Stature estimation using Odontometric measurements of the mandible

Running Title: Stature estimation using mandibular odontometry

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Abstract

Introduction: Stature is the height of a person in the upright posture. In the identification of unknown human remains, stature estimation may be done from human or skeletal remains in which other methods of identification are not possible in the primary investigation. Several studies had been done to correlate relationship of a person's height to the odontometric parameters.

Aim: To estimate stature using odontometric measurement of distance between right and left second premolars of mandible

Materials and methods: The sample size chosen for the study was 60, which included 30 females and 30 males. After obtaining informed consent intermandibular distance of right and left 2nd premolar was measured using a digital vernier calliper and the height of subjects was measured using standard height measuring frame. The measurement was tabulated and linear regression equation was calculated using SPSS software.

Result For Male-, $y = -0.24513x + 184.34559$ Correlation Coefficient, $r = -0.128$
For Female-, $y = -0.18058x + 168.11568$ Correlation Coefficient, $r = -0.121 r<0.2$,
hence odontometric measurement of mandibular 2nd inter-premolar distance is not a reliable parameter in estimation of stature in both males and females

Conclusion From our study we can conclude that the inter maxillary distance between the second premolar is not a reliable odontometric parameter for stature estimation in both males and females

Keyword: innovative stature estimation, mandibular odontometry, second premolar, Anthropometry

INTRODUCTION:

"Forensic odontology" is a branch of dentistry that deals of correct handling and investigation of dental evidences, thereby correctly evaluating and presenting the odontometric finding (1). It plays a fundamental role for human identification especially when the standard procedure cannot be deemed useful because of severe decomposition, fragmentation or carbonization of the body (2). In accident where use of fingerprint or facial recognition was difficult or not possible, a post-mortem dental record can be made by a forensic dentist to identity the victim using age, sex, stature ancestry and socio economic background (3). Stature is the height of an individual in an erect position(4) may be done from human or skeletal remains in which other methods of

identification are not possible in the primary investigation(5). The most common estimation of height can be derived from long bones as most of them correlate positively (6).

Skull and jaw dimension can also be used to estimate stature as often reported among various populations. The studies correlate tooth dimension with height through linear regression equations of y and x (7). The skull with or without teeth may be the only remains of an individual, stature of an individual can be estimated using this (8). Several studies had been done to correlate relationship of a person's height to the odontometric parameters as it may be very specific to a group of population or even within it. So dental odontometric measurements are to be determined specific to a population (9).

Different body parts are utilized in height estimation like the long bones of the limb conventionally served this purpose (1). Stature estimation from various body parts is essential for determining the identy of an individual (10). Odontometric studies of teeth plays a major role as strength of the teeth and its resistance to destruction or breakage after death. When visual identification of sex is impossible, we can use odontometric measurement to determine the identity of a person (7,10). The extensive knowledge and experience of our research team has been translated into high quality publications (11–18),(19),(20),(21),(22,23),(24),(25), (26–30). Aim of this study is to try to estimate stature from using odontometric measurement of distance between right and left second premolars of mandible

MATERIALS AND METHODS

The study population was taken from the dental students of Saveetha dental College and hospitals, Chennai. The sample size chosen for the study was 60, which included 30 females and 30 males. After obtaining informed consent intermandibular distance of right and left 2nd premolar was measured using a digital vernier calliper and the height of subjects was measured using standard height measuring frame. The measurement was tabulated and linear regression equation was calculated using SPSS software(23).

RESULTS

Table 1- Values of regression equation for Stature estimation

	Male	Female
n	30	30
Mean of mandibular 2nd inter-premolar width (X in cms)	4.5	4.3

Mean of height (Y in cms)	173.3	160.33
Correlation Coefficient	-0.128	-0.121
A	184.34	168.11
B	-0.245	-0.180

From the data in table 1, Regression equation was calculated using the formula y = A + Bx
For Male-, y = 184.34 - 0.24x Correlation Coefficient, r =-0.128
For Female-, y = 168.11 - 0.18x Correlation Coefficient, r = -0.121
r<0.2, hence odontometric measurement of mandibular 2nd inter-premolar distance is not a reliable parameter in estimation of stature in both males and females

DISCUSSION

Stature determination is an important parameter in identification of an unknown person. Conservatively researchers use regression formula that are specific to each gender, Estimation of stature is one of the initial steps during forensic analysis of human skeletal remains (31). Calculation of stature helps in identifying an individual person in mass disaster. Estimation of stature from skeletal remains is of great interest in some studies where victims have to be identified. A problem, occurring in practise is that the individual whose stature had to be assessed is in general form an unknown population. Length and breadth of both feet along with the stature of each individual were measured using standard anthropometric instruments in centimeters to the nearest millimeter according to the techniques described by Vallois(32). Stature estimation was done previously using maxillary odontometric measurements (7), (8) and also mandibular odontometric measurements (33), (3). In our our study we found no correlation between stature and the distance between mandibular 2nd inter-premolar in both genders.

LIMITATION & FUTURE SCOPE

The sample size for this research was limited and within the age group between 18 to 25 among the student community. In future this study can be done with larger sample size and different age groups,

CONCLUSION :

Various odontometric measurements of the mandible have been used previously to determine stature and gender. From our study we conclude that the inter premolar distance between the right and left second premolar of the mandible was not a reliable odontometric parameter for stature estimation in both males and females.

AUTHOR CONTRIBUTIONS

Joshitha Subramaniam **:** Study Design, Data collection, Data Analysis, manuscript writing
Yuvaraj Babu K: Study Concept, Data verification, Data Analysis, manuscript drafting and correction

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CONFLICT OF INTEREST

The authors reported the conflict of interest while performing this study to be nil

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