result shows when statistically comparing the data between maxillary and mandibular intercanine distance in females, the mandibular intercanine distance was a reliable measurement for stature estimation than the maxillary intercanine distance.

Comparison of intercanine distance between the varied population was done as variation in tooth size in influence by genetic environmental factors like race, sex, heredity, secular changes, and bilateral asymmetry. Similar observation was made in estimating stature using foot measurement [27,28], biacromial breadth [29] and metacarpals [30]. Various odontometric data were also used to estimate stature in previous works by Yadav et al. [31], using mesiodistal width of maxillary anterior teeth [32], intercanine and interpremolar width [33] and even arc length which was measured from the middle one-thirds of the left to the right canine [34]. Another author has used odontometric measurements as a tool in 2-dimensional reconstruction of faces which aided them in forensic dentistry [35].

The limitation of our study was use of only a limited sample size of 30 female participants within the age group of 18-20 years, future research can be done with a larger sample size in both the sexes and a larger age group.

CONCLUSION

From our study it is found that maxillary intercanine distance does not have any correlation with stature but the mandibular intercanine distance showed moderate correlation to the stature of the female subjects examined. Estimation of stature from parts of the body is a standard procedure, we tried estimating

Table 1: Values of regression equation for estimation of height (Y) from maxillary and mandibular intercanine distance (X) in females, a and b are constant.

	Maxillary intercanine distance	Mandibular intercanine distance
n	30	30
Mean value of Intercanine distance (X)	3.73	3.1
Mean value of Height (Y)	158.06	158.06
Correlation Coefficient (r)	-0.056	0.415
a	162.2	150.23
b	-1.1	2.52

stature using maxillary and mandibular intercanine distance and found mandibular intercanine distance to be a more reliable source for estimating 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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