A55   A Validation Study of the Mandibular Canine Index Method of Sexual Assesment Using Two American Populations

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After attending this presentation, attendees will be informed concerning a dental sexing method developed from a South Indian population and its application to American populations. Attendees will understand that further investigation is needed in the application of this method.

This presentation will impact the forensic science community by acknowledging the idea that not all sexing techniques are useful for all populations, yet specific techniques are still applied too broadly. This presentation will present a validation study of a sexing technique on an American population in which the technique has not previously been implemented.

The analysis of biological sex is important to the forensic community during any investigation of an unknown decedent. Due to the fact that human remains and especially skeletal remains may be incomplete, it is important to create, and also test, sex assessment methods on as many skeletal elements as possible in case the more traditional methods cannot be used.

In 1989, Rao and colleagues studied canine measurements in South Indian male and female populations.[1] Using the data they gathered, the Mandibular Canine Index (MCI) was created: the mesio-distal length of the mandibular canine crown, which was then divided by the width of the mandibular canine arch length (that is, the distance between the left and right canine cusp tips measured at the midline). Males were found to have a significantly higher mandibular canine index than females.[1] Since the Rao article was published; more studies have been conducted in the South Asian populations. Some of these studies have come to the same conclusion as Rao and colleagues, while others have found no significance between males and females using this method.[2] Issues have been found with the mandibular canine index technique, including the fact that teeth that are not in correct occlusion can affect the results.[3] Further research on populations from different regions may clarify the benefits and issues of this method.

The purpose of this current study was to test the effectiveness of the mandibular canine index for sex discrimination in modern North American White and Black populations. Twenty-one individuals from the C.A. Pound Human Identification Laboratory archived collection were measured in addition to 24 individuals from the Wichita State University donated collection. The measured sample consists of 23 females and 22 males. The two ancestry groups were pooled due to the lack of significant differences between the two groups (p value of MCI = .64 for females and .34 for males). The individuals were chosen based on having a known identity and having full dentition that was in correct occlusion. Individuals with dental pathologies or missing teeth were excluded. The maximum mesio-distal lengths of both mandibular canines and the canine arch width were measured using sliding calipers. The MCI was calculated using the left canine. A two sample t-test was completed to determine if there were any significant differences between the male and female canine measurements.

On average, females had significantly smaller canine mesio-distal lengths than males (p = .04 for right and .002 for left). Female right canines averaged 6.68mm compared to the male canines that averaged 7.05mm. Left canines were slightly larger than right canines. Female left canines were 6.7mm while the men's were 7.18mm. Males also had large canine arch widths, with an average of 29.62mm to the females 27.32mm (p=.01)

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The mandibular canine index showed no significant differences between males and females. Using either the right or left canine in the MCI ratio leads to females having a slightly larger mean of .25 compared to the males .24 (p=.48 for right and p=.83 for left.)

Due to the small sample size, only tentative conclusions can be made. From the above results it appears that the Mandibular Canine Index may not be an adequate tool for sex analysis. The mesio- distal lengths and the canine arch widths may be better tools. Further testing is needed.

Reference(s):

1. Rao, Nageshkumar G., Nirmala N. Rao, M. Lakshman Pai, M. Shashidhar Kotian. 1989. Mandibular canine index—a clue for establishing sex identity. *Forensic Science International.* 42(3): 249-254.

2. Acharya, Ashith B., Punnya V. Angadi, Sudeendra Prabhu, Shweta Nagnur. 2011. Validity of the mandibular canine index (MCI) in sex prediction: Reassessment in an Indian sample. *Forensic Science International.* 204(1): 207-e1.

3. Muller M., Lupi-Pegurier L., Quatrehomme G., Bolla M. 2001. Odontometrical method useful in determining gender and dental alignment. *Forensic Science International.* 121(3):194-197.

Sexual Dimorphism, Mandibular Canine Index, Anthropology

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