A24 Influence of Ancestry on Sexual Dimorphism in the Human Mandibular Canine

Brittney L. Blevins, MA*, Lexington, KY 40504

Learning Overview: After attending this presentation, attendees will gain a better understanding of the ancestral differences in sexual dimorphism observed in measurements taken from human mandibular canines.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing an alternative method to estimate sex in skeletonized individuals.

Sexual dimorphism can be quantified using human mandibular canines, which allows these teeth to be used to estimate sex of skeletonized individuals. This study complements and expands on previous research by using the Mesiodistal Diameter (MD) and Buccolingual Diameter (BL) of human mandibular canines to assess sexual dimorphism between three ancestry groups. Measurements were taken from a sample of skeletal individuals from the Terry Collection (n=651), the Maxwell Museum of Anthropology Skeletal Collection (n=61), and a random sample of dental casts from the James K. Economides Orthodontic Case File (JKE) (n=599), for a total of 641 males and 597 females. Three ancestral categories were used: American Black, White, and Hispanic. A total of 50 individuals of each ancestry were randomly selected for all reported statistical analyses.

Previous research using this data set has reported a significant difference between males and females for left and right BL measurements (p<0.0001), indicating that males have significantly larger BL measurements of the mandibular canine than females from the study sample.[1] However, when individuals are separated by ancestry group (as recorded by each collection) only American Black individuals show significant levels of sexual dimorphism for the MD measurement (p=0.0012) and BL measurement (p<0.0001). Although race is a socially constructed concept, not a biological reality, there is a history of segregation between various groups of individuals that might explain the difference in the presence of sexual dimorphism shown between individuals of different ancestries. This study is consistent with other research in finding odontometric differences between different ancestral groups.[2-4] Since significant differences between males and females was only observed in American Black individuals, logistic regression equations were not created for other ancestral groups. Logistic regression equations were created to estimate sex based on measurements from either the left or right mandibular canine. These equations correctly estimated the sex of individuals in up to 73.33% of cases when using only the BL diameter measurement. Accuracy of the equations varies depending on whether the measurements are used individually (BL or MD) or combined (both BL and MD). Equations more accurately estimate the sex of male individuals than female individuals. This method may be useful for estimating the sex of skeletal individuals in forensic cases when traditional methods are not applicable but could only be used for cases whose ancestries have been estimated to be American Black. Future research will further explore the impact of secular change on sexual dimorphism and ancestral differences in the mandibular canines.

Reference(s):
1. Brittney L. Blevins. *Estimating Sex Using the Human Mandibular Canine*. Master's Thesis, (2019): 33–37.
2. Simon W. Hillson. *Teeth* (Cambridge: Cambridge University Press, 1996).
3. Heather J.H. Edgar. Estimation of Ancestry Using Dental Morphological Characteristics. *Journal of Forensic Sciences* 58, no. 1 (2012): S3–S8.
4. Marin A. Pilloud, Joseph T. Hefner, Tsunehiko Hanihara, and Atsuko Hayashi. The Use of Tooth Crown Measurements in the Assessment of Ancestry. *Journal of Forensic Sciences*, 59, no. 6(2014): 1493–1501.

Odontometrics, Sexual Dimorphism, Ancestry