

# BUCCOLINGUAL DIAMETER OF MAXILLARY CANINES IN NORTH INDIAN POPULATION

Bindu Aggarwal\*, Rakesh K Gorea\*\*, Anirudha Agnihotry\*\*\*

**ABSTRACT:** Teeth are the most durable part of the skeleton. They are more resistant to destructive agents than any other structure and are well protected. When all other marks of personal identity have been destroyed, the dentist is often able to recognize a body by the repair work he has done on the teeth. Teeth may be used for gender determination with the aid of odontometric analysis. The canines exhibit the greatest sexual dimorphism. In the present study, 53 male and 56 female volunteers of North Indian origin; in the age group of 18-25 years were selected to observe the sexual dimorphism in the buccolingual crown diameter of the maxillary canines. It was found that the buccolingual diameter was significantly larger in the males as compared to the females and the difference was highly statistically significant. The sexual dimorphism in the buccolingual diameter was found to be 8.77% on the right side and 7.82% on the left side.

**Keywords:** Canines, maxillary, buccolingual diameter, sexual dimorphism.

## INTRODUCTION

Teeth are the most indestructible part of the body and exhibit the least turnover of natural structure. Teeth provide excellent material in living and non-living populations for anthropological, genetic, odontological and forensic investigations<sup>1</sup>. The principal factors which make dental evidence important are that the teeth and bony supporting structures are characteristic of the individual<sup>2</sup>. Teeth may be used for gender determination with the aid of odontometric analysis<sup>3</sup>. The tooth size is an important factor to be taken into consideration in orthodontic therapy and examination<sup>4</sup>.

Canines differ from other teeth with respect to function and show the greatest sex differences<sup>5</sup>. With the use of linear dimensions of the canines such as the bucco-lingual diameter, the sexual dimorphism can be determined<sup>6</sup>.

The result of the present study indicates that the dimorphism in buccolingual diameter of maxillary canines can be of immense medico-legal use in

identification and gender determination. The study defines the morphometric criteria for maxillary canines in North Indian population. This is of definite significance, as tooth morphology is known to be influenced by cultural, environmental and racial factors.

## MATERIAL AND METHODS

### Subjects

The study was conducted on 109 volunteers (53M: 56F) in the age group of 18-25 years. This age group was selected, as attrition of teeth is minimal in this age group<sup>7</sup>. All the subjects included in the study fulfilled the inclusion criteria.

### Inclusion criteria

Subjects with the following status of teeth were included in the study:

1. Healthy state of gingiva and periodontium.
2. Caries free teeth.
3. Normal overjet and overbite.
4. Absence of spacing in the anterior teeth.
5. Normal molar and canine relationship.

## INSTRUMENT

All measurements were taken using a digital vernier caliper, taking into account the error if any, in the instrument.

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\*Associate Professor, Department of Anatomy, Gian Sagar Medical College, Ram Nagar, Banur, Punjab.

\*\*Principal, Professor & Head, Department of Forensic Medicine and Toxicology, Rama Medical College, Hospital and Research Center, Kanpur, Uttar Pradesh.

\*\*\*Intern, Manipal College of Dental Sciences, Manipal.

**Making of study casts**

Impressions of maxillary arches were taken in alginate impression material and later study casts were prepared with stone plaster. Care was taken to pour the impression immediately to minimize the dimensional changes.

**Measuring the Buccolingual Diameter of the Maxillary Canines**

The buccolingual diameter of the maxillary canines on the study casts was taken as the greatest distance between the buccal and lingual surface of the crown. The bucco-lingual diameter was measured with a vernier calipers held at right angles to the mesiodistal crown diameter of the tooth (Figure 1& 2).

A single observer read all the measurements. The process was repeated to take another reading, if the reading showed any difference to the previous reading then a third reading was also taken. The average of all three readings was taken as the final value.

**Sexual Dimorphism**

Sexual dimorphism was calculated by the following formula<sup>8</sup>:

$$\text{Sexual dimorphism} = \frac{Xm - Xf}{Xf} \times 100$$

Where Xm = Mean of buccolingual diameter of males

Xf = Mean of buccolingual diameter of females

The data so obtained was computed, tabulated and statistically analyzed with the purpose of establishing sexual dimorphism.

**OBSERVATIONS**

The buccolingual diameter was measured from the study casts of all the subjects and the sexual dimorphism was determined.

**Table I** : Statistical Significance of Buccolingual Diameter

Side	Sex	Mean (mm)	± S.D.	t'stat	p'value	Significance
Right	Males	8.092	0.5862	6.7385	<0.0001	Highly Significant
	Females	7.439	0.4415			
Left	Males	8.033	0.5745	6.1669	<0.0001	Highly Significant
	Females	7.450	0.4732			

**Table II** : Range of Buccolingual Diameter

Side	Male	Female
Right	6.98- 9.2	6.28-8.31
Left	6.85- 9.43	6.38- 8.53

**Sexual dimorphism :**

The sexual dimorphism was found to be 8.77% on the right side and 7.82% on the left side.

**DISCUSSION**

The female teeth are smaller than the corresponding male teeth and the canines show the greatest amount of sexual dimorphism<sup>9, 10</sup>. The buccolingual diameter of maxillary canines was measured from the dental casts of 109 volunteers (53M: 56F) in the age group of 18-25 years. Earlier a similar study was conducted on a different group of North Indian population; belonging to the same age group but on mandibular canines<sup>11</sup>. In both these studies; the buccolingual diameter was more in the males than the females, the difference being statistically significant.

The buccolingual diameter of canines has been previously studied for sexual dimorphism in different populations. Three populations from Egypt, Mexico and United States were studied by Bishara<sup>12</sup>. Zorba<sup>13</sup> studied the same dimension in Greeks. A study on random osteoarcheological sample of 146 skeletons in Marseilles also reported that the buccolingual diameter of teeth was smaller in females than males<sup>14</sup>.

The buccolingual and mesiodistal crown diameters measured on plaster casts of 118 Ohio white adolescents showed that buccolingual crown diameter asymmetry was greater for boys (0.74) than for girls (0.54)<sup>8</sup>. The diameter was measured for gender determination by Perzian<sup>15</sup> in Indian knoll population and in a South Indian population by Pratibha<sup>16</sup>. In all the studies it was found that the buccolingual diameter was more in the males than the females.

The measurements of linear dimensions of canine teeth have the advantage of being able to use a large sample of population because it is simple, inexpensive and easy to perform<sup>17</sup>. Variation in tooth size is influenced by genetic and environmental factors such as race, sex, heredity,

environment, secular changes and bilateral asymmetry<sup>18</sup>.

According to Alvesalo<sup>19</sup>, the Y chromosome intervenes most in the size of teeth and according to Moss<sup>20</sup>; a longer period of amelogenesis in the males is responsible for the larger teeth in the males.

The results of the present study indicate that the sexual dimorphism in buccolingual diameter of maxillary canines can be of immense medico-legal use in identification and gender determination.

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