Prevalence of canine impaction among Kurdish people in Kurdistan region of Iraq

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Background and Objective: The permanent canine is the second most frequently impacted tooth following the third molars. The etiology of the impacted canine is ambiguous, but also multifactorial. There are some evidences that patients with a few certain features of occlusion may be at higher risk to the development of impacted canine. This study aimed to determine the prevalence of impacted maxillary and mandibular canine teeth in dental patient's sub-population in the Kurdistan region of Iraq.

Methods: This study comprised data from 2520 patients who attended the oral diagnosis and radiology clinic in specialized centers of dentistry in Duhok, Erbil and Slemany cities in a period between January 2015 to December 2019 were examined for the study. The age of the patients ranged from 15years to 45 years. Patients were examined in order to detect the impacted maxillary canines by intraoral examination, and OPG radiographs.

Results: A total of 2520 patients, 152cases (6%) had impacted canines in upper and lower arches (49 males and 103 females) there was high significant relation (P <0.001) of impacted canine prevalence and the dental arches; higher prevalence was in the maxilla than in the mandible (5.5% versus 0.5% respectively).

Keywords: Canine Impaction, Maxillary Canines, Panoramic Radiography, Prevalence, Malocclusion.

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Introduction

As permanent canines consider the basic foundation of smile and occlusion, thus canines consider the most important teeth in the dental arches.[1] Due to the length of canine root and its volume; this makes it one of the most dependable abutments for replacement of other teeth in dental prosthetic work.[2] Impacted teeth are those teeth that impede its eruption or bone leading to delay in eruption time or not erupt completely.[3,4] Its diagnosis is mostly depending on clinical and X-ray.[5]

Impaction may happened to all permanent teeth; however, maxillary and mandibular wisdom teeth, maxillary and mandibular canines, premolars, and maxillary lateral incisors are the teeth most frequently involved.[6] And when wisdom teeth are excluded, the maxillary canines are the most common teeth to be impacted.[7]

According to several prevalence studies impacted permanent maxillary canine occur in 1-2% of the population, which makes the permanent canine, the second most commonly impacted tooth, after third molars.[8-10]

The most common causes of canine impaction according to Lazim (2016), are discrepancy in tooth size, arch length, abnormal position of tooth buds, tooth ankylosis, delayed shedding of deciduous canine and its early loss, tumors or cysts, iatrogenic and idiopathic problems.[11] However, the drawback of canine impaction according to Bishara may lead to: arch length loss, malpositioning of the impacted tooth labially or

lingually, resorption of the impacted tooth or the adjacent teeth roots, and Infection particularly when canine is partially erupted resulting in pain and inflammation.[12]

Impacted canines lead to many orthodontic process problems. They can compromise tooth movement, aesthetics and functional drawbacks.[2] Data and prevalence of dental anomalies in patients are important for planning the treatment required. The prevalence rates of some of these anomalies like teeth impaction may be modifying according to the races and ethnic reason.

When the dental practitioners make attention and observing the ethnic differences in the occurrence of dental anomalies, this will help them for timely clinical intervention to avoid and prevent the complications[13] and early detection with timely prevention, interception and orthodontic treatment can avoid and prevent this problem and allows the impacted canines to erupt to correct and appropriate location in the dental arch. Thus patients should be examined at the age of 8 - 9 years to determine whether the canine path of eruption is displaced from its normal position in the alveolus to predict the potential and possibility for impaction,[3] hence an early diagnosis reduces treatment time, costs, complexity and potential complications that Bishara refer to it previously such as ankylosis of the canine, cysts, infections, root resorption, etc. which threatening its survival rate.[12,14] No work has been reported in international literature related to the prevalence of permanent canine impaction in the whole Kurdistan region of Iraq previously.

This cross-sectional study was designed to estimate the prevalence of both impacted maxillary and mandibular canines in a group of Kurdish patients in Iraq.

Methods

This is a retrospective study of 2520 panoramic radiographs (1169 male and 1351female) taken from patients who were referred or presented at specialized centers of dentistry in Duhok, Erbil and Sulemany cities in a period between January 2015 to December 2019 to indicate the prevalence of impacted canine, their age range from 15 years to 45 years. The No. of prospective were700 Patients which examined in order to detect the impacted canines by intraoral examination, palpation, dental records and followed by OPG radiographs, with specific attention to the partial eruption and impaction of the permanent canines, while retrospective group were 1820 OPGs examined.

After the examination, all participants were included in this study have the following inclusion criteria:

(1) Their ages were older than 15 and younger than 45 years.

(2) No previous history or current orthodontic treatment.

(3) No previous extraction of permanent canines.

(4) There is no history of any hereditary diseases or syndromes (craniofacial anomaly/syndrome) such as Down's syndrome or Cleidocranialdysostosis.

(5) No pathological conditions, trauma or fracture of the jaw that might have affected the normal growth of permanent dentition.

(6) Omitted because mixed dentition 8-10 year

(7) The numbers and locations (right/ left, upper/ lower) of impacted canine teeth, as well as patient sex, age, retained deciduous canines were noted. All radiographs were reexamined 2 weeks after the initial examination by two observers for the reliability of the results.

Statistical analysis:

Data have been analyzed using SPSS version 24. Data were described by their frequencies and percentages. Chi-square test (χ^2) was used to test the relation between presence of impacted canine on one hand, and gender, affected dental arch, pattern and site of the impaction, on the other hand. A $p < 0.05$ was considered significant.

Results

A total number of 2520 panoramic images were included in the present study, 1169 of them were males (46.38%) and 1351 were females (53, 62%) as shown in Table1 and Figure 1.

From the whole included sample, 152(6%) impacted canines were found, 103 (7.6%) were females and 49 (4.2%) were males Table 2. From the entire impacted canines sample, the higher number of impaction was seen on the maxilla 138 (5.5%). The unilateral impacted canine cases were 104 (4.1%).

On the left side 57 (2.3%) canines were impacted, 51 of them were in the maxillary arch; (12 in males and 39 in females) compared to 47 impacted canines (1.9%) on the right side (41 in the maxilla and 6 in the mandible),

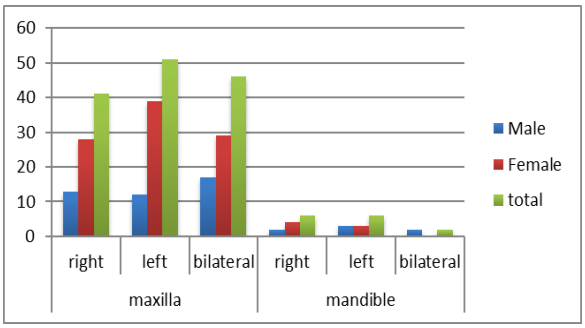

Figure 1. Distribution of patient with impacted canines in the study sample

whereas the bilateral impaction occurred in 48 patients only (1.9%) of the patients. Only 14 cases of mandibular canine impaction were seen which made (0.6% from the whole impacted canines),6 cases on right side and the same number cases on left while only two cases were bilateral (Table 1 and 3).

Table 1. Distribution of patient with impacted canines in the study sample

Gender	Maxilla			Mandible		
	Right	Left	Bilateral	Right	Left	Bilateral
Male	13	12	17	2	3	2
Female	28	39	29	4	3	0
Total	41	51	46	6	6	2

Table 2. General characteristics of the impacted canine sample

Gender	Canine Impaction occurrence Number (%)	No canine impaction Number (%)	χ^2 *P* value	Total Number (%)
Male	49 (4.2 %)	1120 (95.8 %)	$\chi^2 = 13.03$ $P < 0.001$	1169 (100 %)
Female	103 (7.6 %)	1248 (92.4 %)		1351 (100 %)
Total	152 (6.0 %)	2368 (94.0 %)		2520 (100 %)

Table 3. Presence of impacted canine in relation to affected dental arch, pattern and site of the impaction

	Impacted Number (%)	Not impacted Number (%)	χ^2 *P* value
Dental arch			
Upper	138 (5.5 %)	2382 (94.5 %)	$\chi^2 = 104.30$ $P < 0.001$
Lower	14 (0.6 %)	2506 (99.4 %)	
Pattern			
Unilateral	104 (4.1 %)	2416 (95.9 %)	$\chi^2 = 21.27$ $P < 0.001$
Bilateral	48 (1.9 %)	2472 (98.1 %)	
Site			
Right	47 (1.9 %)	2473 (98.1 %)	$\chi^2 = 0.98$ $P = 0.322$
Left	57 (2.3 %)	2463 (97.7 %)	

Discussion

In the current study the result regarding the prevalence for impacted canines in all the cases was found to be 6.0%, which is near to study results conducted by Altaee 2014) that reported a frequency for maxillary canine impaction of 4.6% in Ramadi city.[15] Beside that Indian study made by Sridharan et al. (2011) was found that the prevalence of impacted maxillary canine were 3%and was much higher than the range of 0.8% to 3.6% reported in other studies.[16-20]

This is may be due to the ethnic variation and number of sample that may result in higher or lower rates of some anomalies. Regarding the higher prevalence in the upper arch than the lower (5.5% vs. 0.6), which was high significant difference between the two, arches and this result was similar to other study done in Slemany in (2015), which is one of the governments of Kurdistan region, were the difference was also 6.29% vs. 0.66%.[21] This unbalancing and dissimilarity between maxillary and mandibular canine impactions can be expected and depend to the fact that, maxillary canines is the last teeth to develop and travel a long path before eruption into the dental arch, thus increasing the potential for mechanical disturbances resulting in displacement and impaction.[22] The prevalence of impacted canines as seen in the present study in females was 7.6% which is higher than that that found in males 4.2%; which mean 1.8:1 ratio, this has the same opinion with most of studies about impacted canine; Altaee study in Ramadi city reported that that female: male ratio was 2:1.[15] Topkara and Sarialso found that the prevalence ratio in females was higher than that in males (1.3:1).[23] Sridharan et al, [16] study found prevalence of 2.6 % in males and 3.6 % in females. Also it is almost the same what was reported by Pati et al, (2014) found that the prevalence of canine impaction was higher in females (3.6%) compared to males (2.3%).[24]

Kifayatullah et al, (2015) reported a higher ratio in female as compared to male (1.85:1).[25] This higher female: male ratio for canine impaction could be explained by the fact that the females seek for dental treatment and are more concerning about their dental esthetic than those of males especially in our region. On the other hand females carry smaller arch width and length and this may attributed to genetic links related to the sex chromosomes. Concerning the side distribution in the present study, a higher number of impaction was seen on the left side 2.3% compared to 1.9% on the right side, and this result agree with most of the study's results about impacted maxillary canine.[23-29]

In current study, unilateral impaction was seen in 4.1% whereas the bilateral impaction occurred in only 1.9 % of the patients

having impacted canine from the whole included sample of OPG collected. This prevalence was in accordance to many studies as in the study done by Lazim (2016) in Basra city where he found 94. 3%unilateral and (5.7%) bilateral impacted canine prevalence from the whole impacted and non-impacted sample he took it in his study.[11] In the other hand Peck, (1994) and Ericson and Kurol (2010), observed 8% of bilateral canine impactions. These different percentages may be due to the different sample size and different ethnics.[30,31]

In general the results of the current study was agreed with most studies results exploring the impaction of maxillary canine in particular the fact that the females are more effected than those of male and that the left side impaction is dominant. We measured little differences regarding percentages in different studies, which could be related to racial difference among samples or due to the different size of the samples or even the age of the groups participated in the studies.

Conclusion

From the results gained in the current study and the other studies regarding canine impaction prevalence, we can conclude that canine impaction prevalence in Kurdistan people region of Iraq (6%) was high in regards to other parts of Iraq and was more than those reported in other studies and is a common case in the dental clinic so early diagnosis will decrease future orthodontic intervention and treatment cost. The prevalence of canine impaction in the maxilla was significantly higher 5.5% from that in the mandibular was 0.6%. Around 4.% was a unilateral impaction, whereas only 1.9% shows bilateral involvements.

Conflicts of interest

The authors report no conflicts of interest.

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