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Stature and Gender Estimation Using Foot Measurements in South Indian Population

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Abstract : Introduction: The significance of the human foot and its measurements in identifying an individual has been proved a lot of times by different studies in different geographical areas and its association to the stature and gender of the individual has been justified by many researches. In our study we have used different foot measurements including the length, width, malleol height and navicular height for establishing its association to stature and gender and to find out its accuracy. The purpose of this study is to show the relation of foot measurements with stature and gender, and to derive Multiple and Logistic regression equations for stature and gender estimation in South Indian population. Materials and Methods: The subjects for this study were 200 South Indian students out of which 100 were females and 100 were males, aged between 18 to 24 years. The data for the present study included the stature, foot length, foot breath, foot malleol height, foot navicular height of both right and left foot. Descriptive statistics, T-test and Pearson correlation coefficients were derived between stature, gender and foot measurements. The stature was estimated from right and left foot measurements for both male and female South Indian population using multiple regression analysis and logistic regression analysis for gender estimation. Results: The means, standard deviation, stature, right and left foot measurements and T-test in male population were higher than in females. LFL (Left foot length) is more than RFL (Right Foot length) in male groups, but in female groups the length of both foot are almost equal [RFL=226.6, LFL=227.1]. There is not much of difference in means of RFW (Right foot width) and LFW (Left foot width) in both the genders. Significant difference were seen in mean values of malleol and navicular height of right and left feet in male gender. No such difference was seen in female subjects. Conclusions: The study has successfully demonstrated the correlation of foot length in stature estimation in all the three study groups in both right and left foot. Next in parameters are Foot width and malleol height in estimating stature among male and female groups. Navicular height of both right and left foot showed poor relationship with stature estimation in both male and female groups. Multiple regression equations for both right and left foot measurements to estimate stature were derived with standard error ranging from 11-12 cm in males and 10-11 cm in females. The SEE was 5.8 when both male and female groups were pooled together. The logistic regression model which was derived to determine gender showed 85% accuracy and 92.5% accuracy using right and left foot measurements respectively. We believe that stature and gender can be estimated with foot measurements in South Indian population.

Keywords : foot length, gender, stature, South Indian
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