H117 Skeletal Indicators of Stress: A Component of the Biocultural Profile of Undocumented Migrants

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The goal of this presentation is to inform attendees of consistent differences in levels of physiological stress between Undocumented Border Crossers (UBCs) and individuals who grew up in the United States. Attendees will be encouraged to apply those differences in their forensic casework as criteria to aid in classifying unidentified human remains as undocumented migrants.

This presentation will impact the forensic science community by adding to an established suite of biological features commonly observable in the skeletal remains of foreign nationals from Mexico and Central America.[1] The ability to distinguish undocumented migrants from American-born individuals is growing in importance as the number of border deaths continues to rise, and as migration patterns and the geographic distribution of border deaths shift and expand. Forensic anthropologists working in border jurisdictions and, increasingly, across the U.S. will more frequently find it necessary to differentiate between undocumented migrants and U.S. citizens.

Previous research at the Pima County Office of the Medical Examiner (PCOME) has demonstrated that, when compared to Hispanics born in the United States, foreign national Hispanics have elevated prevalence rates of dental caries and antemortem tooth loss, in addition to shorter stature.[2] The present research builds upon those results and expands the framework of analysis. Because individuals crossing the border often come from depressed socioeconomic circumstances and are disproportionately likely to have experienced nutritional deficiencies and infections during growth and development, this study hypothesized that skeletal indicators of physiological stress would appear more frequently and with greater severity in the remains of UBCs than in those of individuals born in the United States.

To investigate this hypothesis, skeletal samples from the PCOME and the Maxwell Museum of Anthropology were macroscopically examined for the presence of non-specific indicators of physiological stress that included porotic hyperostosis, cribra orbitalia, and linear enamel hypoplasias. The UBC sample from the PCOME comprised 130 adolescents and adults who died while crossing the U.S.-Mexico border into Arizona. Six additional individuals analyzed at the PCOME and included in this study were identified as non-border crossers. The skeletons from the Maxwell Museum, which formed the majority of the samples of non-border crossers, included 45 adolescents and adults from documented forensic cases. Each individual was scored for the presence or absence and the degree of expression of the aforementioned stress indicators. Prevalence rates were compared between the UBC sample and the non-UBC sample using Pearson's chi-square tests or, when cell sizes fell below five, Fisher's exact tests. All calculations were made using SPSS 20.0.

Undocumented border crossers were found to exhibit greater prevalence rates of all indicators of physiological stress assessed in this research. A striking proportion (83/107; 77.6%) of UBCs exhibited porotic hyperostosis, although expression was minor in most cases. The difference in the prevalence of porotic hyperostosis between UBCs and non-UBCs (17.6%) is statistically significant ($\chi^2 = 50.988$, p=0.000). Additionally, the prevalence rate of linear enamel hypoplasias in UBCs (31.3%) was significantly greater than that in non-UBCs (11.1%) ($\chi^2 = 6.497$, p=0.011). While the difference in the prevalence of cribra orbitalia between the UBC sample (11.0%) and the non-UBC sample (2.0%) did not reach the p<0.05 level of significance (p=0.070), the results for this condition appear to reflect a meaningful pattern that is likely to be confirmed in the future as data collection continues and sample sizes increase.

Because porotic hyperostosis, cribra orbitalia, and linear enamel hypoplasias appear with greater frequency among undocumented border crossers than among U.S.-born individuals, their presence in skeletal remains recovered from modern, forensic contexts is noteworthy. Given that most migrants reach their destination within the United States, forensic anthropologists — regardless of whether or not they work in border jurisdictions — should take this suite of skeletal health indicators into consideration when contextual and/or sociocultural evidence suggests that an unidentified human remains case may represent an undocumented migrant.

References:

1. Birkby WH, Fenton TW, Anderson BE. Identifying southwest Hispanics using nonmetric traits and the cultural profile. J Forensic Sci 2008;53(1):29-33.
2. Anderson BE, Smith TR, Birkby WH, Fenton TW, Hurst CV, Gordon CC. Differentiating between foreign national Hispanics and U.S. Hispanics in the southwest: the influence of socioeconomic status on dental health and stature. P Am Acad Forensic Sci 2009;15:309-10.

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