A75 Dental Morphological Ancestry Estimation in a Self-Identified Biracial Sample

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After attending this presentation, attendees will understand the potential for misclassification of Biracial individuals using current dental morphological quantitative methods.

This presentation will impact the forensic science community by showcasing the importance of reference samples and the necessity to understand admixed populations for forensic identification.

The importance of ancestry estimation to the biological profile is well documented in that it can aid medicolegal death investigations by narrowing missing persons lists.[1] Dental non-metric traits have been used successfully to estimate ancestry in American Black and White populations, but no method has examined the effect of mixed ancestry on classification rates. The goal of this study is to understand how a sample of Biracial individuals would ancestrally classify using current quantitative methods for dental morphology.

A sample of 13 (11 female, 2 male) living self-identified Biracial individuals were recruited to complete this study. For this study, the definition of Biracial includes those individuals who are a Black/White racial mix and simultaneously an African/African American and European/European American ancestral mixture. Approval for study on living individuals was granted by the Texas State University Internal Review Board (2016S173). Dental impressions were obtained for each Biracial individual by a licensed dentist. Dental casts were made from the impressions and analyzed using the Arizona State University Dental Anthropology System (ASUDAS) dental morphological traits and the expression count method.[2,3] Root traits were excluded from analysis because they cannot be scored on casts. The scores were used to estimate ancestry for the sample using two methodologies, Edgar and Scott et al. [4,5] The method proposed in Edgar uses discriminant function equations to distinguish between African American (AA), European American (EA), and Hispanic American (HA), while Scott et al. is an online system (http://apps.osteomics.com/rASUDAS/) that processes scores and compares them against sample groups from geographical regions (this study compared between Sub-Saharan Africa and Western Eurasia).[4,5] The system uses a naïve Bayes classifier algorithm to output posterior probabilities for the "Expected bio-geographical origin."

The majority of the 13 individuals classified as European. Using Edgar functions, five of the Biracial individuals classified as EA, seven were not classified as AA/EA and, therefore, HA, and one could not be classified.[4] The web-based rASUDAS system estimated ten of the Biracial individuals as Western Eurasian and three as Sub-Saharan African.[5] The posterior probabilities did not yield results that could indicate a mixture of two ancestries. These results indicate Biracial individuals have a high potential to be misclassified.

Reference(s):

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