

Mesio-distal diameter of mandibular canine as a sex and intercanine distance as the age determinant

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Abstract

Teeth are an excellent material in living and non-living populations for anthropological, genetic, odontologic and forensic investigations. To define the morphometric criteria for teeth in Haryana, the present study has been conducted in 102 patients (M:F – 52:50) in the age group of 17-28 years. It was seen that statistically significant sexual dimorphism exist in the mandibular canine and intercanine distance whether measurements are taken on casts or intra-orally. It is concluded that whenever the mesio-distal diameter of mandibular canine is greater than 7.2 mm, the probability of sex being male is hundred percent. If the intercanine distance is greater than 25 mm, the age of male and female is more than 14 and 12 years in male and female respectively.

Key Words: Sex; Age; Intercanine Distance; Mandibular canine; Mesio-distal.

Introduction

Introduction of the living person and dead is of paramount importance in forensic practice routinely. Age and sex estimation importance of the prime factors employed to establish identity. One of the earliest known “authentic” cases of the application of dental information leading to identification of an individual was that of Lollia Poulina in the year 49 AD. She was the second wife of Claudius, the then emperor of Rome and was killed on the instructions of his first wife Agrippina. Her mutilated body was identified by her teeth which had certain distinctive characteristics.¹ Curiously, this was followed by the second landmark case in the year 66 AD, Sabrina, the mistress of emperor nero, got his wife killed and the decapulated head was subsequently positively identified on the basis of some discoloured anterior teeth.² The scientific employment of dental evidence in identification of individuals began only in the 17th century with the solving of case of disputed identifying a dentist, who evaluated the dental details of the deceased who had been personally know to him.³ 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 The mandibular canines have mean age of eruption is 10-11 years.^{5,6} The present study endeavors to establish the effectiveness of mandibular canine and intercanine distance in predicting of sex and age respectively in Haryana taking correct dental alignment into consideration.

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Material and Methods

The study was conducted on 102 patients (52:50, M:F) in the age group of 17-28 years, selected from the out patient Department of the Govt. Dental College, associated with Post Graduate Institute of Medical Sciences, Rohtak, India. Teeth with marked wear or heavily restored excluded from the research. An impression of mandibular arch was taken with alignate and poured with type IV dental stone. Care was taken to pair the impression immediately to minimize the dimensional changes. The mesio-distal and intercanine diameter measured with vernier callipers (Mechanical Instruments Pvt. Ltd., New Delhi, India) (resolution 0.02 mm) intraorally among patient as well as on the cast. The results obtained were subjected to statistical analysis to derive the conclusion and sexual dimorphism in teeth was calculated using the formula as the previous study.^{7,8}

Observations and Results

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

-M-D diameter of mandibular canine

-Intercanine distance of mandibular arch

the results has been depicted in table 1. It is evident that these parameters, as measured for males, females, age greater than 14 years and less than 14 years, when compared are found to be statistically significant. This is irrespective of whether measurements are taken intraorally or on the study cast. From the findings, it can be inferred that there exists a definite statistically significant sexual dimorphism in the mandibular canines and intercanine distance.

Sexual dimorphism in mandibular canine:

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

Table 1: Statistical Significance of Difference Parameters

Parameters	Group	Variable	Mean (mm)	+ SD	't' stat	'p' value	Significance
Left Mandibular Canine	Casts	Males	7.32	0.035	158.93	.000	HS
		Females	6.54	0.020			
	Intraoral	Males	7.55	0.056	49.84	.000	HS
		Females	6.76	0.099			
Right Mandibular Canine	Casts	Males	7.54	0.069	49.29	.000	HS
		Females	6.63	0.100			
	Intraoral	Males	7.72	0.023	70.45	.000	HS
		Females	6.89	0.077			
Inter canine distance	Casts	< 14 yrs	25.72	0.032	204.73	.000	HS
		> 14 yrs	24.52	0.047			
	Intraoral	< 14 yrs	25.74	0.042	204.36	.000	HS
		> 14 yrs	24.54	0.044			

Table 2: Sexual Dimorphism in Canine

Groups	Right canine	Left canine
Casts	7.86%	9.96%
Intraoral	7.84%	9.93%

From the findings, it is interpreted that in both instances (intraoral and casts), the left mandibular canines is found to exhibit greater sexual dimorphism i.e. 9.93% (as computed intraorally) and 9.93% (as computed from casts) as compared with right canine i.e. 7.86% (casts), 7.84% (intraorally),

Probability of Sex determination

It can be concluded that whenever the width of either mandibular canine is greater than 7.2 mm, then probability of sex being male is 100% for present study. This finding could prove to be of immense medicolegal importance in 'identification' of Haryana subjects.

Probability of age

The intercanine distance is greater than 25 mm, the age of male and female is more than 14 and 12 years in male and female respectively.

Discussion

The present study establishes the existence of a definite statistically significant sexual dimorphism in mandibular canine. 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^{7,13}. Usually the first molar have a mean eruption age of 6-7 years^{5,6} and are less impacted compared to canines.⁹ The mandibular canines are considered to demonstrate amongst all teeth in their mesio-distal width^{10,11} as the current study. For Haryana population this came out to be [7.84%-7.86%] (intraorally and casts) for right canine, [9.93% - 9.96%] (intraorally and casts) for left canines [6.38% - 6.42%] (intraorally and casts). This is of definite significance as tooth morphology is known to be influenced by cultural, environmental and racial factors.¹²

In the current study, we conclude if the intercanine distance is greater than 25 mm, the age of male and female is more than 14 and 12 years in male and female respectively.

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