Importance Of Maxillary First Molar For Sex Determination

B Rai, R Jain, J Duhan, S Dutta, S Dhattarwal

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Abstract

Teeth form an excellent material for anthropological, genetic, odontologic and forensic investigations. Amongst all the teeth, the maxillary first molar is found to exhibit greatest sexual dimorphism. To define the morphometric criteria for maxillary first molar in North India, the present study has been conducted in 102 patients (M:F - 52:50) in the age group of 17-25 years.
It was seen that a definite statistically significant sexual dimorphism exist in the maxillary molar whether measurements are taken on casts or intraorally. It is concluded that whenever the Bucco-lingual of either molar is more than 10.7 mm, the probability of sex being male is 100% while if it is less than 10.7 mm the sex could be 82% female.

INTRODUCTION

Identification of living person and the dead is of paramount importance in forensic practice routinely.[1] Sex estimation is one of the prime factors employed to establish identity. Teeth are excellent material in living and nonliving populations for anthropological, genetic, odontologic and forensic investigations, being hardest and chemically the most stable tissue in the body, they are selectively preserved and fossilized, thereby providing the best records for evolutionary change.[2] Their durability in the phase of fire and bacterial decomposition makes them invaluable for identification of tooth size standards based on odontometric investigations can be used in age and sex determination[1] "Sexual Dimorphism" refers to those difference in size stature and appearance between male and female that can be applied to dental identification because no two mouths are alike.[2]

The present study establishes the impact of morphometry of maxillary first molar of sex factors. The results indicate that the sexual dimorphism in maxillary first molar can be of immense medicolegal use in sex determination. The study defines the morphometric criteria for maxillary first molar in human being. This is of define significance as tooth morphology known to be influenced by cultural, environmental and racial factor.[2]

MATERIAL AND METHODS

The study was conducted on 102 patients (52:50, M:F) in the age group of 17-25 years, selected from the OPD of the G.D.C. PGIMS, Rohtak. The teeth with marked wear (waste disease) were excluded from the research. The impression of maxillary arch was taken with alginate and poured with type IV dental stone. Care was taken to pour the impression immediately to minimize the dimensional changes. The B-L diameter of maxillary first molar was measured with vernier calliper (resolution 0.02 mm) intraorally in patient as well as on the cast.

B-L diameter of the crown : This measurement is the greatest distance between facial and lingual surface of the crown parallel to the long axis of tooth.

The reading obtained were subjected to statistical analysis to derive the conclusion and sexual dimorphism in right and left maxillary dimorphism was calculated using the formula.[2,3]

Sexual dimorphism = (Xm / Xf) * 100

Where Xm = mean value of males
Xf = mean value for females

OBSERVATIONS AND RESULTS

STATISTICAL SIGNIFICANCE OF PARAMETERS

The following parameters were determined intaorally as well as on study casts in males and females.

- Right maxillary first molar B-L diameter.
- Left maxillary first molar B-L diameter.

The results have been depicted in Table -1. From table- 1 it

is evident that these parameters as measured for males and females when compared are found to be statistically significant. This is irrespective of whether measurements are taken intraorally or on the study cast.

Figure 1

Table 1: Showing the range of Maxillary First Molar B-L diameter in different groups males / females

Group	*Sex*	*Right maxillary first molar (range in mm)*	*Left maxillary first molar (range in mm)*
Casts	Male	10.5 - 11.8	11 - 12.0
	Female	9.5 - 10.2	9.0 - 10.2
Intraoral	Male	10.5 - 12.0	11 - 12.0
	Female	9.5 - 10.5	8.9 - 10.5

From these findings, it can be inferred that there exists a definite statistically significant sexual dimorphism in the maxillary first molar. This influence of the 'sex factor' on morphometry in North India population is demonstrable irrespective of whether measurements are taken intraorally or on the study casts.

SEXUAL DIMORPHISM IN MAXILLARY FIRST MOLAR B-L WIDTH

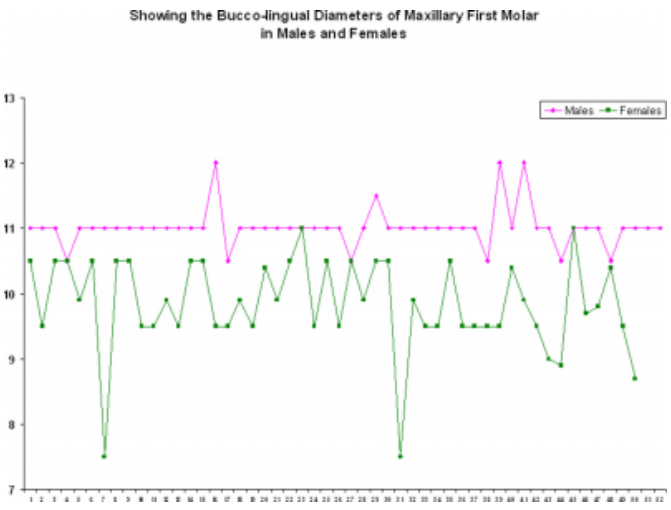
The sexual dimorphism as computed for intraoral measurements and measurements on casts has been presented in table - 2.

Figure 2

Table 2: Showing Sexual Dimorphism in Maxillary First Molar

Groups	*Right maxillary first molar*	*Left maxillary first molar*
Casts	8.8%	8.3%
Intraoral	8.9%	8.4%

Figure 3



From the findings, it is interpreted that in both instances (intraoral and casts), the right maxillary first molars is found to exhibit greater sexual dimorphism.

PROBABILITY OF SEX DETERMINATION

The range of B-L diameter of maxillary first molar in North India has been presented in
table - 1.

From the range of B-L diameter of molar it can be concluded that whenever the B-L diameter of maxillary first molar is greater than 10.7 mm the probability of sex being male is 100%, from the present study, this finding could prove to be of immense medico-legal importance in sex determination of human being.

DISCUSSION

The present study establishes the existence of a definite statistically significant sexual dimorphism in maxillary first molar. Sex can be determined well in mature individuals if the post-cranial skeleton is intact, but in young child and infant determination of sex from skeleton is difficult.[4] It has already been stressed that any measurement of teeth unaccompanied by Age, Race and Sex must be treated within great reserve.[2] Usually the maxillary first molar have a mean eruption age of 6-7 years[5,6] and are less impacted as compared to canines. Usually maxillary first molar is early erupted as compared to canines.[7]

It has already been concluded that sexual dimorphism in 5.7% to 6.4%.[2,3] But in present study the sexual dimorphism of maxillary first molar is 7.7% to 9.1%. In the present study both the parameters of males and females were compared and the differences are found to be statistically significant. The results indicate that the dimorphism in maxillary first molar can be of immense medico-legal purpose.

CONCLUSION

The B-L diameter of either maxillary first molar is more than 10.7 mm the probability of sex being male is 100% while if it less than 10.7 mm the sex could be 82% females.

CORRESPONDENCE TO

Balwant Rai S.Sct.
S/o Sh. Ram Swaroop
Village Bhangu,
District Sirsa,
Post Office Sahuwala First
Haryana (INDIA)
Mobile 0091-9812185855

References

1. Bhat Virendra J et al. Age estimation from the root development of mandibular third molar's. An International Journal of Medico-Legal Update, 2004, 4 (4) : 127-9.
2. Kaushal S, Patnaik VVG, Agnihotri G, Mandibular Canines in Sex Determination; J Anat Soc India, 2003; 52 (2) : 119-24.
3. Garn et al. Genetic control of sexual dimorphism in tooth size. J Dent Res, 1967; 46 : 963-72.
4. Rai Balwant et al. Evidence of tooth in sex determination. An International Journal of Medico-Legal Update, 2004, 4 (4) : 119-26.
5. Ralph E. McDonald & David R. Avery. Dentistry for Child and Adolescent. Eruption of teeth : Local systematic and congenital factors that influence the process. C.V. Mosby, St. Louis : 2004: 175-202.
6. Tencate AR. Oral history. Physiologic tooth movement : Eruption and shedding, C.V. Mosby, St. Louis, 2003 : 275-98.
7. Navile et al. Oral and Maxillofiacial Pathology. Abnormality of the teeth. Saunders, Philadelphia, Pennsylvania : 2004 :49-106.

Author Information

Balwant Rai, S.Sct.
Final Year BDS Student, Govt. Dental College, Pt. B.D. Sharma PGIMS

Rajnish K. Jain, M. D.S.
Lecturer, Dept. of Endodontics, Govt. Dental College, Pt. B.D. Sharma PGIMS

Jigyasa Duhan
Lecturer, Dept. of Endodontics, Govt. Dental College, Pt. B.D. Sharma PGIMS

Sameer Dutta
Professor and Head, Dept. of Pedodontics, Govt. Dental College, Pt. B.D. Sharma PGIMS

S. K. Dhattarwal
Associate Professor, Dept. of Forensic Medicine, Pt. B.D. Sharma PGIMS