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The assesment of pattern of maxillary canine impaction in the Ardabil city

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ABSTRACT

Background & Objective: Impacted teeth are one of the most common reasons for visiting dentists and maxillofacial surgeons. During clinical and radiographic examinations and evaluations, the dentist sometimes realizes that the patient's problem is due to the impaction of one or more teeth. Therefore, it is necessary for every dentist to make the necessary and correct decision for the treatment of such teeth. One of the best ways to diagnose impacted teeth is first of all the absence of that tooth in the desired location and clinical evaluation of the patient and secondly to check the radiographic view of the desired area. Impacted teeth can be the source of many problems for various reasons, so in most cases, their extraction is recommended. Knowing how to place the impacted tooth and determining its type and other characteristics of the impaction can help the dentist in choosing the appropriate treatment-surgical method and also prevent complications during surgery. Proper and timely diagnosis of impaction as well as determining its position (buccal-palatal-intermediate) in the jawbone can reduce damage to adjacent structures and also affect the treatment plan. Because accurate detection of impacted tooth positions is possible with radiography, the most accurate radiograph to examine the impacted tooth is cbct images. Therefore, due to possible occlusion injuries and the effect of occlusion pattern on the treatment of these teeth, it is important to study the types of impaction patterns. Therefore, this study was presented with the aim of investigating the impaction pattern of maxillary canine teeth in Ardabil with cbct archive.

Materials and Methods: In this descriptive cross-sectional study, CBCT images of 239 patients who met the inclusion criteria were evaluated. Due to the lack of statistics, due to the lack of statistics of maxillary impacted canine teeth in Ardabil, the counting method was used for sampling and stereotypes were identified as maxillary impacted canine teeth as the sample size. The obtained data were analyzed in SPSS24 software.

Results: Among the impacted canine teeth studied, 63.2% had palatal, 17.5% buccal and 19.3% had intermediate pattern. Also, 11.2% had damage to adjacent structures and 88.8% had no damage to adjacent structures. Among the types of damage to adjacent structures, 46.9% caused root resorption of the first premolars, 34.5% caused root canal resorption, and 18.6% had other damage to adjacent structures. Of these, 50.4% had root curvature and 49.6% had no root curvature, of which 12.1% had severe curvature, 38.7% had mild curvature and 49.2% had severe curvature. Also, the average angle of the incised canine to the lateral incisor was 41.7%. 9% of impacted canine teeth had a root resorption of lateral incisors and 9% did not have a root resorption of lateral incisors.

Conclusion: Dentists should treat cases such as maxillary latent canine such as: Examine the occlusion pattern, angle to adjacent teeth, damage to adjacent structures, curvature of the incised canine root, and root resorption of adjacent teeth.

Keywords: Maxillary canine; Impacted teeth; CBCT.

Introduction

An impacted tooth is a tooth that has significantly delayed eruption, and clinical and radiographic evidence indicates that it will not erupt in the future [1]. The maxillary canines are one of the most common occlusal teeth after the third molar and are more common in women than men.

These teeth play an important role in terms of function and beauty and are among the last teeth to grow in the anterior maxilla and have the longest evolutionary period and, if left untreated, are very time consuming in terms of treatment [2-4]. Uneruption or impacted maxillary canine (no growth until 14 years of age and the persistence of milk canine) is defined as the teeth not growing and developing at the root for 6 months or appearing in the dental arch during the growth phase. Maxillary canine occlusion can occur unilaterally or bilaterally [5,6]. Factors related to the etiology of canine are divided into two categories: generalized and localized [1]. Generalized factors include abnormal muscle pressure, vitamin D deficiency, radiation, fever, and endocrine hormone deficiency. Localized factors may be the result of a combination of the opposite: dental arch size discrepancies-prolonged occlusion or loss of deciduous canine, improper position of tooth buds, presence of alveolar cleft, ankylosis, cyst or tumor, root deformity [7].

Investigation of the position of the incised canine includes 4 cases:

1- Overlap with the adjacent lateral tooth.

2- Vertical height.

3- Angle with respect to the midline of the palate.

4- Position of the root apex [8].

Touching the buccal sulcus above the root of the mammary canine has been suggested as a tool for early detection of the position of the permanent maxillary canine. The absence of palpable protrusions or the presence of asymmetry in the canine teeth on both sides raises the suspicion of permanent canine occlusion. According to the articles, 85% of the latent canines are palatal and 15% are buccal. Maxillary canines grow at an average age of 11-12 years and grow faster in women than men [9-11]. The canine occlusion and displacement are divided into three categories: palatal-buccal and intermediate. Maxillary canines can also be seen at the top of the apex of the incisor or myopic teeth. Almost half of the canine palatal occlusions examined were also associated with lateral incisor abnormalities [12,13]. Various studies have shown that if the palatal position of the canine tooth is detected at the appropriate age, by extracting the deciduous canine tooth, the growth path of the permanent canine tooth can be greatly improved and its occlusion can be prevented. Most occlusions are not detected until after the normal eruption of canines. The similarity of the deciduous canine to the permanent canine in terms of shape. The first diagnostic tools for canine dysfunction are periapical and panoramic radiographs, but today, cone-beam computed tomography (CBCT) is used, which not only determines the presence or absence of analysis at different root canals, but also the severity. The position of the analysis is also determined at the adjacent roots and the position of the bone around the impacted tooth [14]. Therefore, in order to achieve maximum success in impacted canine dental surgery, it is very important to have surgery to identify the position of the tooth and the type of occlusion pattern and its other characteristics. Therefore, in this study, we have tried to investigate the types of occlusion patterns of maxillary canine incisors using CBCT imaging in Ardabil.

Methods and Materials

In this study, 239 radiological archives related to maxillary canine teeth, which were prepared as CBCT and were eligible for inclusion in the study, from the archives of two private centers of oral and maxillofacial radiology and oral and maxillofacial radiology of Dr. Baser in the city of Ardabil was selected. The angle of the incised canines relative to the lateral was also measured by drawing a line from the apex to the canine crown and another line from the apex to the incisor lateral canopy and measuring the intersection of these two lines as the angle [24]. Finally, the data were analyzed by Fishers test, Chi-square and Monte Carlo squares in SPSS 24 software at a significance level of 0.05.

Inclusion criteria

1. Selected radiology archives that include a maxillary image.

2. The presence of canine teeth inserted unilaterally or bilaterally.

Exclusion criteria

1. Implanted canine teeth with undeveloped roots.

2. Absence of lateral incisor teeth.

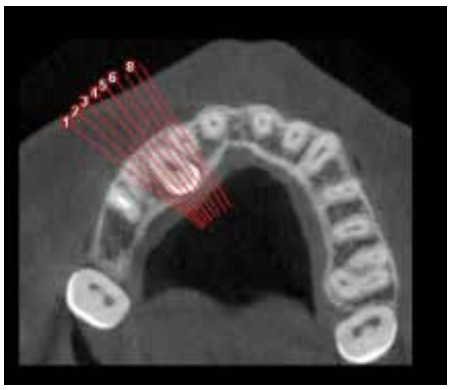

Figure 1. Palatal impacted tooth.

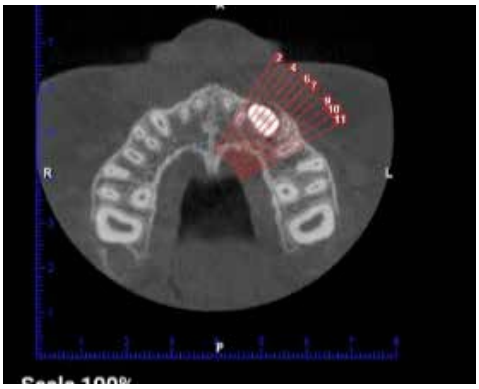

Figure 2. Buccal impacted tooth.

Figure 3. Intermediate impacted tooth.

Results

According to our study, of the total number of subjects, 50 (20.9%) were male and 189 (79.1%) were female. Out of 285 cases of impacted canine teeth, 180 cases had palatal pattern (63.2%), 50 cases had buccal pattern (17.5%) and 55 cases had intermediate pattern (19.3%). Damage to the adjacent structure by impacted canine teeth was the second step of our study. 32 cases (11.2%) damaged the adjacent structure and the damage and the number of cases that did not damage the adjacent structure were 253 cases (88.8%). The table below shows the type of canine tooth damage to adjacent structures.

Out of 267 cases of impacted canine teeth, 24 cases (9%) had lateral incisor root canal resorption and 243 cases (91%) did not have lateral incisor root canal resorption. 130 cases (50.4%) had root canal curvature and 128 (49.6%) had no canine root canal curvature. 31 cases (12.1%) had severe root curvature, 99 cases (38.7%) had mild root curvature and 126 cases (49.2%) had direct curvature. Chi-square was used to determine the relationship between the frequency of maxillary canine occlusion patterns and patients ‹sex and the results show that there is no relationship between the frequency of maxillary canine occlusion patterns and patients› sex (P=0.32).

The Monte Carlo test was used to determine the relationship between the frequency of maxillary canine occlusion patterns and lateral incisor root analysis. The results show that there is no relationship between the frequency of maxillary canine occlusion patterns and the lateral incisor root resorption (P=0.08). Fisher test was used to determine the relationship between the frequency of lateral incisor root canal resorption and the inclination of the incised canine root and the results show that there is no relationship between the incidence of lateral incisor root canal resorption and the incidence of the incised canine root (P=1.00).

Percent	Abundance	Type of canine tooth damage to adjacent structures
46.9	15	Root resorption in first premolar
34.5	11	Root resorption in central incisor
3.1	1	Root resorption in first premolar and central incisor
3.1	1	Root resorption in first molar
3.1	1	Changing root formation of first and second permolars
3.1	1	Destruction of bony base of maxillary sinus
3.1	1	Moving central incisor's root to the buccal
100	32	Total

Discussion

In order to maximize the treatment or surgery position of impacted canine teeth and subsequently prevent unwanted complications and observe differences in the pattern of impacted canine teeth in different populations in this study, we decided to maximize the occlusal patterns of maxillary canine teeth with CBCT archive in the population. Let's examine Ardabil. For this purpose, 239 CBCT images were examined. According to the studies conducted in this study, 20.9% were male and 79.1% were female, indicating a higher number of females than males in terms of maxillary canine occlusion. These findings are in line with the studies of Alisary et al. (2019), Arandi (2017), Haris Khan (2018) Jammel Kifayatullah (2015), Alrwuili (2016), Bassam Ali Al-Turaihi et al. (2020), Deng- Gao Liu, et al. (2008), Yoojun Kim et al. (2012), Caroline S. Lai et al. (2013), Leah Walker et al. (2005) align [15,16,18,21, 31,32,34,35,37] and contradicted the studies of Shimia Bin et al. (2017), Eman Abdel-Salam et al. (2012) [20,28]. In this study, 63.2% of the latent canines had a palatal pattern, 17.5% had a buccal pattern and 19.3% had an intermediate pattern. These findings are consistent with studies by Alisary et al. (2019), Arandi (2017), Haris Khan (2018), Jena AKL and Duggal R (2010). Jammel Kifayatullah (2015), Dariush Goodarzipour et al. (2009), Caroline Lai et al. (2013) [15,16,17,18,22,35] and with the studies of Alkerban et al. (2009) , Bassam Ali Al-Turaihi et al. (2020), Deng-gao Liu et al. (2008) , Yoojun Kim et al. (2012) [31,32,34].

In the study of the type of damage to adjacent structures by latent canine, 49.9% had premolars and 34.5% had central root resorption. These findings are consistent with the studies of Deng-gao Liu et al. (2008) [32] and with the studies of Shahla Momeni and Sholeh Shahidi (2007), Fredric Rafflenbeul (2019), Caroline S. Lai (2013), Zahra Khalili Jan And colleagues (2020) , Leah Walker and colleagues (2005), Bin Yan et al. (2012) disagreed [19,35,37,39].

In the study of the intensity of curvature in the root apex, 12.1% of the canines were severely curved, 38.7% were mildly curved and 49.2% were straight in terms of the intensity of the root curvature. These findings are consistent with the studies of oneronochová et al. (2003) [82] and contradicted the studies of Becker A et al. (1999) [383].

Conclusion

To increase the success of treatment of maxillary canine teeth and prevent its complications during surgery, we need to be familiar with the types of occlusion patterns to be diagnosed and treated in a timely manner. Over time, various radiographic techniques have been used to identify different patterns. Today, CBCT technology has been used in various studies and its high accuracy and reliability have been proven compared to other methods. According to the technique used in this study, using CBCT technology to determine the location and effects of canine embedded in adjacent structures, the results are reported as follows: In terms of descriptive statistics, latent canine latency was higher in women than men, but in terms of inferential statistics, there was no statistically significant relationship between the frequency of latency patterns and patients' sex (P=0.32). Palatal latency had the largest share compared to buccal and intermediate patterns and unlike other studies, interdental latency was higher in Ardabil population than buccal latency. 9% of incisor lateral teeth had root resorption but there was no significant relationship between the frequency of maxillary canine occlusion patterns and lateral incisor root resorption (P=0.08). In the study of the type of damage to adjacent structures, 11.2% of the incised canines had damaged adjacent structures, with the first premolar root analysis being the most common type of injury. Half of the impacted canines had curvature in the root apex and there was no significant relationship between root canal analysis of lateral incisor and root curvature of the incised canine (P=1.00). Also, the relationship between damage to the ad-

jacent structure and the curvature of the incised canine root was not statistically significant (P=0.33). There is no significant relationship between the frequency of latent canine root curvature and damage to the adjacent structure (P=0.30).

Also, there is no significant relationship between the frequency of root canine curvature and the type of damage to the adjacent structure (P=0.83) and there is no significant relationship between the frequency of latent canine root curvature and tooth root resorption (P=0.44). The angle of the impacted canines relative to the lateral tooth was normal in terms of distribution. The minimum angle was 10 degrees and the maximum was 90 degrees. Also, the mean angles were 41.70 and there was no significant difference between the mean angles of the impacted tooth and lateral root resorption (P=0.52). The different frequencies of different types of occlusion patterns and other related cases can be attributed to racial differences, heredity, differences in diagnostic context, criteria for selecting teeth as affected teeth, differences in the statistical population and the target population. If the two studies are not similar, even with one study method, the results will be different [40].

Conflict of Interest

There is no conflict of interest to declare.

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