A65 Dental Non-Metric Analysis as an Aid to Undocumented Border Crossers (UBCs) Region-of-Origin Estimation

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After attending this presentation, attendees will better understand the application of dental non-metric analyses to the process of identifying deceased UBCs, as they help narrow an estimated region-of-origin for these individuals.

This presentation will impact the forensic science community by demonstrating the utility of dental non-metrics as a part of ancestry estimation within the biological profile, particularly in reference to how this methodology can contribute to the ongoing research seeking to increase UBC's identification rates.

Dental non-metric analyses have been used for more than 100 years in ancestry studies and were standardized through the establishment of the Arizona State University Dental Anthropology System (AUDAS) by Turner et al. in 1991.[1,2] Per Birkby et al., though, only two dental non-metric traits are utilized by the Pima County Office of the Medical Examiner (PCOME) in the UBC identification process.[3] This is not surprising, given that much of the recent UBC literature has focused on cranial and postcranial studies. Non-metric cranial studies primarily differentiate American Blacks and Whites from known UBC samples.[4-5] The metric postcranial study, though, found a need for population-specific formulas when working with known UBC individuals, as not all of the decedents originate from the same geographical location and, therefore, cannot be pooled under one ancestry umbrella term.[6] A craniometric study from within Mexico highlights this need for population-specific formulas as regional skeletal variation exists.[7] There is also a dental non-metric study that focuses on American Hispanic differentiation that highlights these same results from the aforementioned studies.[8] Edgar discussed the difficulty in distinguishing American Hispanic groups from one another when compared in a large study sample with American Whites and Blacks. The results of this study indicate that there may be potential for dental non-metric analyses when population-specific trait suites are established.

To explore the utility of dental non-metric analyses as they pertain to UBC individuals, samples were selected from Albuquerque, NM, Mexico City, Mexico, Zimapán, Hidalgo, Phoenix, AZ, and from unidentified UBC individuals housed at the PCOME, as well individuals from the Sacred Heart Burial Park from Falfurrias, TX, housed at Texas State University. Seventy-five American Southwest Hispanic (ASH) individuals were included in analysis, as well as 90 Mexican individuals and 33 unidentified UBC individuals; UBC individuals were either pooled or separated for certain analyses based on the small sample size of this group. These region-of-origin groups were selected based on the prevalence of UBC individuals that have been previously identified as Mexican at the PCOME and the need to determine any potential differences between ASH and foreign-born Hispanics. The dental non-metric data were collected according to the Arizona State University Dental Anthropology System (ASUDAS) standards and dichotomized for analyses.

A series of Pearson's chi-square and Fisher's exact tests to compare dental non-metric trait prevalence between each of the three region-of-origin groups demonstrated a lack of M_2 protostylid in the ASH sample (15.7%), while it was present in the Mexican (67.8%) and UBC (52.4%) groups in higher percentages of the total samples. The Lower Canine Distal Ridge (LCDR) (82.4%) and M_1 cusp 7 (53.8%) were more prevalent in the UBC group than in the ASH (49.1% and 25.0%, respectively) and the Mexican groups (42.1% and 25.0%, respectively). Furthermore, Mean Measure of Divergence (MMD) indicated that the ASH group differed significantly from the Mexican group (0.106) and the ASH group differed significantly from the UBC group from the Sacred Heart Burial Park (0.103).

These results indicate there are regional differences in dental non-metric trait prevalence among the ASH, Mexicans, and some of the unidentified UBCs included in these analyses. While there are limitations of this current research due to the samples selected for study, these are promising indications of the utility of dental non-metrics in UBC studies, nonetheless. Additionally, when placed in the framework of existing UBC literature, this research supports the assertions that population-specific trait suites and formulas are necessary to further the identification process of UBC individuals.

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Dental Non-Metrics, Ancestry Estimation, UBC