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Prevalence of Canine Impaction among Saudi Population at Al Qassim Area in the Kingdom of Saudi Arabia

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Abstract

Background: One of the most reported dental problems is a tooth impaction which is defined as the infraosseous position of the tooth after the estimated time of eruption [1]. Thus, the most notable tooth impaction is canine impaction which is a frequently encountered clinical problem. **Aim:** This study aimed to determine the prevalence of impacted canines among Saudi people from the 5-year period of 2013-2018 in Al Qassim area in the KSA. **Methodology:** A retrospective research designed was utilized in the study. A retrospective study simply means to "look back" in the past and usually done by obtaining data from medical records of the targeted population with common characteristics [2]. **Results:** This 5-year study covered year 2013 to 2018. In this study, there were 1500 who seek dental health in King Fahd Specialist Hospital. Thus, out of these clients, only 89 were identified with cases of impacted canine using the OPG with a prevalence rate of 5.9 %. In addition, it was found that out of 89 patients identified, the patients have impacted canines in different locations: maxillary, mandible, right side and left side. It was found that there were 187 impacted teeth in different locations among 89 clients affected. There were 48 cases (25.7%) of impacted canines on the right side while 64 cases (34.2%) were reported on the left side of the total group. Moreover, impacted maxillary canine were 68 cases (36.4%) and mandibular impacted canine were only 7 cases (3.7%) of the total group. **Conclusion:** The early detection and treatment approach of impacted canines among affected individuals is vital in order to prevent different problems that may arise during impaction of canine teeth. Awareness, early detection, proper diagnostic test and multiple treatment approaches are needed to prevent different sequelae due to canine impaction.

Keywords

Canine Impaction, Dental Health, Maxillary and Mandibular

1. Introduction

Dental problems are widely experienced around the world and early detection and diagnosis are imperative. One of the most reported dental problems is a tooth impaction which is defined as the infraosseous position of the tooth after the estimated time of eruption [3]. Thus, the most notable tooth impaction is canine impaction which is a frequently encountered clinical problem. Impaction is a pathological condition that the tooth in the oral cavity failed to erupt within the expected time which hinders normal eruption process [4]. Canine teeth in humans have the longest period of development and the most complex route to full occlusion that leads it to be the third most common tooth impacted next to teeth like mandibular and maxillary third molars [5].

Overall canine impaction varies from one populace to another, nevertheless, it is suggested there are 12% - 15% affected in a general population (ADA, 2020). There were 5.6% to 18.8% prevalence of tooth impaction among various tribal populations [6] [7] [8]. In the retrospective cross-sectional study of Abutayyem and colleagues (2019), the prevalence of impacted canine was found to be 1.7%. Similarly, there was a 1.38% with impacted canines out of 1593 patients included in the study [9]. Additionally, according to Shapira, Chaushu and Becker (2000) maxillary canine impaction is 1% to 3% in a normal population. In a 10-year study conducted in Budapest Hungary, it was found that there were 5.4% prevalence of impacted maxillary canines [10]. Furthermore, a retrospective study conducted among 2215 patients in Turkey, it was generated that there were 5.1% incidence of maxillary impacted canines [11]. Moreover, there are theories associated with canine impaction, the guidance and genetic theory. The former theory suggests that the canine erupts along the root of the lateral incisor which serves as a guide. Thus, the absent or malformed lateral incisor root will hinder the canine eruption. On the other hand, the latter theory proposes other possibility associated with dental anomalies such as small or missing incisors [1] [12]. In addition, diagnosis of canine impaction is based on clinical and radiographic examination. Thus, dentists and orthodontists will base their clinical evaluation of canine impaction based on the following: 1) delayed eruption of the permanent canine or prolonged retention of the deciduous canine beyond 14 - 15 years of age, 2) absence of a normal labial canine bulge, 3) presence of palatal bulge in the canine region, 4) delayed eruption, distal tipping or migration (splaying) of the permanent lateral incisor 5) loss of vitality and increased mobility of the permanent incisors.

The general rule for all impacted teeth should be removed except for canine teeth due to their importance in oral cavity of a person. Nevertheless, complica-

tions arise once impacted canine teeth will not be treated appropriately. The following sequelae were suggested due to canine impaction: 1) Labial or lingual malposition of the impacted tooth, 2) loss of arch length and migration of the neighboring teeth, 3) internal resorption 4) dentigerous cyst formation, 5) infection specially with partial eruption, 6) external root resorption of the impacted tooth, 7) referred pain and combination of the above sequel [13].

Furthermore, canine teeth are considered as the longest teeth and most important in the oral cavity [4] Therefore, impaction of it will affect the guidance of the teeth into the intercuspal position and affect the aesthetic smile of a person. As the prevalence of canine impaction varies from one population to another population, early detection and management are thoroughly needed in order to deliver the best treatment to the affected clients. In addition to, early diagnosis and initiation of proper surgical and orthodontic treatment approach are helpful for an eruption and guiding the canine tooth to its appropriate location. The immediate intervention will prevent the consequent aesthetic, pathological and functional complications arising from canine impaction. The study aim is to determine the prevalence of impacted canines among Saudi people from the 5-year period of 2013-2018 at Al Qassim area in the Kingdom of Saudi Arabia.

2. Aim

In general, this study aimed to determine the prevalence of impacted canines among Saudi people from the 5-year period of 2013-2018 at Al Qassim area in the KSA.

Specifically, it sought to find the following aims:

- To determine the frequency of distribution of patients with impacted canines in the 5-year period from 2013-2018.
- To determine profile of the patient with impacted canines according to 1) age, 2) gender.
- To determine the location of impacted canines among affected clients.

3. Materials and Methods

3.1. Setting

The conduction of the study took place in King Fahd Specialist Hospital located in Buraydah Al-Qassim Province in Saudi Arabia. It is 469-bed capacity and government hospital which is under Ministry of Health. Most people in this particular area seek dental health services from this hospital which is ideal setting of the study. In addition, archives of the radiology department of the said hospital were reviewed from year 2013 to 2018.

3.2. Research Design

A retrospective research designed was utilized in the study. A retrospective study simply means to "look back" in the past and usually done by obtaining data from

medical records of the targeted population with common characteristics [14].

3.3. Population and Sample

The participants of the study consisted of both group of female and male Saudi clients aged from 13 to 30 years. Patients with a status of missing permanent mandibular and maxillary canine in right and left sides were included in the study. Nevertheless, clients with cases of any abnormality and pathological condition such as cleft lip and palate, tumor, cyst and odontoma were excluded in the study.

3.4. Data Collection

Collection of data began after seeking for approval to conduct the study from the concerned authority of the hospital administration. The main tool for the data gathering is Orthopantomogram which is also known as a panotomograph or orthomograph (OPG). In addition, this tool is a panoramic single image radiograph of the teeth, mandible and maxilla of a client. Moreover, a guide questionnaire which contained information on the patient's demographic profile was used in the study. All the information was taken through record analysis of 1500 patients' files which were accessed in the archives of the radiology department of the hospital and college. Data were tallied, tabulated and computed utilizing the different tools for data analysis to come up with valid results.

3.5. Data Management and Analysis Plan

Data was coded for entry and analysis using SPSS statistical software package version 20. Data was presented using descriptive statistics in the form of frequencies and percentages. Percentage was calculated by dividing the frequencies for each of the options by the number of population and multiplying by 100.

$$P = \frac{f}{N} \times 100$$

where:

P = Percentage.

f = frequency for each options.

N = number of population.

3.6. Ethical Consideration

Researchers had requested permission from the hospital and college authorities to carry out the research. They had made it sure that they strictly followed hospital and college protocols and research ethics in pursuing the study. All data taken from the files were considered highly confidential and no part of this study was produced that may divulge the identities of the patients or their families. Furthermore, no health or physical injuries were incurred because no direct contact with any participant was involved.

3.7. Limitations of the Study

This study had not included patients with cases of any abnormality and pathological condition such as cleft lip and palate, tumor, cyst and odontoma.

4. Results

This 5-year study covered year 2013 to 2018. In this study, there were 1500 who seek dental health in King Fahd Specialist Hospital. Thus, out of these clients, only 89 were identified with cases of impacted canine using the OPG with a prevalence rate of 5.9%.

5. Patient's Profile

In Table 1, it shows the patient's profile distribution like the age (Figure 1) and gender (Figure 2) of the participants of the study.

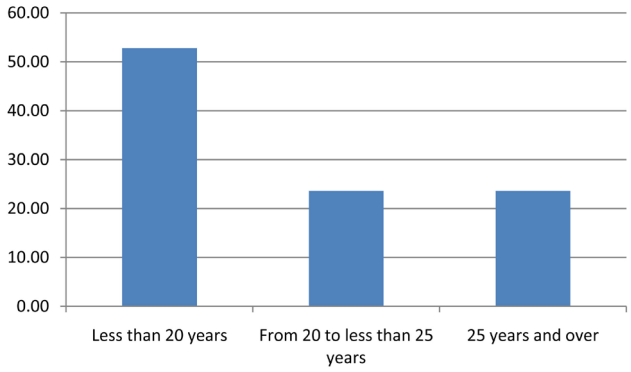

Figure 1. Patient's age distribution.

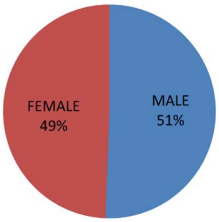

Figure 2. Patient's gender distribution (N = 89).

Table 1. Patients' profile distribution (N = 89).

Age	Frequency	Percentage	Prevalence
Less than 20 years	47	52.80	3.1
From 20 to less than 25 years	21	23.60	1.4
25 years and older	21	23.60	1.4
Gender			
Male	45	50.56	3
Female	44	49.44	2.9
Total	**89**	**100.0**	**5.9**

Age. The age of the patient noticeably fell on less than 20-year category with 47 (52.80%) with a prevalence rate of 3.1. Ages from 20 to less than 25 years and 25 years and older had the same number of clients with 21 (23.60%) with a prevalence of 1.4.

Gender. The study group was divided in relation to sex. There were 45 (50.56%) of males in the study with a prevalence rate of 3 while 44 (49.44%) were females with 2.9 prevalence rate.

6. Canine Impaction Location

In Table 2, it shows the canine impaction location (Figure 3) and frequency among the participants of the study.

It was found that out of 89 patients identified, the patients have impacted canines in different locations: maxillary, mandible, right side and left side. It was found that there were 187 impacted teeth in different locations among 89 clients affected. There were 48 cases (25.7%) of impacted canines on the right side while 64 cases (34.2%) were reported on the left side of the total group. Moreover, impacted maxillary canine were 68 cases (36.4%) and mandibular impacted canine were only 7 cases (3.7%) of the total group.

7. Discussion

In the present study, there were 89 patients identified with canine impaction out of 1500 clients who seek dental health in King Fahd Specialist Hospital. Thus, prevalence rate of impacted canine among Saudi population in Al Qassim Saudi Arabia is 5.9 percent. In the study conducted in 2019, there were 22 patients

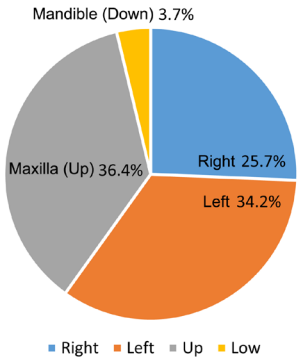

Figure 3. Patient's impacted canine locations.

Table 2. Canine impaction location and frequency (N = 187).

Location	Frequency	Prevalence
Right	48	25.7
Left	64	34.2
Maxilla (Up)	68	36.4
Mandible (Down)	7	3.7

identified using OPG with impacted canine out of 1593 subjects with 1.38 percent of canine impaction [9]. Similarly, in 2015, there were 82 subjects identified with impacted canine out of 2200 patients with 3.7 percent prevalence rate [15]. In addition, another retrospective cross-sectional study found that out of 8243 radiographs, there were 146 cases affected with canine impactions [14].

The current study almost has the same gender percentage affected with canine impaction which is slightly higher among men compared to women. Similarly, there were 51.1 percent of affected males while 48.9 percent were females with canine impaction [10] and another study found that 77 percent of canine impaction were men while 23 percent were women [14]. Nevertheless, in 2014, it was found that females (56.1%) were higher compared to males (43.9%) with impacted canine teeth. In similar to the study of Abu-Hussein and colleagues (2015), females have higher percentage with canine impaction in comparison to men with 55.1% and 43.9%, respectively [5] while no gender difference was found in the study conducted in 2019 [9].

Moreover, maxillary canine impaction has the highest recorded cases of impacted teeth in the present study. In a descriptive, cross-sectional and retrospective study conducted in Madinah, Al Munawwarah Saudi Arabia, the researchers found that maxillary teeth impaction is common than impacted teeth than in the mandible [10]. In contrast to the prospective clinical study conducted in 2016, it was found that there were only less than one percent (0.93%) of maxillary impacted canine [9]. Moreover, prevalence of impacted canine was only 1.7% out of 8243 patient's radiograph reviewed [14]. In addition, the maxillary left canine is the most frequently impacted [5] while canine in the maxillary is the most impacted teeth and impacted teeth in the maxilla is more twice than mandibular impacted canine [3].

Furthermore, canine impaction on the right side was recorded with more than a quarter in total population in comparison to the left side with more than one third of identified with impacted teeth. In similar to the retrospective cross-sectional study conducted between September 2013 and December 2018, there were almost half of the total subjects who had impacted canine in the left side while more than one third of affected clients had canine impaction on the right side [14]. Mandibular canine impaction received the lowest cases of teeth canine impaction among the patients in the current study with only 3.7 percent. Similarly, it was recorded that there were 0.37% cases of mandibular canine impaction among 22 clients identified with canine impaction [9]. Paralleled to the study conducted in Israel, only 13 cases identified out of 82 patients recorded with mandibular canine impaction [5].

8. Conclusion

Considering the complexities of canine teeth, various approaches are needed. The early detection and treatment approach of impacted canines among affected individuals are vital in order to prevent different problems that may arise during impaction of canine teeth. Within the study limitations, there were 5.9 percent

prevalence of canine impaction among participants of the study. Awareness, early detection, proper diagnostic test and multiple treatment approaches are needed to prevent different sequelae due to canine impaction. Lastly, implementing preventive measures to prevent impaction of canine is also important. Dentists and orthodontists must work effectively with clients toward better oral and dental health.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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