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ESTIMATION OF GENDER BY PERMANENT MAXILLARY AND MANDIBULAR INTERCANINE DISTANCE

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ABSTRACT

Human beings are born with an identity and deserve the right to die with an identity. Anatomical structures including skull, teeth and pelvic girdle have been implicated time and again by the forensic anthropologists to conclude the gender of skeletal remains. Teeth measurements are significantly authentic tool in determination of gender and age especially in cases where secondary sexual characteristics have either not developed or where certain body parts, otherwise useful to determine the gender and age, were missing. The present study was performed on 300 patients from NIMS dental college and hospital, Jaipur. Intercanine distance were measured on the basis of intraoral examination, plaster modal and orthopantomographs with the help of Vernier calliper. Sexual dimorphism were calculated from these measured parameters. The present study showed that males show higher mean value of intercanine distance than females in the study group and the difference was statistically significant. Mandibular canine shows more sexual dimorphism than maxillary canine.

KEYWORDS: *Canines, intercanine distance, sexual dimorphism*

INTRODUCTION

Human beings are born with an identity and deserve the right to die with an identity. Identity means the determination of the individuality of a person.[1]

Anatomical structures including skull, pelvic girdle and teeth have been implicated time and again by the forensic anthropologists to conclude the gender of skeletal remains. Teeth measurements are significantly authentic tool in determination of gender and age especially in cases where secondary sexual characteristics have either not developed or where certain body parts, otherwise useful to determine the gender and age, were missing.[2,3]

Gendural dimorphism refers to those differences in size, structure and appearance between male and female, at an equal age, which can be applied to dental identification, because no two oral cavities are alike. The gendural dimorphism is more pronounced in permanent dentition than in deciduous teeth.[4,5]

Canines are perhaps the most stable teeth in the oral cavity because of the labio-lingual thickness of the crown and the root anchorage in the alveolar process of the jaws. The crown portions of the canines are shaped in such a manner as to promote cleanliness. This self-cleansing quality and efficient anchorage in the jaws tend to preserve these teeth throughout life. Canines are the last teeth to be extracted with respect to age since they are least affected with abrasion from brushing, bear lesser occlusal loading and are less severely affected by periodontal disease. Canines are also better likely to survive severe trauma such as air disasters, hurricanes or conflagration. These findings indicate that canines can be considered the 'key teeth' for personal identification. [6,7,8,9]

MATERIALS AND METHODS

Study Area– Department of Oral Medicine & Radiology, NIMS Dental College and Hospital, Jaipur (Rajasthan)

Sample Size–300 patients comprising 150 Males and 150 Females reporting to the Department of Oral Medicine & Radiology, NIMS Dental College and Hospital, Jaipur.

Inclusion criteria:
1. The subjects having complete set of fully erupted, morphologically well-formed teeth.
2. Non-carious, non-attrited, intact teeth.
3. Absence of spacing in the anterior teeth.
4. Normal molar and canine relationship.
5. No history of orthodontic treatment.
6. No evidence of cleft palate or crown restorations.

Exclusion criteria:
1. Subjects with hard tissue abnormalities (like rotation, crowding, occlusal disharmony).
2. Physiologic or pathologic wear and tear (like attrition, abrasion, erosion).
3. Restored either in the crown or root or have prosthesis to it.

Instruments: Following Instruments were used in the present study: -
1. Digital Vernier calliper
2. Standardized flexible measuring ribbon tape
3. Dental cast
4. Orthopantomographs x-ray

Inter canine Distance:

Maximum Inter canine distance is measured along the tips of right canine with the sliding caliper to tip of left canine in maxillary and mandibular jaw.

Intercanine distance were measured by three methods
a) Intraoral
b) On the cast
c) On orthopantomographs of same patients.

The mean values of intercanine distance of males and females were subjected to the formula to calculate the sexual dimorphism (in percentage).

Sexual dimorphism (in percentage) = $X_m / X_f - 1 \times 100$

X_m =mean value of males X_f=mean value of females

RESULTS

Table & Graph No 1: Mean ± SD of maxillary intercanine distance of intraoral, cast & orthopantomographs among male and female patients.

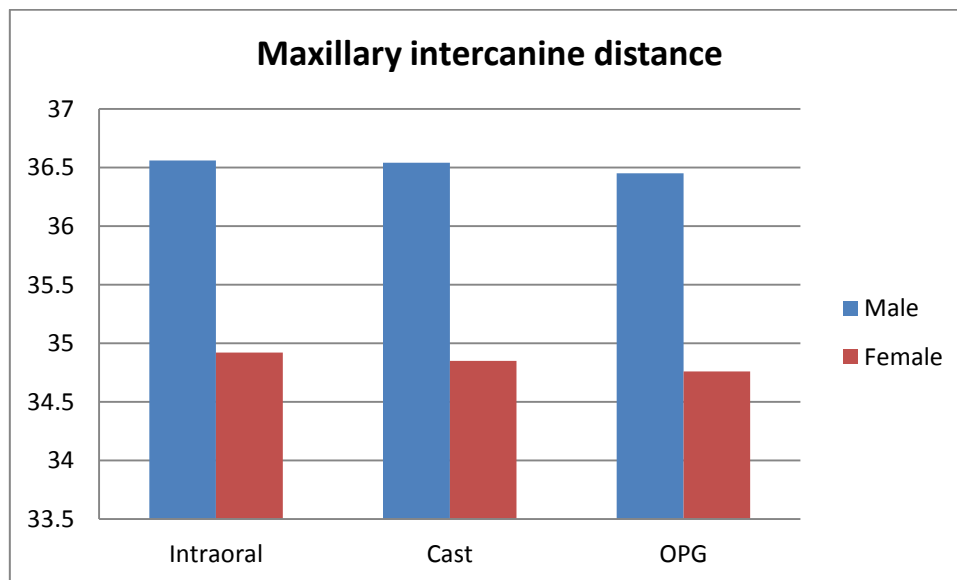| Parameters	Group	Gender	Mean (mm)	± S.D.	'p' value	Significance
	Intraoral	Male	36.56	0.07	<0.0001	HS
		Female	34.92	0.91		
	Casts	Male	36.54	0.07	<0.0001	HS
		Female	34.85	1.32		
Maxillary intercanine distance	OPG	Male	36.45	0.81	<0.0001	HS
		Female	34.76	1.55		

Table & Graph No 2: Mean ± SD of mandibular intercanine distance of intraoral, cast & orthopantomographs among male and female patients.

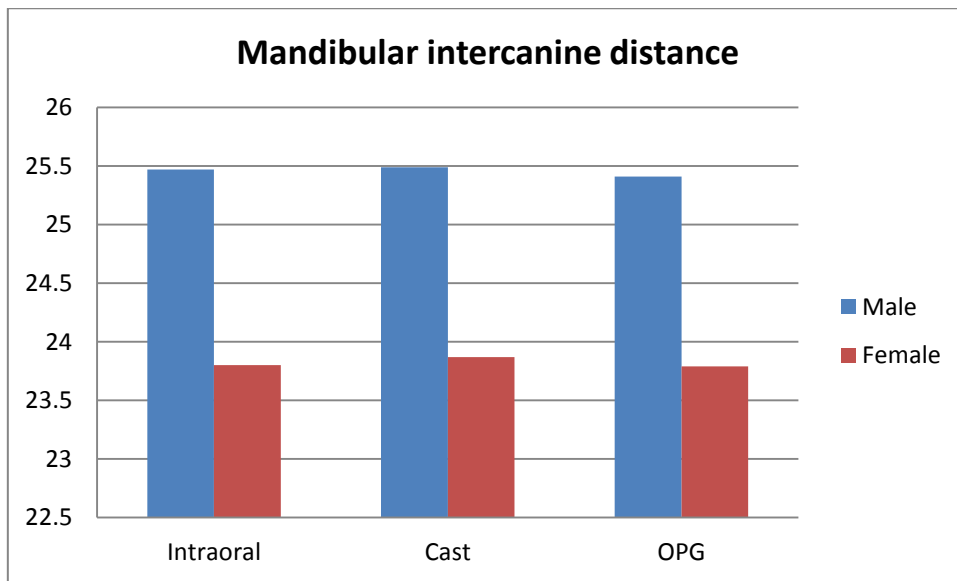| Parameters	Group	Gender	Mean (mm)	± S.D.	'p' value	Significance
Mandibular intercanine distance	Intraoral	Male	25.47	0.85	0	HS
		Female	23.8	0.68		
	Casts	Male	25.49	0.83	<0.0001	HS
		Female	23.87	0.65		
	OPG	Male	25.41	0.83	<0.0001	HS
		Female	23.79	0.66		

Table & Graph No 3: Sexual dimorphism (in percentage) in maxillary and mandibular canine tooth

Parameters	Intraoral(%)	Cast(%)	OPG(%)
Maxillary Intercanine distance	4.7	4.85	4.86
Mandibular Intercanine distance	7.02	6.79	6.81

Comparsion of maxillary and mandibular intercanine distance of intraoral, cast and OPG between male and female indicates that values higher in males as compare to females and P value < .0001, it was highly significance as shown in Table -1, 2

Maxillary intercanine distance was 36.56 ± 0.07 (intraoral), 36.54 ± 0.07 (cast), 36.45 ± 0.81 (OPG) for male & 34.92 ± 0.91 (intraoral), 34.85 ± 1.32 (cast), 34.76 ± 1.55 (OPG) for female.

Mandibular intercanine distance was 25.47 ± 0.85 (intraoral), 25.49 ± 0.83 (cast), 25.41 ± 0.83 (OPG) for male & 23.8 ± 0.68 (intraoral), 23.87 ± 0.65 (cast), 23.79 ± 0.66 (OPG) for female.

The sexual dimorphism was greater in the mandibular canine than maxillary canine. Intercanine distance in mandible shows maximum sexual dimorphism among all measurements (introral 7.02%).

DISCUSSION

Comparison of maxillary and mandibular intercanine distance in different populations.

Author	Population	Maxillary intercanine distance		Mandibular intercanine distance	
		Male	**Female**	**Male**	**Female**
Aliaa Omar[10]	Egyptian	36.82	34.65	26.4	26.33
Mohsenpour[11]	Iranian	35.27	34.20	28.4	26.34
Paramkusam[12]	Indian (Andhra Pradesh)	34.4	32.7	25.9	23.7
Baheti[13]	Indian (Maharashtra)	36.11	34.78	27.20	26.38
Shastry[14]	Indian (Bangalore)	**34.48**	**34.97**	27.89	26.72
Bakkannavar[15]	South India	34.17	33.47	25.25	24.75
Present study	Rajastahn	36.56	34.92	25.47	23.8

Parikh (2013) showed that the most sensitive predictors for gender determination were the maxillary and mandibular inter-canine distance & canine index[16] Hence the present study was conducted on maxillary and mandibular intercanine distance to find out the sexual dimorphism

In present study the maxillary intercanine distance close to Aliaa Omar and Baheti while mandibular intercanine distance close to Paramkusam. These Variation in maxillary intercanine distance and mandibular intercanine distance between the different populations being characteristic of genetic factor, environmental factors, sex, heredity, race, secular changes and bilateral asymmetry.

In all the populations mentioned above, the intercanine distance of the maxillary and mandibular canines was found to be is more in the males than the females and the difference was statistically significant. It can thus be concluded that the sexual dimorphism in maxillary and mandibular canines is evident in its intercanine distance.

Shastry showed that maxillary intercanine distance more in female then male, this was contrast result of the present study. Kaddah also reported contrast result to present study that, there were no statistically significant differences between males and females in the intercanine distance. This disagreement may be caused by comparison between the mean values of both maxillary and mandibular measurements which may decrease the differences in maxillary arch dimensions.

CONCLUSION

The present study showed that males show higher mean value of intercanine distance than females in the study group and the difference was statistically significant. Mandibular canine shows more sexual dimorphism than maxillary canine.

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