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A STUDY ON THE RELIABILITY OF GENDER AND STATURE ESTIMATION FROM HEAD CIRCUMFERENCE, INNER CANTHAL DISTANCE, INTER CANINE & INTER-ALAR WIDTH IN NORTH INDIAN POPULATIONS

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Background: Biological identity of an individual can be determined by its sex, age, stature, and ancestry background. This becomes important in many of the medico legal cases where identity of the deceased has to be established. Out of the four biological indicators of identity, assessment of sex particularly has significant contribution in construction of a physical profile of the decedent. While forensic and archaeological excavations, skull and teeth often provide the only identification material and the methods of gender determination depend on their condition. Craniofacial anthropometry is a vital tool in making a precise and systematic measurement of human skull, so as to deduce sex of dead individuals. Among the various craniometrical dimensions, the most important ones are height and width of head. Laeque et al in 2013 observed an important role of head circumference and biparietal diameter of skull for determination of gender. George and Bhat in 2010 have successfully shown in their data gender differentiation by means of inner canthal width. Patel et al in 2011 have highlighted the significance of inter-alar width in sex differentiation while studying the relationship between intercanine width, inner canthal distance, and inter alar width. Teeth are very important elements in the identification of skeletal remains, especially in cases when, due to the poor preservation of skeletal remains, the identification is not possible by standard methods. Sex determination using dental features is primarily based on the comparison of tooth dimensions in males and females. Canines vary from other teeth with respect to survival and sex dichotomy. In forensic identification of unknown human remains, stature estimation is also a preliminary important step. In a study by Karthikeya et al; significant correlation has been shown of diameter and circumference of skull and combined mesiodistal width of maxillary anterior teeth with stature or height of an individual by means of regression analysis. Studies have been done on sex differentiation using craniometrical and odontometrical data in different parts of India, however the literature is scanty for the north Indian population especially in Uttar Pradesh. This fact has inspired us to carry out a study in Uttar Pradesh population, aiming to estimate sex and stature based on combined mesiodistal width of maxillary anterior teeth, right and left maxillary canine width, head circumference, inner canthal distance, inter alar width, and skull diameter. **Methods:** Cross-sectional

prospective study was conducted involving 100 participants. Craniometrical and odontometrical measurements were obtained with the help of Vernier Caliper with resolution of 0.02 mm and a non stretchable measuring tape, following the methods used by Kalia et al, Dhara et al, and Patel et al. Gender and height was regressed against each measurement so as to derive linear regression equations based on combined mesiodistal width of maxillary anterior teeth, right and left maxillary canine width, head circumference, inner canthal distance, inter alar width, and skull diameter. Data was also studied as ratio of different measurements. Finally discriminant function analysis was done for height. Results: All recorded craniometrical and odontometrical measurements were significantly different between males and females. Ratio of measurements was also significant among males and females except for head circumference to combined mesiodistal distance of maxillary anterior teeth and height to skull diameter. Head circumference significantly predicted the height of male and female, while a poor correlation was observed between height and other parameters among male and females. Conclusions: Craniometrical and odontometrical measurements recorded can successfully be used for gender determination but not for stature.

KEYWORDS: Forensic Odontology, Identification, Craniometry