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ORIGINAL ARTICLE

Pattern and Prevalence of Maxillary Canine, A CBCT Based Study

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ABSTRACT

Background: Maxillary canines are considered as the keystone of mouth. It plays main role in supporting the upper lip and biting and tearing of food. Canines are also called as cuspids, the upper one is second most common teeth. The purpose of this research was to find the pattern and prevalence of the maxillary canine.

Study design: It is a retrospective study conducted for the duration of six months from April 2022 to September 2022 at the dental department of Karachi Medical and Dental College, Karachi.

Material and Methods: The study was conducted on 200 subjects visited the dental sciences department of the hospital. The patients who willingly participated in the study was included. The CBCT data was collected and sorted for the further use.

Results: Out of the 200 subjects, the 96 (48%) males and 104 were females. The left buccal quadrant of impaction was observed in the 21 males and 15 females. The 5 male and 10 female subjects have the both buccal impaction position. The 8 male and 10 female have the both platal position of impaction. The prevalence of subtype I was 55% in the female and 44% in the males. The subtype II was observed in the 44% females and 55% males. There was no case of type IV subtype. The type VII prevalence was also higher in female 66% as compared to males 33%.

Conclusion: The maxillary canine impaction is higher in the female as compared to the males. The impaction prevalence is most commonly observed on the left side as compared to the right side. It was also observed that the buccal and palatal impaction are predominant than other impactions.

Keywords: cuspids, maxillary canine, palatal impaction.

INTRODUCTION

Maxillary canines are considered as the keystone of mouth. It plays main role in supporting the upper lip and biting and tearing of food. Canines are also called as cuspids, the upper one is second most common teeth. Maxillary canine are vital for the canine guidance of mandibular movement. Its presence play role in canine eminence which support upper lip and alar base which develop for esthetic smile and facial aesthetic. The teeth are said to be impacted when they do not flare up at the suitable time and age. Maxillary canine impaction (MCI) is one of the clinical problem which encountered usually in orthodontic practice. There are many possible ways to define impacted tooth. Impaction of maxillary canine is because of local pathology, local obstruction, and lack of guidance from adjacent lateral incisor, genetic reasons and disturbance of normal development. Maxillary canine impaction may be occur unilaterally and bilaterally[1-3]. It is more common in females than males. In general population the prevalence of maxillary canine impaction ranges from 0.27% to 2.4%. The subtype II is more prevalent in males as compared to females, while subtype VII is more prevalent in females. The etiology of maxillary canine impaction is complex and multistep. Many conditions like anemia, rickets, malnutrition, and cleft lip and palate are found in canine impaction. They are related with syndrome such as achondrodysplasia, cleidocranial dysplasia, downs and progeria syndrome[4-5]. MCI is frequently asymptomatic and patients approach it with difficulty. Plain radiographs make it especially difficult to detect dental resorption when the hard tissue has been resorbed from the buccal or palatal root aspect. CBCT-based studies suggest a higher incidence. The CBCT image datasets were reconstructed and viewed with software provided by the CBCT manufacturer. Early detection of canine impaction is hypercritical and lead to many complications[6-9]. Internal or external root resorption (RR) of the impacted canine may occur, but RR of the adjacent teeth is the most common complication. The most commonly affected teeth, as well as the location of RR, were also evaluated[10-11]. The sufficient and limited knowledge about the prevalence and pattern of the canine is present. The need of the hour is to determine its prevalence for better understanding of it pattern. Therefore this study was conducted. The purpose of this research was to find the pattern and prevalence of the maxillary canine.

MATERIAL AND METHODS

It is a retrospective study conducted for the duration of six months from April 2022 to September 2022 at the dental department of Karachi Medical and Dental College, Karachi. The study was conducted on 200 subjects visited the dental sciences department of the hospital. The ethical committee of the hospital approved the study. Protocol of study was also approved by ethical committee. The patients who willingly participated in the study was included. The CBCT data was collected and sorted for the further use. Written permission was taken from the patients. Statistical analysis was also carried out by making use of STATISTICA 10.0 software. P values were calculated and a p value less than 0.05 was considered as significant. The patients with the following symptoms were excluded from the study;

- Unerupted canine
- Incomplete root development
- local pathology
- diagnosis of syndromic conditions
- orofacial clefts
- supernumerary teeth

The unilateral maxillary canine cases were categorized. The data was analyzed by statistical analysis. SPSS software was used for the statistical analysis. The demographic features were recorded. The chi-square test was performed to evaluate the gender association of maxillary canine. The results were analyzed and presented in the form of tables. The conclusion was derived accordingly to the results obtained.

RESULTS

The study was conducted on 200 subjects visited the dental sciences department of the hospital. Out of the 200 subjects, the 96 (48%) males and 104 were females. The left buccal quadrant of impaction was observed in the 21 males and 15 females. The 21 male had the left impaction while 18 had the right impaction. The 15 female had the left impaction while 20 male had the right buccal impaction. The 6 male had the left mid of arch impaction while 7

male had the right mid of arch impaction. The left mid of arch impaction was not reported in the female however the right mid of arch impaction was reported in the 5 females. The 21 male had the left palatal impaction while 23 had the right canine impaction. Similarly the 44 female were observed with the left palatal canine impaction while 20 has the right palatal impaction as shown in the table 1.

Table 1: Unilateral Impacted Canine and its position and quadrant distribution

Impaction Position	Male(Quadrant of Impaction)		Female(Quadrant of Impaction)	
	Left	Right	Left	Right
Buccal	21	18	15	20
Mid of arch	6	7	-	5
Palatal	21	23	44	20

The 5 male and 10 female subjects have the both buccal impaction position. The 8 male and 10 female have the both platal position of impaction. The left buccal, right palatal was observed in the 2 male and 4 females. The mid of arc position of impaction was also observed in 4 females. The unilateral impaction position was reported in the 15 male and 30 females. (as shown in table 2)

Table 2: Bilateral Impacted Canine and its position and quadrant distribution

Impaction Position	Male	Female
Both Buccal	5	10
Both Palatal	8	8
Left Buccal, Right Palatal	2	4
Left mid of arch, Right Buccal	_	4
Mid of arch	_	4
Total	15	30

The prevalence of subtype I was 55% in the female and 44% in the males. The subtype II was observed in the 44% females and 55% males. There was no case of type IV subtype. The type VII prevalence was also higher in female 66% as compared to males 33%.

Table 3: Subtypes of maxillary canine impaction and their prevalence

Subtypes	Type I (n=90)	Type II (n=68)	Type III (n=8)	Type IV (n=0)	Type V (n=8)	Type VI (n=20)	Type VII(n=6)	Total (n=200)
Percentage	45%	34%	4%	0	4%	10%	3%	100
Female	50(55%)	30(44%)	3(37%)	0	5(62%)	12(60%)	4(66%)	104
Male	40(44%)	38(55%)	5(62%)	0	3(37%)	8(40%)	2(33%)	96

The 50 female were observed to have the subtype I impaction while 30 female were reported to have subtype II impaction. The type III was reported in the 3 female while other 5 were observed to have the type V. There was no case in which type IV was reported. The 12 patients were reported with the type VI and 6 with the type VII. In case of male the 44 were observed to have type I, 38 cases of type II were reported, 5 cases of type III were reported. The 3 cases of type V, 8 cases of the type VI and 2 cases of the type VII were repoted in the males as shown in the table 3.

DISCUSSION

The mandibular canine impaction is less prevalent as compared to maxillary canine impactions. There is a need for a proper understanding of impacted canine prevalence and pattern for its early diagnosis. In the respective study of 200 people, most of them were attended by self referral. Among them subtype I of maxillary canine impaction was found in 55% of females and 44% of males, subtype II is more prevalent in males as compared to females, while subtype VII was more prevalent in females. Similar results were found in an orthodontic study directed in Turkey[12]. But a Pakistani orthodontic study conducted in Peshawar shows different prevalence rates. The study described here is limited to only a small group of people but the study conducted in Turkey and Peshawar was done on a large group of the population[13-15]. When compared with the European studies, it was observed that maxillary canine impaction is six times more prevalent in the European population. Asian populations have a less frequent displacement of canines. While Chinese population also has more maxillary canine impaction but is less frequent than the European one. A Chinese study emphasizes more on impaction in females as compared to males[14].

A Chinese study also examines the effect of lateral incisors on unilateral canine impaction and maxillary canine impaction. The sample population[15] was larger and not randomly selected, and a complete demographic record of the population was considered. The impact of the incisors was in 2% of the population, while in most European studies, the impact of incisors was 70%. The distributive variations on the left side of maxillary canine impaction are observed in this study, but most of European studies suggest the right side impacted maxillary canine. This study is also perfectly balanced with both sides of impacted canines. The difference between these two studies[17-18] suggested the possible reasons i.e. different races Asian and European, size of the sample, different radiographic diagnostic techniques, and grouping methods. Both populations belong to different races and show different patterns of canine impaction.

Gender-wise canine impaction is also narrated in a number of studies and most of them suggest the more prevalence in females due to the diminution of facial bones and jaws which lead to more impaction of canine. However, the large number of female involved in the study suggest a drift of more female having orthodontic therapies. However, some studies suggest an equal prevalence frequency in both male and female patients. The impacted canines are distributed internationally in different genders with a range of 1.3:1 to 1:2. The quadrant distribution of the left side buccal and palatal canine impaction was found in both genders. The respective results are exactly similar to the internationally reported results. Both males and females were almost equally susceptible to bilateral impaction[19-21]. Only female patients were suffering from the left mid -arch of the right buccal and mid arch. Compared to the previous study conducted in Peshawar, the above-mentioned study follows the international patterns of canine impaction but this study lacks any information related to the genetic link of canine impaction.

CONCLUSION

The maxillary canine impaction is higher in the female as compared to the males. The impaction prevalence is most commonly observed on the left side as compared to the right side. It was also observed that the buccal and palatal impaction are predominant than other impactions. There is still need to study the genetic basis of canine impaction. Further studies must be conducted to study in detail the genetic linkage and their inheritance pattern.

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