H101 Evaluation of Methodologies for Stature Estimation Based on Tibiae in Colombia: Forensic Stature Versus Cadaver Stature

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The goal of this presentation is to provide insight into new research on stature estimation that has been recently conducted in Colombia. This project aims to utilize centralized stature data from national identification cards in order to generate stature equations for the tibia.

This presentation will impact the forensic science community by demonstrating how stature can be generated from the tibia of positively identified individuals. In addition, it presents two discriminant function equations that can be utilized by Colombian forensic anthropologists to estimate stature and considers the difference between self-reported stature (FSTAT) and cadaver stature (CSTAT).

The country of Colombia is fortunate to have an infrastructure that includes a government-sponsored database which maintains stature data of the entire Colombian population aged 18 years and older. These data are sourced from self-reported identification cards that all Colombian citizens are required to carry. However, studies have not been conducted to prove the reliability of this source and its usefulness for the forensic area. Stature information is frequently used to compare the forensic identification of missing individuals, even though no methods have been developed for stature estimation based on this information. This study evaluates the reliability of the first stature formulae developed on the basis of forensic stature data (FSTAT) from tibiae in Colombia.

Right and left tibiae of positively identified male individuals were analyzed (n=63). The mean age of the sample was 48 years old and stature information was recorded on each individual's identification card. Two types of stature data were available in this study: stature recorded on the identification card (FSTAT) and the cadaver stature obtained during autopsy (CSTAT). Maximum length (XLN), as defined by Buikstra and Ubelaker, was measured for each complete tibia.[1] Regression equations for left and right tibiae were obtained: [FSTAT = 86.0 + 2.24(XLNL) ± 3.384] and [FSTAT = 84.7 + 2.27(XLNR) ± 3.286]. These new equations were applied to a control sample (n=22) and compared with five other stature estimation methods developed on various Hispanic populations. The figures estimated for each formula were compared to known statures of the control sample.

The results show that the stature data recorded on the identification card provide a high level of correlation (0.84 and 0.83) and standard error of the acceptable estimation (3.2% and 3.3%) in the stature equations developed for this research. Paired t-tests demonstrated that the formulae of this study were reliable, both for forensic stature estimation and cadaver stature estimation, while the other tested methods generated statistically significant differences (*p-value* < 0.05) between estimates and known statures.

On the other hand, the comparison of the Mean Square Error (MSE) showed that the equations developed in this research are more precise when estimating FSTAT than CSTAT. The results of the remaining methods evaluated do not differ significantly between FSTAT and CSTAT estimates. The analysis showed that the equations presented here are more reliable for the estimation of both FSTAT and CSTAT than other methods developed earlier in Colombia.[2]

To conclude, it must be noted that the database sponsored by the Colombian Vital Statistics Office is a valuable source of forensic information, not only for data comparison but for the development of stature estimation methodologies. On the other hand, a study should be undertaken in Colombia on the relation between living stature and data recorded on the ID cards, in order to establish the potential biases that may arise when these data are used. Finally, this research is expected to contribute nationally and internationally to an understanding of the importance of using forensic stature for the identification of missing persons. The data generated will also strengthen forensic services in Colombia.

References:

1. Buikstra JE, Ubelaker DH. Standards for data collection from human skeletal remains. Fayetteville: Arkansas Archeological Survey, 1994
2. Mantilla JC, Cárdenas N, Jácome JM. Estimación de la Talla a Partir de la Medida de la Tibia en Población Colombiana. Int J Morphol 2009; 27:305-309.

Forensic Stature, Cadaver Stature, Colombian Population Standards

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