

Original Article

Prevalence of Dental Anomalies in a Sample of Orthodontic Patients in Erbil City

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Abstract

Objective: Dental anomalies are abnormal morphological development of dentition during various periods of tooth development and have an important role in the development of various kinds of malocclusions. If dental anomalies not diagnosed, they can make dental and orthodontic treatment more difficult. So, orthodontists and the general dental practitioner must investigate patients carefully. The objective of the current study was to determine the prevalence and distribution of dental anomalies in a sample of orthodontic patients in Erbil city using orthopantomogram.

Methods: Four hundred fifty-eight orthopantomograms of orthodontic patients with age of 16-40 years evaluated to determine the prevalence and distribution of the hypodontia, impaction, microdontia, and supernumerary tooth.

Results: 15.06% orthodontic patients: 21 males and 48 females had at least one dental anomaly. Impaction and hypodontia were the most common dental anomalies with no significant difference between genders. Maxillary canines were more commonly impacted tooth, whereas maxillary lateral incisors were the most common tooth agenesis among genders.

Conclusions: Impaction was the most prevalent dental anomaly, and maxillary canines were the most involved teeth and are in agreement with many studies among various populations. The most frequently missing teeth were the maxillary lateral incisors. However, mandibular 2nd premolar was the most common hypodontia in some studies.

Keywords: Prevalence, Dental anomalies, Orthopantomography, Orthodontic examination.

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Introduction

Dental anomalies are known as abnormal morphological development of dentition regarding the position and function of teeth, bone, and soft tissue of the oral cavity during various periods of tooth development^(1,2,3,4,5). Dental anomalies are either developmental, congenital, or acquired and may be involved just a single tooth or can be a systemic condition⁽⁶⁾. The dental developmental anomalies are beginning at the stage of development of the dentition, while the acquired anomalies occur after the development of teeth⁽⁷⁾. The anomalies were defined as follows:

A tooth is determined as hypodontia (congenitally missing), in the situation of no identification or distinguished radiographically based on time of calcification or there is no evidence of removing the tooth. If the diagnosis of hypodontia is not accurate, the file was dismissed. Dental supernumerary: is a tooth that appears in addition to the normal number of teeth. Impaction is defined as the failure of a tooth to erupt into the oral cavity after 2/3 root formation. Microdontia: the decrease in the mesiodistal or gingivoincisor dimension of the clinical crown^(8,9). Dental anomalies like supernumerary teeth or agenesis of the tooth, has an important role in the development of various kinds of malocclusions⁽¹⁰⁾. They affect occlusion and arch length, especially in the anterior region in adolescents, so their role in the aesthetic and orthodontic treatment plan is undeniable^(11,12). The range of prevalence of dental anomalies is 12% - 45% among different populations in the world^(10,11,13-15).

Orthodontic patients have more tooth anomalies than the general population and mostly associated with some kind of malocclusions^(16,17). Congenitally missing teeth is one of the most commonly reported dental anomalies. It is seen about 25% of the population in the world, which mostly affects third molars⁽¹⁰⁾; however, the prevalence of hypodontia was 6.66% in Erbil city⁽¹⁸⁾. In a study done regarding the prevalence of malocclusion and orthodontic treatment need in Erbil city, it was found that 52.7% of the sample have malocclusion with varying treatment needs. The results for Dental Health Component (DHC) of IOTN were: 30.4% of children showed a severe and very severe need for treatment, 8.8% were in borderline, 13.5% had a mild need, and 47.1% did not need treatment. There was a significant correlation between DHC and gender ($p=0.003$) according to DHC, boys need more orthodontic treatment than girls. The most common features of malocclusion for the group of the need for orthodontic

treatment were the following: Impeded eruption teeth 14.3%, partially erupted and tipped or impacted teeth 14%, increased overjet 12.4%, crossbites 7.5%, increased overbites 6.6%, contact point displacement (crowding) 5.6%, open bites 4.1% and reversed overjets 0.8%⁽¹⁹⁾.

Although there are high rates of dental anomalies reported among orthodontic patients, orthodontists mostly unable to consider this; if dental anomalies not diagnosed, they can make dental and orthodontic treatment more difficult. So, orthodontists and the general dental practitioner must investigate patients carefully⁽²⁰⁾.

The objective of the current study was to determine the prevalence and distribution of dental anomalies in a sample of orthodontic patients in Erbil city using an orthopantomogram, which is a useful and effective diagnostic tool.

Patients and methods

Four hundred fifty-eight patients attending the orthodontic department in the college of dentistry, Hawler medical university seeking orthodontic treatment were screened to determine the prevalence and distribution of the hypodontia, impaction, microdontia, supernumerary and retained primary tooth. The panoramic radiographs were retrieved from Orthodontic Clinic at the College of Dentistry, Hawler Medical University, Erbil/Kurdistan Region of Iraq from October 2018 till April 2019. The age of patients was between the ages of 16 to 40. Permanent third molars were excluded from the examination.

Complete medical, dental, and family histories were taken from all patients. The inclusion criteria were:

- No history of metabolic disease or syndrome with an effect on the metabolism of bone or formation of the tooth.
- No history of prior orthodontic treatment or tooth extraction.
- No cleft lip or palate, craniofacial anomalies, and diagnosed syndromes.
- Good quality of panoramic radiographs.

- Complete root formation of all permanent teeth appeared on panoramic radiographs (except the third molar).
- No history of trauma to the maxillofacial region.

Patients were characterized according to their gender and type of anomaly (agenesis, supernumerary, impaction, and microdontia, retained primary dentition). The anomalies were defined as follows:

A tooth is determined as hypodontia (congenitally missing), in the situation of no identification or distinguished radiographically based on time of calcification or there is no evidence of removing the tooth. If the diagnosis of hypodontia is not accurate, the file was dismissed. Dental supernumerary: is a tooth that appears in addition to the normal number of teeth. Impaction is defined as the failure of a tooth to erupt into the oral cavity after 2/3 root formation.

Microdontia is the decrease in the mesiodistal or gingivoincisor dimension of the clinical crown^(17,18). One orthodontist has investigated the prevalence of dental anomalies (excluding third molars), and its occurrence pattern concerned the involved sides (left vs. right/maxilla vs. mandible), tooth types, and gender. Intra-examiner reliability was tested by re-examining the random patients, a month after initial examination to ensure the diagnostic consistency.

Statistical analysis

Data tabulation and analysis were processed using SPSS software version 20. Independent t-test was used to co-

mpare between genders and the p-value of 0.05 was used as a cut off point for the significance of statistical tests.

Results

Sixty-nine (15.06%) orthodontic patients: 21 males and 48 females had at least one dental anomaly. Also, 364 (79.47%) of the sample had no dental anomaly (Figure 1). According to Table 1, impaction and hypodontia were the most commonly occurring dental anomalies with no significant difference between genders (p=0.51, p=0.55, respectively). Impaction, hypodontia, and microdontia were more in females than males.

However, dental anomalies tended to occur more unilaterally and in maxilla among both genders except microdontia, which was more bilaterally as revealed in Table 2,3 except for microdontia, which was more common bilateral in female patients.

Maxillary canines were more commonly impacted tooth with more prevalence in females with a statistically no significant difference (Table 4), whereas maxillary lateral incisors were more common tooth agenesis among genders (Table 5).

All of the studied anomalies were more frequent among females than males; however, no significant difference was observed.

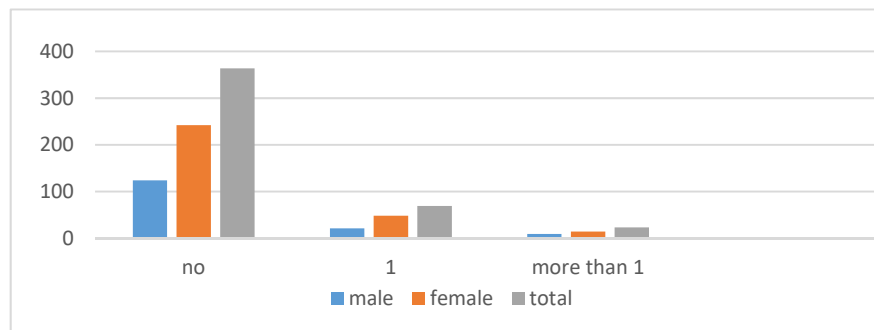


Figure 1: Distribution of dental anomalies among genders.

Table 1: Distribution of dental anomalies among genders.

Dental anomalies	Male n=152 (%)	Female n= 306 (%)	Total n=458 (%)	p-value	Most affected teeth
Hypodontia	16 (10.52)	27 (8.82)	43 (9.38)	0.55	12, 22, 35, 25
Impaction	13 (8.55)	32 (10.45)	45 (9.82)	0.51	13, 23, 45, 37
Retained primary tooth	2 (1.31)	5 (1.63)	7 (1.52)	0.79	1C, 1E, 3E, 2C
Supernumerary	1(0.65)	2 (0.65)	3 (0.65)	0.99	19
Microdontia	8 (5.26)	13 (4.24)	21 (4.58)	0.62	22, 12

Table 2: Distribution of dental anomalies in maxilla and mandible among genders.

Dental anomalies	Maxilla (%)			Mandible (%)			Both jaws (%)		
	Male n= 152	Female n= 306	Total n=458	Male n=152	Female n=306	Total n=458	Male n=152	Female n=306	Total n=458
Hypodontia	9 (5.92)	18 (5.88)	27 (5.89)	5 (3.28)	8 (2.61)	13 (2.83)	2 (1.31)	1 (0.32)	3 (0.65)
Impaction	9 (5.92)	26 (8.49)	35 (7.64)	2 (1.31)	4 (1.3)	5 (1.09)	2 (1.31)	2 (0.65)	4 (0.87)
Retained primary tooth	0	5 (1.63)	5 (1.09)	1 (0.65)	0	1 (0.21)	1 (1.31)	0	1 (0.21)
Supernumerary	1 (0.65)	2 (0.65)	3 (0.65)	0	0	0	0	0	0
Microdontia	8 (5.26)	13 (4.24)	21 (4.58)	0	0	0	0	0	0

Table 3: Distribution of dental anomalies unilateral and bilateral among gender.

Dental anomalies	Unilateral (%)			Bilateral (%)		
	Male n= 152	Female n=306	Total n=458	Male n=152	Female n=306	Total n=458
Hypodontia	12 (7.89)	14 (4.29)	26 (5.67)	4 (2.63)	13 (4.24)	17 (3.71)
Impaction	8 (5.26)	26 (8.49)	34 (7.42)	5 (3.28)	6 (1.96)	11 (2.4)
Retained primary tooth	0	5 (1.63)	5 (1.09)	2 (1.31)	0	2 (0.43)
Super numerary	1 (0.65)	1 (0.32)	2 (0.43)	0	1 (0.32)	1 (0.21)
Microdontia	5 (3.28)	4 (1.3)	9 (1.96)	3 (1.97)	9 (2.94)	12 (2.62)

Table 4: Distribution of most common impacted teeth among gender.

impacted teeth	Male n=152 (%)	Female n=306 (%)	Total n= 458 (%)	p value
Maxillary canines	9 (5.92)	24 (7.84)	33 (7.2)	0.45
Mandibular canines	2 (1.31)	1 (0.32)	3 (0.65)	0.21
Maxillary 2 nd premolar	1 (0.65)	2 (0.65)	3 (0.65)	0.99
Maxillary 2 nd molar	1 (0.65)	1 (0.32)	2 (0.43)	0.61
Maxillary lateral incisors	1 (0.65)	0	1 (0.21)	0.33
Mandibular 1 st premolar	0	1 (0.32)	1 (0.21)	1
Mandibular 2 nd premolar	0	4 (1.3)	4 (0.87)	0.3
Mandibular 2 nd molar	2 (1.31)	3 (0.98)	5 (1.09)	0.74
Mandibular 1 st molar	0	1 (0.32)	1 (0.21)	1

Table 5: Distribution of most common congenitally missing teeth among gender.

Missing teeth	Male 152	Female 306	Total 458	p value
Maxillary 2 nd premolar	2 (1.31)	5 (1.63)	7 (1.52)	0.03
Maxillary lateral incisors	8 (5.26)	11 (3.59)	19 (4.14)	0.39
Mandibular 2 nd premolar	4 (2.63)	5 (1.63)	9 (1.96)	0.46
Mandibular 2 nd molar	0	2 (0.65)	2 (0.43)	1
Mandibular 1 st molar	2 (1.31)	4 (1.3)	6 (1.31)	0.07
Maxillary 1 st premolar	1 (0.65)	1 (0.32)	2 (0.43)	0.61
Maxillary 1 st molar	2 (1.31)	0	2 (0.43)	0.1
Mandibular central incisors	0	1 (0.32)	1 (0.21)	1

Discussion

The results of the present study revealed that 15.6 % of the sample had at least one dental anomaly, which is in line with a study done in Pakistan⁽¹⁹⁾ and less than the prevalence in the studies done in Sudanese, Thai, Turkish and Indian orthodontic patients (38.6%, 40%, 23.74%, 23.7%, respectively)^(9,12,14,20). The current finding was more than the prevalence among Iranian (12%) and Pakistani orthodontic patients (12.9%)^(11,21). This variation in the results may be partially attributed to the racial differences, sample sizes, and study populations; some authors study orthodontic patients, whereas others study the general population. Moreover, the third molars were not considered^(8,9,11,12,22).

Impaction was the most prevalent dental anomaly in the present study (9.82%), and maxillary canines were the most involved teeth [7.2%], followed by mandibular second molars (0.87%) and is in agreement with previous studies among various populations⁽²²⁻²⁵⁾. The prevalence of impaction is in accordance with the study among Greece population (8.8%)⁽²⁴⁾.

The percentage of impacted canines in Saudi, Portuguese, Indian, and Turkish patients were less than the current study (3.3%, 1.8%, 3.1%, and 2.9%, respectively)^(8,12,26,27). Worldwide, a higher percentage of impaction had been reported than that which had been found in the current study; 13.7 % among 1239 Greek patients and 15.5 % among 1123 Indian population^(13,24).

However, in Saudi Arabia, a much higher prevalence (21.1%) was found⁽⁸⁾, and in another study in Saudi Arabia was 14.32%, but it was 16.5% among Serbian patients^(28,29).

Concerning genders, no statistical difference was observed in the present study, which is in agreement with Uslu, Haugland, and Maria^(12,22,27), whereas Hou and Afify found that females were significantly more affected than males^(8,30). This variation in the results can be attributed partially to the sample sizes, type of study samples, ethnic backgrounds, and other co-founding factors such as level of education.

The most common impacted tooth in the current study was maxillary canine (7.2%), which is in line with other studies^(8,28,29), while Haugland et al. found that mandibular 2nd premolar most common impacted tooth in their study⁽²²⁾. Dental impaction, according to findings in the general population ranging from 0.6–8.4%^(11,31,32).

In the current study, hypodontia was 2nd most common dental anomalies with the prevalence of 9.38%, which more than the results obtained by Endo among Japanese orthodontic patients (8.5%) and Fnaish among Jordanian patients 8.83%^(33,34). Sudanese studies showed less percentage (5.1%) of hypodontia among orthodontic patients⁽³⁵⁾. In many studies, hypodontia was the most common dental anomaly^(8,12,14,21). Worldwide, the low prevalence was reported in Norway 6.6% and India 4.19%^(13,22), whereas high prevalence was reported among Thai orthodontic patients (26.1%), Saudi population (25.7%), and Indian patients (16.3%)^(8,9,26).

The most frequently missing teeth were the maxillary lateral incisors 4.14%, followed by mandibular second premolars 1.96%, which in accordance with Khan et al. and Hassan et al.^(19,36). In contrast, previous Sudanese studies showed that the mandibular lateral incisor was the most commonly missing tooth among the general population, followed by the maxillary lateral incisor⁽³⁵⁾, whereas among orthodontic patients, the maxillary lateral incisor was the most frequently missing tooth

2.1% followed by the mandibular second premolar 1.7%⁽³⁷⁾. However, mandibular 2nd premolar was the most common hypodontia in some studies^(8,21).

Regarding the location, hypodontia was more in the maxilla. However, among females, it tended to occur more. Also, some studies reported a higher prevalence in females^(7,11,22), while others reported more in males^(26,38,39). This divergence in the results may be attributed to the ethnic variation, study populations, and sample sizes.

In this study, the prevalence of supernumerary teeth was 0.65%, which was less than Kositbowornchai (2.7%) among Thai children⁽⁹⁾. In previous literature, less prevalence (0.13%, 0.3%, and 0.3%) had been reported among Chennai, Saudi, and Turkish populations, respectively^(8,12,39), whereas 4.5% was observed among 3660 Jordanian school children⁽³⁴⁾.

Microdontia was 3rd common dental anomaly (4.58%) in the current study, which was more than Indian and Serbian patients (2.58%, 2.9%), respectively^(13,29). Ramdurg et al. found it as 2nd common dental anomalies among Indian patients⁽¹⁴⁾.

Conclusions

Impaction was the most prevalent dental anomaly, and maxillary canines were the most involved teeth and are in agreement with many studies among various populations. The most frequently missing teeth were the maxillary lateral incisors. However, mandibular 2nd premolar was the most common hypodontia in some studies. Different types of dental anomalies are popular in dental clinics, so careful diagnosis and customized treatment plans are required to decrease complications. As dental anomalies can be chief, complain of patients seeking treatment in the orthodontic clinic, an early radiographical examination (OPG) for primary students as a preventive measure to exclude the possible complication for those who have the anomalies.

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