H64 Molar Crenulation as an Attribute of Ancestry in Forensic Cases: Identification and Accuracy

Christen E. Herrick, BS, and Heather A. Walsh-Haney, PhD, Florida Gulf Coast University, Division of Justice Studies, 10501 FGCU Boulevard AB3, Fort Myers, FL 33965-6565; Katy L. Shepherd, BS, Florida Gulf Coast University, Division of Justice Studies, 10501 FGCU Boulevard, South, Fort Myers, FL 33965; Marta U. Coburn, MD, District 20 Medical Examiner's Office, 3838 Domestic Avenue, Naples, FL 34104; and Margarita Arruza, MD, Medical Examiner's Office, 2100 Jefferson Street, Jacksonville, FL 32206*

After this presentation, the attendee will gain understanding of the diagnostic accuracy of molar crenulation as a marker of African ancestry, as well as how to correctly classify and identify the condition. This presentation will impacts the forensic science community by providing guidelines for the identification of molar crenulation and its utility as a predictor of ancestry in forensic cases.

Forensic anthropologists frequently rely heavily on metric assessment and morphological observation of the mid-face and cranial vault to determine ancestry. Often, dental morphological traits are used to bolster these skeletal ancestry assessments. On a macroscopic level, the differences in the size, contour, and shape of tooth enamel are integral variables used in the determination of ancestry. Well-studied dental characteristics such as the "shoveling" of the lingual surfaces of upper incisors or the presence of an additional lingual cusp adjacent to the protocone on any or all of the upper adult molars (e.g., Cusp of Carabelli) are often used as diagnostic markers of Asian or European ancestry, respectively. However, the complex wrinkling of molar occlusal surfaces (e.g., crenulation) coincident with African ancestry lacks the depth of lucubration evidenced by the shoveling and Cusp of Carabelli ancestry traits used in forensic anthropology.

The dearth of scholarly research concerning molar crenulation provided us the opportunity to investigate the extent to which African ancestry groups expressed the condition relative to European and Asian ancestry groups. To this end, we reviewed forensic skeletal cases (n=85) that were placed within an ancestry group (i.e.; African, European, or Asian) based upon metric assessment using FORDISC 3.0 and/or positive identification through other scientific means (e.g., dental, fingerprints, DNA, or medical records/radiographs) from Florida medical examiner districts 4, 17, and 20.

The forensic anthropologist inventoried each case and charted all teeth to ensure elements necessary to create a biological profile were present (i.e., cranium, mandible, ossa coxae, tibia, or femur). She then metrically and non-metrically analyzed each case to determine age, sex, ancestry, and stature using standard forensic anthropological methods. In order to determine the extent of crenulation necessary for this study, the upper and lower first, second, and third molars were scored for the presence and absence of occlusal crenulations when observable using a 5x hand lens and the naked eye. Three investigators independently scored each case to minimize the propensity for interobserver error. The data was statistically analyzed using SPSS 15.0. Specifically, compared was the frequency of the condition between the three ancestry groups using chi square analysis of variance.

Upon analysis of the data, it was found that molar crenulation was associated with individuals of African ancestry one hundred percent (100%) of the time, while fifteen percent (15%) of those with Asian or Native American descent presented with the condition. None of the individuals of European ancestry showed evidence of molar crenulation. These results were statistically significant (x^2=19.429, df=2, p= 0.00), evidencing that while molar crenulation is an accurate indicator of African ancestry, this is not the only ancestral group that will exhibit this dental morphological characteristic.

Forensic Anthropology, Dental Morphology, Molar Crenulation

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