

## Original Research

### Sexual Dimorphism in the Permanent Dentition of a known population

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#### ABSTRACT:

**Background:** The present study was conducted for assessing Sexual Dimorphism in the Permanent Dentition of a known population. **Materials & methods:** A total of 20 males and 20 females within the age range of 16 to 26 years were included. Only those subjects were enrolled who reported for orthodontic treatment and had fully erupted maxillary and mandibular first molars. The inclusion criteria taken into consideration were: Presence of fully erupted bilateral caries, attrition, abrasion free permanent maxillary first molars, healthy periodontium, intact contact area. The subjects fulfilling the inclusion criteria were subjected to impression making of the maxillary arch with irreversible hydrocolloid (alginate) material and casts poured immediately in type II dental stone to minimize dimensional change. Measurement of buccolingual (BL) and mesiodistal (MD) width of both the maxillary first molars was done by vernier calliper both intra-orally and on study casts. **Results:** The comparison of mesiodistal width and buccolingual width of both genders measured intraorally, and on study cast showed that a highly significant correlation was found on intraoral measurements. Hence, statistically maxillary permanent first molars showed the nonsignificant difference; thus, they are a better predictor for gender dimorphism. **Conclusion:** The permanent maxillary first molars showed significant correlation of both measurements done intraorally and on study cast, hence suggestive of a better predictor of sexual dimorphism.

**Key words:** Permanent, Sexual, Dimorphism

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#### INTRODUCTION

In most contemporary human populations, males possess larger permanent molar crowns than females. Historically, this dimorphism has been viewed as being primarily due to larger amounts of either enamel or dentine. Some authors suggested that it is enamel, while others found significant differences in the amounts of dentine. These and other studies relied on linear measurements of tissue thickness derived from either intraoral periapical or bitewing radiographs. In these studies, enamel thickness measurements were confined to the mesial and distal interproximal regions (the so-called “marginal enamel thickness”), while dentine thickness was usually represented by a measure of maximum linear distance of the dentine cap between the enamel-dentine junctions in the mesiodistal plane.<sup>1-3</sup>

For the most part, these measures were chosen because they are the most accessible and reliable that can be made from radiographs that were taken for clinical reasons. Linear measurements of this sort might, however, be limited for a number of reasons,

and one aim of this study was to confirm previous findings using different measurements (tissue areas) made from buccolingual (not mesiodistal) longitudinal sections of teeth and not from radiographs. Larger dentine crown caps in males might also arise, for example, from greater crown heights, and occlusal enamel thickness might similarly influence the pattern of enamel dimorphism in a different way from that recorded interproximally from radiographs that image teeth in the mesiodistal plane.<sup>4-6</sup> Hence; the present study was conducted for assessing Sexual Dimorphism in the Permanent Dentition of a known population.

#### MATERIALS & METHODS

The present study was conducted for assessing Sexual Dimorphism in the Permanent Dentition of a known population. A total of 20 males and 20 females within the age range of 16 to 26 years were included. Only those subjects were enrolled who reported for orthodontic treatment and had fully erupted maxillary and mandibular first molars. The

inclusion criteria taken into consideration were: Presence of fully erupted bilateral caries, attrition, abrasion free permanent maxillary first molars, healthy periodontium, intact contact area. The subjects fulfilling the inclusion criteria were subjected to impression making of the maxillary arch with irreversible hydrocolloid (alginate) material and casts poured immediately in type II dental stone to minimize dimensional change. Measurement of buccolingual (BL) and mesiodistal (MD) width of both the maxillary first molars was done by vernier calliper both intra-orally and on study casts. Measurement was done twice for avoiding observer bias. All the results were recorded and analysed using SPSS software.

**RESULTS**

While assessing the mean mesiodistal width and buccolingual width of maxillary first molar intraorally of both sides in both genders, it was observed that mesiodistal width was more on the left side. The results were found to be statistically significant. Similar results were seen on the study casts. The comparison of mesiodistal width and buccolingual width of both genders measured intraorally, and on study cast showed that a highly significant correlation was found on intraoral measurements. Hence, statistically maxillary permanent first molars showed the nonsignificant difference; thus, they are a better predictor for gender dimorphism.

**Table 1: Dimension of mesio-distal and bucco-lingual variables of 16 and 26 measured intra-orally**

Gender	Mesio-distal		Bucco-lingual		p- value
	16	26	16	26	
Males	9.59	9.68	10.99	11.09	0.003 (Significant)
Females	9.51	9.51	10.63	10.82	
Overall	9.55	9.59	10.81	10.93	
p- value	0.001 (Significant)		0.002 (Significant)		

**Table 2: Dimension of mesio-distal and bucco-lingual variables of 16 and 26 measured on casts**

Gender	Mesio-distal		Bucco-lingual		p- value
	16	26	16	26	
Males	10.02	9.96	11.36	11.48	0.001 (Significant)
Females	9.88	9.75	11.10	11.05	
Overall	9.95	9.85	11.23	11.21	
p- value	0.002 (Significant)		0.003 (Significant)		

**Table 3: Comparison of mesio-distal and bucco-lingual variables of 16 and 26 measured on intra-orally and casts**

Gender	Mesio-distal				Bucco-lingual			
	16		26		16		26	
	IO	Cast	IO	Cast	IO	Cast	IO	Cast
Males	9.59	10.02	9.68	9.96	10.99	11.36	11.09	11.48
Females	9.51	9.88	9.51	9.75	10.63	11.10	10.82	11.05
Overall	9.55	9.95	9.59	9.85	10.81	11.23	10.93	11.21
p- value	0.255		0.112		0.885		0.336	

**IO: Intra-orally**

**DISCUSSION**

Based on the referenced literature and from a holistic and integrating viewpoint, dental anthropology is seen as an interdisciplinary field that integrates knowledge of anthropology, dentistry, biology, paleontology and paleopathology in order to study all the information provided by the human dentition, such as anatomical, developmental, pathological, cultural and therapeutic variations in consideration of the conditions of life, culture, food and adaptation processes of the past and present human populations, through morphology, size, disease and modifications of teeth. Basically, dental anthropology is concerned with the study of morphological variation (dental morphological features) and metrics of the dentition of human populations over time (prehistoric and

modern) and space (ethnic influences) and their relation with the processes of adaptation and dietary changes that led to the evolution of the dental system and the human race. This is possible because the enamel is the hardest tissue of the human body and has a high capacity to preserve itself even in extreme conditions of pH, moisture, salinity and high temperatures, which is recognized in the archaeological taphonomic field as resistance, that dental morphology is expressed to be genetically unique and unrepeatable in each tooth.<sup>6- 10</sup>Hence; the present study was conducted for assessing Sexual Dimorphism in the Permanent Dentition of a known population.

In the present study, while assessing the mean mesiodistal width and buccolingual width of

maxillary first molar intraorally of both sides in both genders, it was observed that mesiodistal width was more on the left side. The results were found to be statistically significant. Similar results were seen on the study casts. Our results were in concordance with the results obtained by previous authors who also reported similar findings. In a previous study conducted by Agrawal A et al, authors assessed the dimorphic status of mesio-distal (MD) and buccolingual (BL) diameter of mandibular canine with mandibular first molar among the students of dental college. Sexual dimorphism can be predicted by measuring mesiodistal dimension of mandibular canine and mandibular first molar. The left mandibular canine showed more sexual dimorphism (12.66%) in comparison to left mandibular first molar (0.824%) only. Right mandibular canine showed greater dimorphism in MD dimensions (10.94%) in comparison to right mandibular first molar (6.96%). In bucco-lingual dimensions mandibular canine showed less variability when compared with mandibular first molar, thus our study showed more significance on mesio-distal dimensions of both teeth. Their study concluded statistically significant sexual dimorphism in mandibular canine over mandibular first molar on study casts.<sup>10</sup>

In the present study, the comparison of mesiodistal width and buccolingual width of both genders measured intraorally, and on study cast showed that a highly significant correlation was found on intraoral measurements. Hence, statistically maxillary permanent first molars showed the nonsignificant difference; thus, they are a better predictor for gender dimorphism. Similar results were obtained in the study conducted by Viciano J et al. Their study was based on the deciduous and permanent dentition of 269 individuals (150 males and 119 females) from the Granada osteological collection of identified infants, young children, and adults. The results showed that the first and second deciduous molars and the permanent canines are the teeth with the greatest sexual dimorphism, providing percentages of correct assignment of sex between 78.1 and 93.1% in deciduous dentition and between 79.4 and 92.6% in permanent teeth, depending on the dimensions used. Their results indicated that this method may be

applicable as an adjunct with other accepted procedures for sex estimation.<sup>12</sup>

## CONCLUSION

The permanent maxillary first molars showed significant correlation of both measurements done intraorally and on study cast, hence suggestive of a better predictor of sexual dimorphism.

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