A36   Population Variation in the Occurrence of Midline and Canine Diastemata

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Learning Overview: After attending this presentation, attendees will better understand the population and sex differences in the occurrence of central and canine diastemata. This dental variation manifests as a measurable gap between the central maxillary incisors or on either side of the canine.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by offering insight into the degree of population and sex variation in dental diastemata. This research also highlights inter-trait correlation, which could be used in additional research to study the genetic and environmental impacts on these traits. By using modern skeletal collections for this research, the findings can contribute toward enhancing ancestry estimation methods in forensic casework and illuminating variation in these populations.

The variety of dental morphological traits allows researchers to explore population variation resulting from microevolution and varying population histories. There are a handful of methods to evaluate ancestry using dental morphological traits; however, these methods only incorporate a few dental traits, and these traits may have large observer error.[1-3] The goal of this study is to investigate population variation of a well-studied morphological variant—dental diastema. This trait as both a midline (i.e., between the two maxillary incisors) and canine (on either the mesial or distal side of the canine) has been extensively studied in the biological anthropological literature, which has shown the diastema trait to have documented population variation and a potential genetic component to expression.[4]

This study uses a large sample of data collected from documented modern skeletal samples from the United States, South Africa, and Japan (n=647). Samples include the donated collections from Texas State University; University of Tennessee, Knoxville; University of Pretoria; Witwatersrand University; Stellenbosch University; and Chiba University. Statistical analyses explore ancestry and sex differences as well as correlation between the traits. All analyses were conducted in Statistical Package for the Social Sciences (SPSS) version 26. Diastemata were scored at the maxillary central incisors and around the right and left maxillary canines. Traits were scored according to the system outlined by Pilloud (4), which differentiates between absence (score of 0: gap < 0.5mm), low-grade (score of 1: gap between 0.5 and 1.49mm), and high-grade (score of 2: gap ≥ 1.5mm) diastemata.[4]

Results indicate no sex-based differences in diastemata presence. Population differences were found in the central incisor and left and right canine diastemata in evaluations of the raw and dichotomized data (p<0.05 in all cases). Central diastemata were most common among American Black and South African Black samples, and a high diastema grade of 2 was most common among the South African Black sample. Left and right canine diastemata were most common among the South African Black sample, and scores of 2 were uncommon. The central diastema was not largely correlated to the left canine (τ_b =0.413) or the right canine (τ_b =0.377). However, the left and right canine diastema were found to be positively correlated (τ_b=0.887).

While it has been critiqued that modern orthodontia could have an impact on the occurrence of diastemata, orthodontics is a relatively recent phenomenon that is not a global practice. Based on these data, canine diastema of the maxillary central incisors and canine may be used as part of the methods to evaluate population variation and ancestry in a forensic context. Further, in another study, it was found that there was high rater agreement in the scoring of the canine diastema (kappa between 0.641 and 0.789), thereby making this trait of potential utility in forensic anthropology.

Reference(s):

[1.] Edgar N.J.F. Estimation of ancestry using dental morphological characteristics. *J Forensic Sci.* 2013;58(s1):S3-S8.
[2.] Scott G.R., Pilloud M.A., Navega D., d'Oliveira Coelho J., Cunha E., Irish D.J. rASUDAS: A New Web-Based Application for Estimating Ancestry from Tooth Morphology. *Forensic Anthropology* 2018;1:18-31.
[3.] Pilloud M.A., Adams D.M., Hefner J.T. Observer error and its impact on ancestry estimation using dental morphology. *Int J Legal Med.* 2019;133:949-62.
[4.] Pilloud M.A. Technical Note: The definition of new dental morphological variants related to malocclusion. *Dental Anthropology.* 2018;31(1):10-8.

Dental Anthropology, Ancestry Estimation, Sex Estimation

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