## H29 Estimation of Stature From Foot and its Segments in a Sub-Adult Population of North India

*Kewal Krishan, PhD*, Panjab University, Department of Anthropology, Sectoc-14, Chandigarh, 160 014, INDIA; Tanuj Kanchan, MD, Kasturba Medical College, Department of Forensic Medicine, Light House Hill Road, Mangalore, 575 001, INDIA; and Neelam Passi, MSc, Panjab University, Department of Anthropology, Sector-14, Chandigarh, HI 160 014, INDIA*

After attending this presentation, attendees will understand the usefulness of stature estimation in forensic examinations especially from foot and its segments as the literature on this aspect has been scanty.

This presentation will impact the forensic science community by presenting standards for stature estimation from foot and its segments when feet or their parts are brought for forensic examination.

Establishing personal identity is one of the main concerns in forensic investigation process. Estimation of stature forms a basic domain of investigation process in unknown and commingled human remains in forensic anthropology case work. The objective of the present study was to set up standards for estimation of stature from foot and its segments. Sample for the study constitutes of 154 male and 149 female adolescents from Northern part of India. The subjects were aged between 13 to 18 years old (Mean age in male and female was 15.8 + 1.7 and 15.5 + 1.6 years respectively). Besides stature, seven anthropometric measurements that included length of the foot from each toe (T1, T2, T3, T4, and T5 respectively), foot breadth at ball and foot breadth at heel were taken on both feet of each subject. All the measurements were taken with standard procedures and landmarks according to international texts and research papers. The results indicate that mean stature in adolescent males (163.1 + 10.1 cm) is significantly larger than mean stature in females (154.3 + 5.9 cm). All measurements in the male foot are significantly larger than in females ($p<0.05$). Statistically significant sex differences exist between various anthropometric measurements of the foot. Significant side differences occur in foot breadth at heel amongst males and foot breadth at ball, and at heel in females. Foot length measurements (T1 to T5 lengths) do not show any statistically significant bilateral asymmetry. Karl Pearson's correlation coefficients (r) between stature and various foot measurements on the right and left sides in males and females were found to be statistically significant ($p<0.001$). Thus, the stature is positively and strongly related to various foot measurements. In males, various foot measurements show relatively higher values of correlation coefficients than in females. Linear regression models and multiple regression models (step wise regression models) were derived for estimation of stature from the measurements of the foot. The present study indicates that anthropometric measurements of the foot and its segments are valuable in estimation of stature. Based on Standard error

of estimate (SEE), it is observed that stature from foot measurements can be estimated more accurately in females than males. Among the foot measurements, T5 in males and T1 in females give the most accurate estimation of stature by linear regression analysis. Multiple regression models are derived for estimation of stature from foot length (T1 to T5) in males and females. Foot breadth measurements (BHEL and BBAL) are used to derive multiple regression models on the right and left sides in males and females. Multiple regression models tend to estimate stature more accurately than the linear regression models. It is observed that the multiple regression models derived from the measurements of the foot length (T1 to T5) estimate stature more accurately than models derived from the measurements of the foot breadth (BHEL and BBAL). The method may be applied successfully for estimation of stature whenever foot remains are brought for forensic examination that can help the investigating agencies primarily in narrowing down the pool of possible victim matches by establishing the partial identity of the deceased.

**Forensic Anthropology, Foot Anthropometry, Stature Estimation**

 ** Presenting Author*