

Original Research

Assessment of canine sexual dimorphism in permanent dentition in Kashmir population-An original study

Shahid Hassan, Afreen Nadaf, Romshi

Deptt. of Oral Pathology, Govt Dental College Srinagar, J & K, India

ABSTRACT:

Background: Among the various calcified structures in the human body, teeth are highly resistant to destruction and decomposition. These have emerged as the excellent material for anthropological, genetic, odontologic and forensic investigations. **Objective:** The present study aims to assess the use of permanent canines in sexual dimorphism as well as to describe the dimensional characteristics of canines among the population of Srinagar district of Jammu and Kashmir, India. **Materials and Methods:** One hundred participants belonging to Srinagar district of Kashmir population were included in the study. Clinical crown height (CCH), maximum mesiodistal diameter (MMD) and maximum buccolingual width (MBL) of maxillary and mandibular canines of both dentitions were measured using digital vernier caliper. **Results:** In permanent dentition, CCH and MMD showed significant differences except mandibular canines not showing significant differences in MBL ($P < 0.05$). **Conclusion:** Canines can act as pivotal role in gender determination.

Key words: Canines, sexual dimorphism, forensic odontology, gender determination.

Received: 13 January, 2019

Revised: 25 June 2019

Accepted: 27 June 2019

Corresponding author: Dr. Afreen Nadaf, Tutor, Deptt. of Oral Pathology, Umar colony, 117 Beigh Manzil, Pin 190015

This article may be cited as: Hassan, Nadaf A, Romshi. Assessment of canine sexual dimorphism in permanent dentition in Kashmir population-An original study. J Adv Med Dent Scie Res 2019;7(8): 1-3.

INTRODUCTION

Skeletal remains and dentition play a pivotal role in routine forensic practice. Teeth being hardest and chemically the most stable tissue provide the best record for evolutionary change and identification of age, sex and race based on odontometric parameters.¹ As no two persons are alike, there are differences in size, stature and appearance between male and female that can be applied to dental identification. These differences are known as "Sexual dimorphism".² According to Suazo et al (2008), teeth are known to have sexual dimorphism.³ Mesiodistal diameter of mandibular and maxillary canines provides evidence of sex determination due to dimorphism.⁴ Canines are also the least extracted teeth being less affected by periodontal disease.

In this context, the present study aims to assess the sexual dimorphism of permanent maxillary and mandibular canines in a Kashmir population.

MATERIALS AND METHOD:

The study group consisted of 100 participants from Srinagar district with equal gender distribution in the age group of 17–30 years.

Partially erupted/ectopically erupted teeth, patients with dental/occlusal abnormalities, teeth showing physiologic/pathologic wear and tear as with bruxism were excluded from the study.

Study models of maxillary and mandibular impressions were prepared in dental stone. On the study model, following measurements were taken for all the participants using digital vernier caliper.

- Clinical crown height (CCH)
- Maximum mesiodistal diameter (MMD)
- Maximum buccolingual width (MBL).

Clinical crown height

The CCH was measured from the tip of the cusp to the cervical line of canine using digital vernier caliper.

Maximum mesiodistal diameter

The maximum width of canine teeth was taken as greatest mesiodistal width on either side of the jaw.

Maximum buccolingual width

The maximum width of canine buccolingually was measured using digital verniercalipers.

Sexual dimorphism

According to Garn and Lewis,[5] sexual dimorphism: $(X_m/X_f) - 1 \times 100$

- X_m = mean value of measurement for males
- X_f = mean value of measurement for females.

All the measurements were recorded, and the statistical analysis was done using SPSS 20.0, (SPSS Inc., Chicago III, USA) Student's *t*-test and discriminant function analysis were used.

RESULTS

Table 1 shows gender comparison with respect to CCH, MMD and MBL in the right and left sides of maxillary and mandibular teeth. It was observed that the mean values of the Clinical crown height and mesiodistal dimensions of the mandibular and maxillary canines were greater in males than in females. Student's *t*-test results showed a significant difference.

Table No 1: Role of maxillary and mandibular canines in gender determination

Quadrants	Sides	Variables	Male		Female		t	p
			Mean	SD	Mean	SD		
Maxillary	Right	CCH	10.22	0.79	8.32	1.07	3.7888	0.0000*
		MMD	7.75	0.55	6.71	0.34	4.2748	0.00001*
		MBL	6.37	0.69	5.67	0.46	2.6534	0.00002*
	Left	CCH	9.62	1.05	8.03	0.01	5.6784	0.00000*
		MMD	8.35	0.88	7.01	1.00	0.6875	0.00003*
		MBL	5.68	0.77	4.55	0.65	0.7419	0.4589
Mandibular	Right	CCH	10.62	1.31	8.17	0.70	4.4675	0.6327
		MMD	6.90	0.71	5.62	0.98	3.5546	0.000001*
		MBL	5.44	1.06	6.40	1.11	0.7895	0.00007*
	Left	CCH	10.9	1.42	9.99	1.05	3.6667	0.3567
		MMD	7.04	0.67	6.05	0.56	3.8945	0.0004*
		MBL	4.55	0.89	4.35	0.61	2.7103	0.00016*

* $p < 0.05$ CCH: Clinical crown height, MMD: Maximum mesiodistal diameter, MBL: Maximum buccolingual width, SD: Standard deviation
Statistical test: Student t test

DISCUSSION

Identification is the basis of uniqueness of a person. Numerous methods of identification are available but they have their own limitations. Dentition is one part of the body that resists all environmental insults for maximum time and thus can be a valuable tool in identification.¹

According to the present study, there exists a significant sexual dimorphism in all canine dimensions, both maxillary and mandibular, as shown by the results. However, among all dimensions, CCH and MMD show very significant difference among permanent canines. Similar results were confirmed by Ingleshwar P et al⁵. On the contrary, Hashim and Murshid found the highest sexual dimorphism in canines when compared with other teeth, but failed to obtain a significant difference in canine widths between the right and left sides.⁶ This significant sexual dimorphism in the tooth can be attributed to the presence of relatively more dentine in males when compared with females. Agnihotri and Sikri attributed the difference of mesiodistal widths between genders to the genetics, where Y chromosome controls the size of the teeth and X chromosome controls the thickness of the enamel.⁷

Interestingly, studies done by Acharya and Mainali and Karen et al. revealed a reverse dimorphism in the Nepalese population and the south Indian population, respectively, where the mean widths of canines were found to be larger in females than males. This could be attributed to the evolutionary process resulting in a reduction in sexual dimorphism in modern males and females.^{8,9,10}

CONCLUSION

From the present study, it can be concluded that there is a significant sexual dimorphism in maxillary and mandibular permanent canines of the Srinagar population. The present study can be useful in cases even when only one canine is present. These may act as a valuable tool in cases of mass disaster and when the bodies are decomposed or in extreme burnt cases.

However the study with larger samples can increase the accuracy of the findings.

The present study measured only linear dimensions. More accuracy could have been obtained by the application of Moire's topography and Fourier's analysis that however require sophisticated equipments and the use of complex mathematical equations, respectively.

REFERENCES:

1. Rastogi P, Jain A, Kotian S, Rastogi S. Sexual dimorphism – An odontometric approach. *Anthropology* 2013;1:1-4.
2. Kieser JA. *Human Adult Odontometrics*. Cambridge, England: Cambridge University Press; 1990.
3. Suazo GI, Cantin LM, Lopez FB, *et al.* Sexual Dimorphism in mesiodistal and buccolingual tooth dimensions in Chilean people. *Int. J. Morphol.* 2008;26:609-14.
4. Parekh D, Patel SV, Zalawadia AZ, Patel SM. Odontometric study of maxillary canine teeth to establish sexual dimorphism in gujrat population. *Int J Biol Med Res* 2012;3:1935-7.
5. Ingaleshwar P, Vaswani V, Bhosale SS, Deepak V, Redder P, Smitha T. Evaluation of canine sexual dimorphism in deciduous and permanent dentition. *J Oral MaxillofacPathol* 2018;22:451
6. Hashim HA, Murshid ZA. Mesiodistal tooth width – a comparison between Saudi males and females. *Egypt Dent J* 1993;39:343–6.
7. Agnihotri G, Sikri V. Crown and cusp dimensions of the maxillary first molar: a study of sexual dimorphism in Indian Jat Sikhs. *Dent Anthropol* 2010;21(1):1–6.
8. Kaushal S, Patnaik VV, Agnihotri G. Mandibular canine in sex determination. *J AnatSoc India* 2003;52:119–24
9. Acharya A, Mainali S. Univariate sex dimorphism in the Nepalese dentition and the use of discriminant functions in gender assessment. *Forensic SciInt* 2007;173:47–56.
10. Rao NG, Rao NN, Pai ML, Kotian MS. Mandibular canine index: A clue for establishing sex identity. *Forensic SciInt* 1989; 42:249-54.