H13 Sex Estimation in Modern African and Diaspora Populations

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After attending this presentation, attendees will become familiar with cranial and postcranial metric sex estimation techniques in a modern African population and United States diaspora populations. Prior analysis looking at populations throughout Africa shows strong regional variation, especially concerning sexual dimorphism, which supports implications for using population-specific estimation parameters.

This presentation will impact the forensic science community by offering research into human skeletal variation among under-studied populations.

The estimation of sex is a significant component to the biological profile created by forensic anthropologists during casework. Many methods related to the biological profile have been developed based on skeletal collections in the United States. As forensic initiatives have increased throughout the continent of Africa, questions arise as to whether estimation parameters created from one population are appropriate for diverse groups. This presentation explores this question by using cranial and postcranial data collected at the Raymond A. Dart Skeletal Collection in Johannesburg, South Africa. For this research, a modern Botswanan sample was used containing 31 male and 31 female individuals. The age, sex, and population is known and confirmed for all of these individuals. As a preliminary analysis, by using these Botswanan individuals to create sex estimation techniques to be used in that region of Africa, comparisons can then be made to modern United States samples to assess the variation and determine whether population specific methods are needed.

Both cranial and postcranial measurements were used to create univariate and multivariate sex estimation techniques. All cranial data were collected with a Microscribe G2X digitizer. Seventeen measurements were used. Additionally, 31 postcranial measurements were taken from each individual. Multivariate analyses were performed on the cranial and postcranial measurements in SAS 9.1.3, consisting of a stepwise Discriminant Function Analysis (DFA) to determine which variables are the most accurate when estimating sex. From these variables, classification functions were created for multivariate sex estimation. A linear DFA allowed for sectioning points and cross-validation classification rates to be produced for the cranium and postcranial skeleton.

The multivariate results suggest that the femur's stepwise selected variables allow for a classification function with a total cross-validation rate of 90.53%, which is higher than any of the other classification rates, with the cranium (90.32%) and the humerus (88.89%) following closely behind. When considering only the univariate sectioning points of the postcranial skeleton, the top three total classification rates are measurements of the humerus, including humeral head diameter (88.89%), humerus epicondylar breadth (87.29%), and humerus proximal epiphyseal breadth (87.04%). When utilizing the Robert J. Terry Collection to represent an African diaspora sample, univariate maximum length measurements of the arm also consistently had the highest classification rates with ulna maximum length (83.71%) and humerus maximum length (82.03%). By comparing these resulting measurements and classification rates to African American samples, insights can be obtained into human variation in Africa and other diaspora populations.

Human Identification, Sex Estimation, African Populations

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