H39 Anatomical Stature Estimation: Why Not Fully Accurate?

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After attending this presentation, attendees will understand the pos- sible problems associated with the anatomical method of stature estimation.

This presentation will impact the forensic community and/or humanity by helping to more accurately estimate statures of unknown individuals in a forensic context.

The purpose of this paper is to introduce and discuss a possible bias in the estimation of statures using the Fully Anatomical Method.

Traditional regression equations require knowledge of an individual's sex and ethnicity (and often age) in order to be applied correctly. The anatomical method proposes that an individual's stature may be determined - if the skeleton is sufficiently complete - without regard to these variables by determining an individual's skeletal height and adding a soft tissue cor- rection of 10 to 11.5 centimeters. This correction factor, purportedly applicable to all individuals regardless of ethnicity, sex, and age, will be tested in this paper using regression analysis.

Skeletal heights of 129 individuals from the Terry Collection were obtained using the anatomical method. This included measurements of the head height (basion-bregma), anterior vertebral heights from C2 to S1, the bicondylar length of the femur, maximum length of the tibia, and the height of the articulated calcaneus and talus (ankle height). To these skeletal heights, the cor- rection factor (based on overall skeletal height) was added to each individual. All of the individuals used in this study had cadaver lengths on file. These were converted to an estimate of living stature by subtracting 25 mm, an adjustment which had been determined by previous researchers. Each anatomical stature was then compared to the adjusted cadaver length to determine the accuracy of the estimation. The differences between the "living statures" and the anatomical statures ranged from -9.00 to +7.10 centimeters with an average difference of -1.36 and a Pearson correlation of 0.935. While these results were an improvement over long bone regressions, such as those of Trotter and Gleser, the fact that error still remained required further explanation. Mean soft tissue correction values were calculated for each group; with both black and white females having an average adjustment of 101 mm and black and white males an average of 104 mm. Lowess regres- sions on the data set, however, suggested that the original soft tissue cor- rection factor may be too low, and in most cases in this study the differences between skeletal height and cadaver length were between 110 and 115 mm.

Typically, errors resulting from long bone regressions are due to dif- ferences in body proportions such that statures of individuals with long trunks and short legs are generally underestimated and vice versa. The original soft tissue correction factors calculated by Fully were based on French citizens in an Austrian concentration camp, and while Fully's data set has never been published, it is possible to conclude that the French *may* have had shorter trunks, either due to shorter vertebral heights, thinner intervertebral discs, or both. More research is needed to determine whether the soft tissue corrections calculated by Fully may truly be applied to other populations and both males and females.

Stature, Fully, Regression

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