



Prevalence of impacted canine among Libyan native's orthodontic patients in Sirte city

Aftima Alamin Derbash

Department of Orthodontics, Preventive Dentistry and Pediatric Dentistry,
Faculty of Dentistry, Sirte University, Sirte Libya.

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ABSTRACT

Corresponding Author

aftima.lamin@su.edu.ly

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This retrospective study was carried out in a dental center in the Sirte, a city in the middle region of Libya. Based on the surveying of panoramic radiographs of patients attended the dental clinic. A total of 500 panoramic radiographs were screened, and all patients with impacted canines were further screened clinically and radiologically. The purpose of this study was to report the prevalence of impacted canine teeth in Sirte city according to the age, and gender. The clinician can investigate the presence and position of the canine using visual inspection, palpation, and radiography. Canine impaction with or without other impactions occurred in (6.8%) of the scanned radiographs, with higher incidence in female (79.4%) than male (20.6%) cases. The aim of the present study was to create baseline information by evaluating the prevalence of impacted canine in middle region of Libya/Sirte city.

1.0 Introduction

Eruption of teeth is a complex process, therefore early, delayed or even failure of teeth eruption may occur. Once the expected time for teeth eruption has past, teeth are regarded as impacted (Fardi *et al.* 2011). Teeth impaction's cause is still a mystery. Localized, systemic, or hereditary causes have all been put out as potential etiological explanations for canine impactions. Arch length-tooth size disparity is the most prevalent localized factor (Jacoby, 1983) (Hamada Y *et al.* 2019). The genetic theory and the guidance theory are the two basic hypotheses relating to displaced maxillary canines (Litsas and Acar, 2011). According to genetic hypothesis, the primary cause of palatally displaced maxillary canines is hereditary (Peck and Peck, 1994). The guiding theory propose that lateral incisor root guides the eruption of the canine; hence if the root is damaged or missing, the canine will not erupt. (Becker A, Chaushu S. 2015). Chronological age, clinical examination, and radiographic examination are some of the approaches used to diagnose impacted canines. The diagnosis provided by panoramic radiography is valuable in tracking the course of tooth emergence and the effectiveness of treatment (Chaushu *et al.* 1999) although CBCT has proven to be superior (Grisar *et al.* 2019). Various ethnic groups reported varying incidences (Ezoddini *et al.* 2007). The prevalence of some dental malformations may be lower or higher depending on the

population's ethnic origin (Baccetti, 1998) (Iman Abdelgader *et al.* 2015). Different populations have varying rates of maxillary canine impaction (Aras *et al.* 2008). According to the literature, upper canines are next to third molars in terms of frequency of impacted teeth (Peck and Peck, 1994). The maxillary canines are second to wisdom teeth in terms of frequency of impacted teeth, according to some studies (Halicioğlu *et al.* 2012), but not all of them (Litsas and Acar, 2011). Canines have a high rate of impaction, which has been related to the fact that they develop last and take a long time to reach a functional occlusion. Due to the tortured eruption path; canines commonly experience displacements or mechanical blockages from nearby teeth and, pneumatization of the maxilla during this prolonged journey (Becker and Chaushu, 2015) (Dekel *et al.* 2021). The screening radiograph was most frequently advised since it was simple to use, economical, and easily accessible in dental clinics in comparison to cone beam computed tomography. Up to date, there is no study assessed the prevalence of impacted canines in Sirte, middle region of Libya. This study was designed to determine the prevalence of impacted canines in Sirte/Libya, and to stress the importance of including the canine eruption path as part of the children's clinical dental assessment whenever possible.

2. Materials and Methods

This retrospective study was carried out in a dental center in the Sirte, a city in the middle region in Libya. Based on the surveying of panoramic radiographs of patients attended the dental clinic. A total of 500 panoramic radiographs were screened, and all patients with impacted canines were further screened clinically and radiologically. The data were analyzed using IBM SPSS Statistics for IOS Version 25 (Armonk, NY: IBM Corp). The data was collected from private dental clinics in Sirte city from July 2022 to November 2022.

The inclusion criteria were: 1) chronological age range: 14-16 years, 2) all teeth are present with/without the third molars, 3) no interproximal caries or restoration, 4) no crown or bridge restoration. 5) no medical disease or cleft cases. All panoramic radiographs were taken with the Orthophos XG 5 (Sirona Dental Systems, Bernsheim, Germany), and the magnification factor was 1:1. All reported measurements were adjusted according to this factor. Data regarding patient age, sex were obtained from patients' main data in the R4 system. All panoramic radiographs were investigated by two observers in two-time interval to assess intra- and inter-examiner reliability of measurements.

3.0 Results

Seven hundred and thirty panoramic radiographs were scanned for this study. Based on the selection criteria, only 500 patients' panoramic radiographs fulfilled the inclusion criteria (136 male (27.2%) and 364 female (72.8%) were included in the final evaluation of impacted teeth. Total canine impaction with or without other impactions occurred in (6.8%) of the scanned radiographs as shown in figure 1. Canine impaction was found in (6.8%); 34 cases out of 500; 7 male (20.6%), 27 female (79.4%) as shown in figure 2, 7 cases have bilateral impaction (20.6%), 27 unilateral impacted cases (79.4%), figure 3 shows distribution of impacted canine in maxilla and mandible with 8 mandibular canine impaction (23.5%), and 26 maxillary (76.5%) of the sample. Bilateral canine impaction was present in 20.6% of the patients with impacted canines, and only (76.5%) had impacted maxillary canines only. The ratio of maxillary to mandibular impaction was about 3.25: 1, and the impaction in upper jaw was nearly three times greater than that in the lower jaw. Females (79.4%) had more impacted canines than males (20.6%).

Table 1. Show distribution of impacted canine in different dental jaw regions.

Position of impacted canine	Right side	Left side	Both sides	Total
Impacted upper canine	12	8	6	26
Impacted lower canine	2	5	1	8

For the upper jaw, 12 cases have only one canine impacted in the right side (46.2%), 8 cases with left side impaction (30.8%), and 6 cases with bilateral impaction (23.1%), while in the lower arch 2 cases (25%) have right side impaction, 5 cases with left side impaction (62.5%) and one bilateral case impaction (12.5%) as shown in table 1.

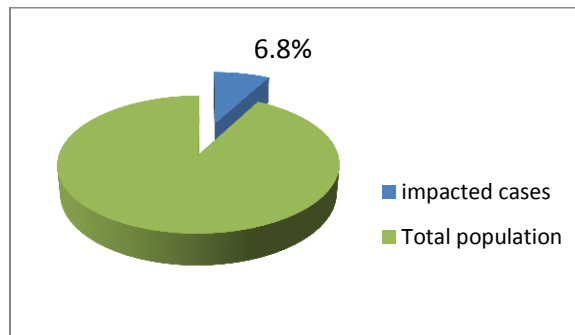


Fig. 1. Prevalence of impacted canine in the studied sample.

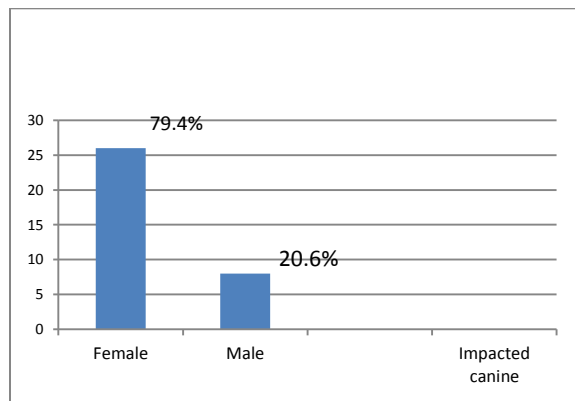


Fig.2. Gender distribution of patients with impacted canine.

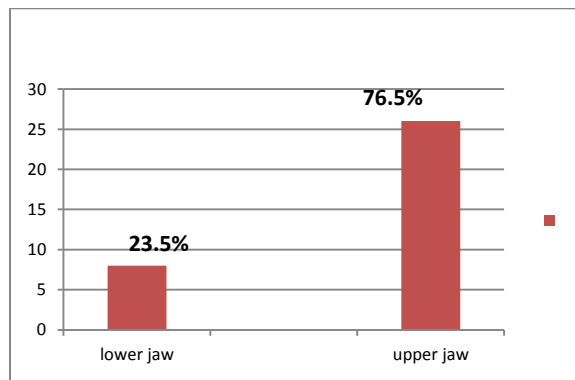


Fig.3. Distribution of impacted canine in maxilla and mandible.

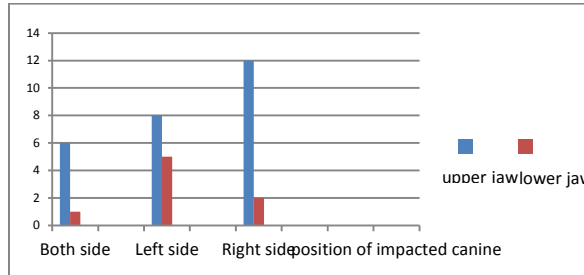


Fig.4 Unilateral/Bilateral distribution in maxilla and mandible.

4.0 Discussion

The canine tooth is one of the last teeth in the dental arch to erupt and has a complex eruption pattern. These circumstances suggest that the emergence of this tooth might not occur naturally. Canines are essential for the development of the arch, the aesthetics of the teeth, and the function of the occlusion. If early signs of canine impaction are found, interceptive procedures should be taken to avoid that and its consequences at all costs. Early intervention eliminates the need for complicated therapies and surgical intervention (Patel and Taylor, 2016).

When impacted canines are not treated at the right time, they might lead to complications such as the root resorption of nearby teeth, canine transposition, a reduction of the arch length, and the growth of cystic masses that cause discomfort and infection (Bedoya and Park, 2009) (Lindauer *et al.* 1992). Several studies have reported the prevalence of canine impaction to be between 0.8 and 8.8 % (Aydin *et al.* 2004) (Chu *et al.* 2003) (Fardi *et al.* 2011) (Zahrani, 1993). The health planning office and officials would be able to properly manage human and material resources to address the issue with the use of data on the pattern and prevalence of this dental problem (Haralur *et al.* 2017).

The present data indicated that the prevalence of maxillary canine impaction was more than those reported in other studies. Canine impaction was found in (6.8%) of Libyan population in Sirte city, this falls within the high range reported by studies in other populations, with predominance in females (79.4%), this could be attributed to sample number and methodology, the ratio is higher in maxillary arch (76.5%) than in mandibular arch as reported in the literature. In accordance with a study done by Arnadi *et al.*, and Ataee (Arnadi *et al.* 2017) (Ataee, 2014). In comparison to study that was done in Zawia city in western of Libya which found the incidence of canine impaction was 7.4% with high incidence of left side impaction (Rohuma *et al.* 2020), this may be attributed to the selection of cases and inclusion/exclusion criteria and difficulty to access detection and diagnosis at an early age

due to the same living conditions. In mandibular arch the left side impaction was more dominant (62.5%), unilateral impaction highly occurred according to the finding here which is not uncommon, bilateral impaction was found in maxilla in 6 cases (23.1%), and in only one case in the mandible (12.5%) as shown in figure 4.

5.0 Conclusions:

Prevalence of canine impaction in Sirte city/Libya is more than the range reported in other populations. Females showed more canine impactions than males. The maxillary canine impaction was more dominant than the mandibular, and the unilateral impaction was significant. The right side of the maxilla was preferred. Such a study encourages clinicians to take preventive measures just before or at the age of ten if the canines look like they may become impacted.

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