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Research Article

Prevalence of Different Impacted Maxillary Canine Locations in a Saudi Population in Riyadh City

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Abstract

Objective: The aim of this study was to determine the prevalence of impacted maxillary canines according to location whether buccal or palatal.

Materials and Methods: 900 orthopantomographs were collected from orthodontics clinics at Riyadh Colleges of Dentistry and Pharmacy in Riyadh Saudi Arabia. The Canine Incisor Index (CII) was calculated and used to determine the location of canine impaction. The prevalence of maxillary canine impaction was calculated. Comparison of maxillary canine impaction between males and females was conducted using chi-square test.

Results: 91 (10.1%) were found to have at least one impacted maxillary canine. The sample consisted of 37 (40.7%) males and 54 (59.3%) females with mean age 16.2 ± 4.4 years. Statistically significant difference was found between males and females (P = 0.029). Among impacted canines, 45 (49.5%) were palatally impacted and 46 (50.5%) were buccally impacted (Table 2). 46 (50.5%) were in the maxillary right quadrant and 45 (49.5%) were in the maxillary left quadrant.

Conclusions: The prevalence of canine impaction in Saudis is 10.1%. Females experience maxillary canine impaction more the males. Palatal maxillary canine impaction accounts for 49.5% while buccal maxillary canine impaction accounts for 50.5% of the cases of maxillary canine impaction.

Keywords: *Maxillary Canine Impaction; Location of Canine Impaction; Maxillary Canine Impaction in Saudi Arabia; Orthopantomograph*

Introduction

Dental practitioners are always challenged, especially when dental anomalies are present such as teeth size, number and locations [1]. Maxillary canines are among the most commonly impacted teeth [2,3]. The prevalence of canine impaction has been reported in several studies among different populations and racial groups; it ranged from 0.8% to 8.8% [3-12]. The prevalence of different locations of canine impaction, i.e. buccal or palatal has been studied in several populations and it has been found that palatal impaction was more common and ranged from 50% to 92.6% of the cases of impaction [8,13-21].

The ability to locate the canine impaction site with some other considerations is of utmost importance in order to correctly set the orthodontic treatment plan and the exposure technique when indicated [22]. Moreover, impacted canines can cause resorption to the roots of adjacent teeth [23,24]. Orthodontic treatment time in cases with impacted maxillary canines tend to be longer in duration [25].

Different methods were used to locate impacted maxillary canine position including computed tomography and cone-beam computed tomography [21,23]. These advanced methods are not readily available in all orthodontic clinics. Researchers proposed the use of conventional radiographic methods to locate impacted maxillary canines including calculations performed on orthopantomographs which are usually available and taken for all patients seeking orthodontic treatment [26-28].

Therefore, the aim of this study was to determine the prevalence of impacted maxillary canines according to location whether buccal or palatal in Riyadh city.

Materials and Methods

The protocol of this study was approved by the institutional review board at Riyadh Colleges of Dentistry and Pharmacy, Riyadh, Saudi Arabia. 900 orthopantomographs were collected from the orthodontics clinics at Riyadh Colleges of Dentistry and Pharmacy, Riyadh, Saudi Arabia for patients seeking orthodontic treatment. Inclusion criteria included subjects seeking orthodontic treatment with no history of medical illness or syndromes affecting the maxillofacial area.

The following measurements adapted from Chaushu., *et al*. were made for each orthopantomograph in order to localize impacted canines [26,28]:

1. The widest mesio-distal width of the impacted canine was measured perpendicular to its' long axis.
2. The widest mesio-distal width of the ipsilateral central incisors was measured perpendicular to its' long axis.

Canine Incisor Index (CII) was then calculated. CII was defined as the ratio of the impacted canine width to the ipsilateral incisor width as explained previously. Judgement of the location of the impacted canine was decided as palatal when CII was equal to or greater than 1.15, otherwise it was considered buccal [28]. Measurements were done by one general dentist and then confirmed by an orthodontic resident.

Statistical Analysis

Prevalence and descriptive statistics were calculated. Differences between males and females were then compared using chi-square test at ($p < 0.05$).

Results

Out of 900 orthopantomographs, 91 (10.1%) were found to have at least one impacted maxillary canine. The sample consisted of 37 (40.7%) males and 54 (59.3%) females (Table 1) with mean age 16.2 ± 4.4 years. Statistically significant difference was found between males and females ($P = 0.029$). Among impacted canines, 45 (49.5%) were palatally impacted and 46 (50.5%) were buccally impacted (Table 2). 46 (50.5%) were in the maxillary right quadrant and 45 (49.5%) were in the maxillary left quadrant (Table 3).

Gender	N	Percentage	P value
Male	37	40.7%	0.029*
Female	54	59.3%	
*p < 0.05			

Table 1: *Distribution of impacted canines according to gender (n = 900).*

Impaction location	N	Percentage
Palatal	45	49.5%
Buccal	46	50.5%

Table 2: *Distribution of impacted canines according to impaction location.*

Quadrant	N	Percentage
Maxillary right	46	50.5%
Maxillary left	45	49.5%

Table 3: *Distribution of impacted canines according to quadrant.*

Discussion

Canine impaction is a problem usually encountered in orthodontics Many studies have investigated the prevalence of canine impaction with percentages ranging from 0.8% to 8.8% [3-12]. Few studies have investigated canine impaction location and none in Saudi Arabia [8,13-18].

Several methods of canine localization have been proposed. Most accurately using computed tomography and cone-beam computed tomography [21,23]. Other methods that make use of conventional radiography have been attempted. Among the methods attempted is the canine incisor index (CII) which has been proposed in several studies and found to be [28,29]. The merits of this technique is that it is readily available in almost all orthodontic clinics, routinely taken to patients reducing radiation exposure and easily implemented by the orthodontist.

In this study, we found that 49.5% of the impacted maxillary canines were located palatally while 50.5% were located buccally. Our findings were different from the results of a study by Stivaros and Mandall, they reported maxillary canine impaction locations to be palatal in 61% of the cases, in line of other teeth in 34% and buccal in 4.5% of the cases of maxillary canine impactions [18]. Another study by Ericson and Kurol stated that 20% of impacted maxillary canines were buccal while 80% were lingual [14]. Walker., *et al*. showed that 92.6% of the impacted canines were located palatally while 7.4% were located buccally [21].

The differences in prevalence of impacted canines between our study and other studies and the differences in prevalence of canine impaction locations between studies including this study may be related to the difference in populations and racial groups. The higher percentage of canine impaction in females in our study (59.3%) comes in line with all other studies that reported the same finding including the study of Zahrani in a similar Saudi population [7,12].

Conclusions

- The prevalence of canine impaction in Saudis is 10.1%.
- Females experience maxillary canine impaction more the males.
- Palatal maxillary canine impaction accounts for 49.5% while buccal maxillary canine impaction accounts for 50.5% of the cases of maxillary canine impaction.
- Studies with bigger samples in different geographic locations in Saudi Arabia are recommended.

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