

ORIGINAL ARTICLE

Role of mandibular canines in establishment of gender



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Received 27 January 2014; revised 9 May 2014; accepted 13 May 2014

Available online 18 June 2014

KEYWORDS

Sex dimorphism;
Canine tooth;
Forensic sciences;
Dental models;
Personal identification

Abstract Objective: The objective of this study was to determine the maximum mesiodistal width of mandibular canines for establishing their variation as a tool to determine gender and to determine the accuracy of the measurements through clinical examination and dental cast models. **Study design:** A total of 60 subjects (30 males and 30 females) in the age group of 15–34 years were selected for the study. The maximum mesiodistal widths of the right and left mandibular canines were first measured intraorally and then on cast models of the same patients with the help of a divider and a digital vernier caliper. The collected data were subjected to statistical analysis and sexual dimorphism was calculated.

Results: The mesiodistal width of the mandibular canines as determined by clinical examination and on plaster models was statistically insignificant. The mean canine widths were found to be higher in males when compared with females. The right mandibular canine showed a greater sexual dimorphism than the left mandibular canine.

Conclusion: The present study established the mandibular canine as a valuable tool for sex determination.

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1. Introduction

Sex determination with the aid of skeletal remains poses a great dilemma to forensic experts, particularly when only a part of the body is endured.¹ DNA analysis is considered the

most precise technique for gender determination, but lack of facilities and the cost factor hindered its use in developing countries like India. This made the teeth and their odontometric analysis as the most steadfast method.

Teeth are the hardest and chemically most stable tissues in the body which exhibit the least turnover of natural structure.² They can be selectively preserved and fossilized, thereby providing the best evidence for evolutionary change. Their resilience in the case of fire and bacterial decomposition makes them important for identification in forensic science. Of all the teeth in the human dentition, the canines are the least frequently extracted teeth because of the relatively decreased incidence of caries and periodontal disease. Furthermore, canines are reported to withstand extreme conditions and have been

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Peer review under responsibility of The International Association of Law and Forensic Sciences (IALFS).

<http://dx.doi.org/10.1016/j.ejfs.2014.05.003>

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recovered from human remains even in air disasters and hurricanes.³

Males possess larger tooth crowns than females in contemporary human populations, which can be attributed to the longer period of amelogenesis for both deciduous and permanent dentitions.⁴ Bansal et al. considered mandibular canines as the key teeth for personal identification.⁵ Garn et al. and Nair et al. have found the mandibular canines to exhibit the greatest sexual dimorphism among all teeth.^{6,7}

In light of above factors this study was aimed at measuring the maximum mesiodistal width of mandibular canines to establish their variation as a tool for gender determination. The present study also intended to determine the accuracy of measurements by clinical examination and on cast models.

2. Materials and methods

The study was initiated after the protocol had been approved by the institutional committee of research ethics, and written informed consents were obtained from all the subjects. A total of 60 subjects reporting to the Department of Oral Medicine and Radiology in a dental school from south India were recruited for the study. The subjects enrolled in the study were in the age group of 15–34 years (30 males and 30 females).

Subjects with healthy mandibular canines and periodontium were included in the study. Subjects with dental or occlusal abnormalities (rotation, crowding, occlusal disharmony, etc.), physiologic or pathologic wear and tear (e.g., attrition, abrasion, abfraction, erosion) and deleterious oral habits (like bruxism) were excluded from the study.

The maximum mesiodistal widths of right and left mandibular canines were first measured intraorally and then on cast models of the same patients with the help of divider and digital vernier caliper (Hangzhou Maxwell tools Co. Ltd, Zhejiang, China) with an accuracy of ± 0.01 mm (Figures 1 and 2) as recommended by Moorrees and Reed.⁸ The measurements were performed by a single examiner and each measurement was taken thrice. The average of the three values was obtained to minimize the intra-observer error.

The collected data were entered in a spreadsheet (Excel 2007, Microsoft office) and were analyzed using statistical analysis software (SPSS version 16.01, SPSS, Inc., Chicago, 1989–2007). *T*-test was done to compare the mean width of canines in males and females. A significance was set at 0.05 level ($P < 0.05$). Sexual dimorphism in right and left mandib-

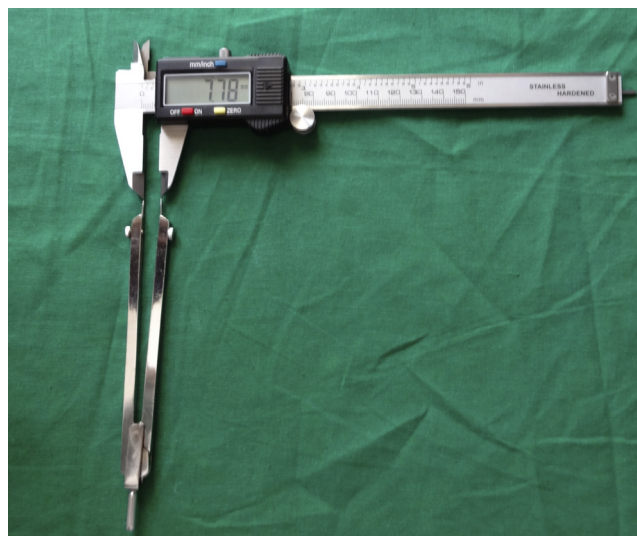


Figure 2 Figure showing the recorded measurements using the vernier calipers.

ular canines was calculated using the formula given below by Garn and Lewis.⁶

$$\text{Sexual dimorphism} = \frac{X_m}{X_f - 1} \times 100$$

where X_m = Mean value of male canine width, X_f = Mean value of female canine width.

3. Results

The mesiodistal widths of mandibular canines were measured for all subjects both clinically and on the prepared cast models of the same patients. The mean mesiodistal width of right and left mandibular canines is tabulated in Table 1.

The mesiodistal width of mandibular canines determined by clinical examination was found to be in accordance with the measurements on plaster models ($p > 0.05$). Significant differences were not obtained between the mean values of mandibular canine widths on the right and left sides ($p > 0.05$). Interestingly, the right and left mean canine widths in males were significantly higher than females clinically and on the plaster models (Table 2).

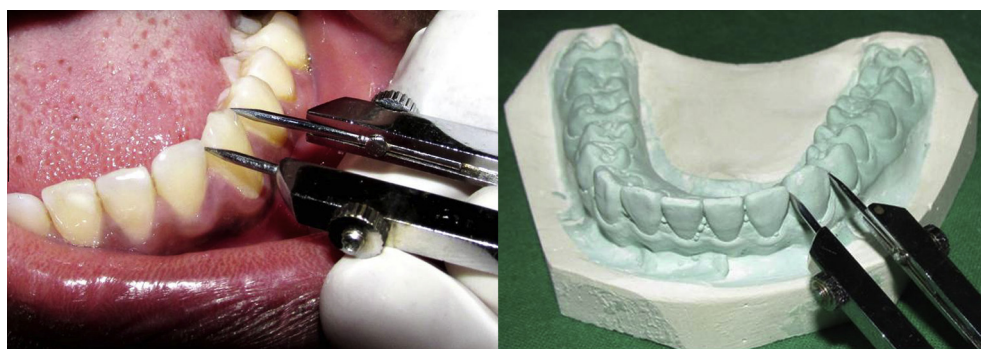


Figure 1 Figures showing measurement of mandibular canine width clinically and on dental cast model.

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