Prevalence of Dental Anomalies in Orthodontic Patients Referred To Dental School of Shahid Sadoughi University of Medical Sciences, Yazd, Iran

Soghra yassaei[1], Hosseinagha Aghili[2], Asghar sheikhi[3], Nemat Hoseini[4]

Department of Orthodontics, Faculty of Dentistry, Shahid Sadoughi University of Medical Sciences, Iran.

Abstract

Aim: The prevalence of dental anomalies in different ethnic groups is different. The aim of this study was to evaluate the prevalence of dental anomalies associated with different malocclusions in Yazd. Iran.

Methods: In this retrospective study the census method was used (with the confidence interval of 95% and the error margin of 5%). Dental records of 450 orthodontic patients referred to dental school of Shahid Sadoughi University of Yazd, Iran between 2010 and 2015 were collected. Dental records were classified into skeletal class I, II and III malocclusions (based on ANB angle measurements on cephalograms) searching for dental anomalies related to number, size and position. Data were analyzed using t-test, ANOVA and chi-square tests.

Results: A total of 405 patients, (251 females 62%, 154 males 38%) with the mean age of 15.5 ± 4.1 were assessed. 49% of patients had at least one anomaly. The most frequent anomaly was impaction (24.9%). Hypodontia was found in 14.5% of patients and mandibular wisdom tooth was the most commonly missing tooth. 2.9% of patients had supernumerary which the maxillary anterior presented the higher number of it. The frequency of dental anomalies was not different between males and females. There was no correlation between type of malocclusion and frequency of dental anomalies except for hypodontia which was significantly higher in class I malocclusion.

Conclusion: The most common anomaly seen in patients referred to the school of dentistry was impaction.

Key Words: Dental anomaly, Malocclusion, Orthodontic patients.

Introduction

Dental anomalies (DAs) are observed frequently in dental patients. These anomalies may be acquired or occur due to genetic predispositions which seems to play more important role [1]. Genetic disorders cause many abnormalities before and after birth including anomalies in the number, size, morphology, position and structure [2].

There have been several studies assessing the prevalence of DAs. In 2011, Dastjerdi examined 1151 orthodontic patients and found that 0.74% had supernumerary teeth [3]. In another study, Dastjerdi evaluated the incidence of non-syndromic hypodontia in 160 Iranian patients and found 197 (9.1%) missing teeth [4]. However in Gomez's study on 1040 orthodontic patients in Brazil, the prevalence of hypodontia was reported to be 6.7% [5].

Despite of the presence of several studies assessing the prevalence and epidemiology of DAs, only a few have been investigated the association between DAs and orthodontic problems. Some DAs have been shown to be associated with specific dentofacial features. Hypodontia as a common anomaly represents with several dentofacial and esthetical problems including the shorter anterior face height, increased nasolabial angle, deep labiomental fold, and decreased vertical and transversal dimensions of the alveolar process [6]. Early diagnosis and proper orthodontic and restorative management may eliminate, at least, some of the periodontal and restorative problems [6,7]. Ben Bassal reported that the number of congenital missing teeth is affected by the skeletal pattern [8]. Endo et al. [9] reported that hypodontia was related with head and face morphology. Lei fort's study revealed higher prevalence of palatal canine impactions in deep bite patients [10]. Uslu et al. [2] reported a significant association between dental abnormalities and malocclusions.

The aim of this study was to determine the prevalence of dental anomalies in association with different types of malocclusions.

Material and Methods

In this retrospective study, the census method (with the confidence interval of 95% and the error margin of 5%) was used. Dental records (lateral cephalograms, panoramic and dental casts) of 450 orthodontic patients referred to dental school of Shahid Sadoughi University of Yazd, Iran between 2010 and 2015 were analyzed. Ethics committee of Yazd University approved the project (ID; p/17/1/223645).

Dental records belong to patients with developmental anomalies (Down syndrome, ectodermal dysplasia, cleft lip and palate), any positive history of trauma and/or previous extraction, poor quality of radiographs and incomplete filling dental records were excluded from the study. Using these exclusion criteria, 45 records were eliminated leaving a total of 405 records included in study.

Records of selected patients were divided into 3 groups of class I, II and III malocclusions based on ANB angle. ANB angles between 1 to 4 degrees classified as class I, in class II subjects, ANB was greater than 4 degrees and in class III, ANB was equal to or smaller than 1 degree.

Dental records were carefully investigated searching for below anomalies:

Number abnormalities (hypodontia, supernumerary), size abnormalities (macrodontia, microdontia), shape abnormalities (peg shaped teeth, root dilaceration) and eruption abnormalities (ectopic eruption and impaction).

Gathered data was subsequently analyzed using SPSS software and statistical analyses were done by t-test, ANOVA, and chi-square tests.

Results

A total of 405 records, (251 females and 154 males) with the mean age of 15.5 ± 4.1 were evaluated in this study. 49% of subjects had at least one dental anomaly. *Table 1* shows the distribution of DAs by malocclusion type. In all three types of malocclusion, the most prevalent dental anomaly was

Corresponding author: Nemat Hoseini, Associate Professor, Department of Orthodontics, Faculty of Dentistry, Shahid Sadoughi University of Medical Sciences, Yazd 89195/165, Iran. Tel: 035-172-401-71; Email: Hoseini.n17@gmail.com

impaction observed in 24.4% of class I cases, 24.4% of class II and 25.9% of class III cases followed by hypodontia (14.5%) and microdontia (9.1%). Mandibular third molar and second premolars were the most impacted teeth. However canine impaction was observed in 39 cases (23 cases at right side and 16 cases at left side). Gemination was the rarest anomaly observed in only 2 cases of study group.

Table 2 shows the distribution of DAs by region. In total, the frequency of DAs was different in anterior and posterior region. The most prevalent anomaly in the maxillary anterior, premolar and molar region was supernumerary (71.4%), dilacerations (36.8%) and microdontia (51.6%) respectively. However in the mandible, hypodontia (6.8%), dilacerations (42.1%) and impaction (47.2%) were the most prevalent anomalies in the abovementioned regions respectively.

The rate of impaction and hypodontia was the highest in mandibular and maxillary posterior region respectively.

Regarding third molar anomalies (*Figure 1*), prevalence of maxillary third molar missing was more than impaction. In class I, II and III malocclusions 18, 3 and 16 cases of third molar hypodontia were observed respectively. On the Contrary, in mandible, third molar impaction was more frequently observed than hypodontia. In class I, II and III malocclusions 22, 27 and 23 cases of impaction were observed respectively.

Distribution of DAs by sex is given in *table 3*. The dental anomalies were statistically independent from gender, but gemination was observed only in the male subjects.

To sum up, the prevalence of DAs, except that hypodontia, was not affected by the type of malocclusion. Based on Chi-square test hypodontia was significantly (p-value: 0.02) higher in malocclusion class I.

Discussion

Although several studies assessed the prevalence of dental

Table 1. *Distribution of dental anomalies by type of malocclusion.*

Dental anomalies	Class1	Class2	Class3	P Value	Total
	N (%)	N (%)	N (%)		N (%)
Hypodontia	27 (45.8)	11 (18.6)	21 (35.6)	0.02	59 (100)
Ectopic eruption	7 (35)	6 (30)	7 (35)	0.949	20 (100)
Impaction	33 (32.7)	33 (32.7)	35 (34.7)	0.949	101 (100)
Dilaceration	8 (53.3)	5 (33.3)	2 (13.3)	0.154	15 (100)
Microdontia	17 (45.9)	9 (45.9)	11 (29.7)	0.213	37 (100)
supernumerary	5 (41.7)	4 (33.3)	3 (25)	0.773	12 (100)
Pegshaped lateral	7 (46.7)	4 (26.7)	4 (26.7)	0.536	15 (100)
Gemination	2 (100)	0	0	0.134	2 (100)
Ankylose	2 (100)	0	0	0.134	2 (100)

Table 2. *Distribution of dental anomalies by region.*

Maxillary Anterior (3-3)	Mandibular Anterior (3-3)	Maxillary Premolar	Mandibular Premolar	Maxillary Molar	Mandibular Molar	Total
	N (%)	N (%)	N (%)	N (%)	N (%)	
16 (13.7)	8 (6.8)	4 (3.4)	9 (7.7)	39 (33.3)	41 (35)	117
32 (20.1)	6 (3.8)	1 (0.6)	20 (12.6)	25 (15.7)	75 (47.2)	159
4 (16.7)	0	8 (33.3)	12 (50)	0	0	24
3 (15.8)	1 (5.3)	7 (36.8)	8 (42.1)	0	0	19
22 (35.3)	2 (3.3)	0	2 (3.2)	32 (51.6)	4 (6.5)	62
10 (71.4)	0	0	2 (14.3)	2 (14.3)	0	14

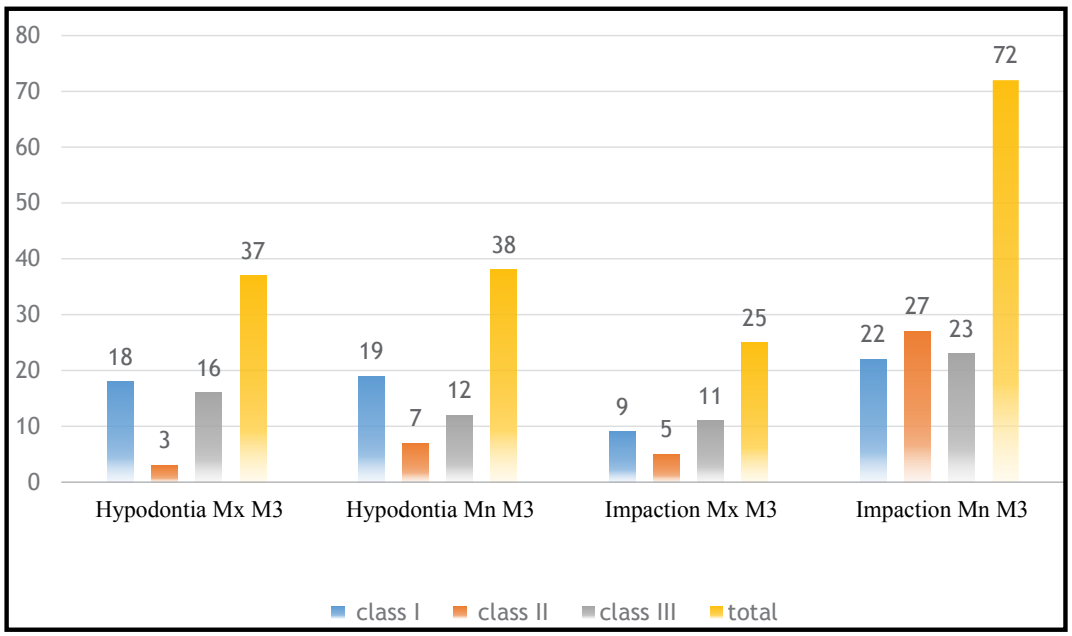

Figure 1. *Comparison of mandibular(Mn) and maxillary(Mx) third molar (M3) anomalies.*

Table 3. *Distribution of dental anomalies by sex and results of chi-square test.*

	Male(M)(n=154)	Female(F)(n=251)	p	M + F (n=405)
	N (%)	N (%)		N (%)
Hypodontia	20 (33.9)	39 (66.1)	0.48	59 (100)
Impaction	41 (40.6)	60 (59.4)	0.539	101 (100)
Ectopic eruption	7 (35)	13 (65)	0.775	20 (100)
Dilaceration	7 (46.7)	8 (53.3)	0.482	15 (100)
Microdontia	11 (29.7)	26 (70.3)	0.276	37 (100)
Supernumerary	5 (41.7)	7 (58.3)	0.792	12 (100)
Pegshaped lateral incisor	6 (40)	9 (60)	0.872	15 (100)
Macrodontia	1 (1.50)	1 (50)	0.727	2 (100)
Gemination	2 (100)	0	0.07	2 (100)

anomalies, the reported results have been different in various racial and ethnic groups. Therefore we decided to investigate the prevalence of dental anomalies in orthodontic patients referred to dental school of Yazd university in Iran.

We found significant differences in the prevalence of dental anomalies between this study and previous epidemiological studies [11-13]. These differences can be explained mainly by racial differences, local environmental influences and nutrition [14]. In the present study, 49% of 405 patients had at least one dental anomaly, whereas in the study of Altug 5.46% of 3043 Turkish patients had dental anomalies [14]. More similar to our results was reported by Uslu who showed 40.3% of 900 patients had at least one dental anomaly [15]. In another studies 38.6% [16] and 49% [17] also, has been reported.

In the present study, we found impaction the most prevalent dental anomaly in all three types of malocclusions followed by hypodontia and microdontia. Similarly Montasser reported that the most commonly detected DAs were impaction (12.8%) [18]. However Qalab Abbas reported tooth agenesis the most prevalent dental anomaly observed in 24.9 % of 503 orthodontic patients referred to a university of Pakistan. Uslu also, reported tooth agenesis the most common anomaly (21.6%).

In our study, the rate of impaction and hypodontia was the highest in mandibular and maxillary posterior region respectively. Mandibular third molar was the most affected by impaction followed by maxillary canine and maxillary third molar. However Uslu observed that impaction was more frequent in the maxilla than in the mandible and the most frequently impacted tooth was the maxillary right canine. Uslu, also, showed that statistically significant differences in impaction rates were observed between malocclusion groups, with the Class II and Class II Division 2 groups having the lowest rates whereas we found no significant difference between malocclusion types in regard to amount of impaction. According to the literature, the prevalence of canine impaction is 1 to 3 percent [19]. However we found higher rate of canine impaction in our study (9%)

In this study the prevalence of supernumerary was found to be 2.9 % and the most common site of supernumerary teeth was the maxillary anterior region. These results were supported by the previous studies [15,16].

We found that 9.1% of patients had microdontia which was quite higher than Kocabalkan (1.5 to 2%) and Uslu (0.7%) studies [15,20].

Statistically significant correlations were not observed between sex and dental anomalies, with the exception of gemination, seen only in males. Some studies agree with these results [12,21] whereas others reported significant differences by sex for some kinds of DAs [22,23].

Conclusion

Based on this study there was no correlation between type of malocclusion and frequency of dental anomalies except for hypodontia. Impaction was the most frequently anomaly in the sample of the present study.

References

1. Jeong KH, Kim D, Song YM, Sung J, Kim YH. Epidemiology and genetics of hypodontia and microdontia: A study of twin families. *The Angle Orthodontist*. 2014; **85:** 980-985.

2. Uslu O, Akcam MO, Evirgen S, Cebeci I. Prevalence of dental anomalies in various malocclusions. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2009; **135:** 328-335.

3. Vahid-Dastjerdi E, Borzabadi-Farahani A, Mahdian M, Amini N. Supernumerary teeth amongst Iranian orthodontic patients. A retrospective radiographic and clinical survey. *Acta Odontologica Scandinavica*. 2011; **69:** 125-128.

4. Vahid-Dastjerdi E, Borzabadi-Farahani A, Mahdian M, Amini N. Non-syndromic hypodontia in an Iranian orthodontic population. *Journal of oral science*. 2010; **52:** 455-461.

5. Gomes RR, da Fonseca JA, Paula LM, Faber J, Acevedo AC. Prevalence of hypodontia in orthodontic patients in Brasilia, Brazil. *European Journal of Orthodontics*. 2010; **32:** 302-306.

6. Borzabadi-Farahani A. Orthodontic considerations in restorative management of hypodontia patients with endosseous implants. *European Journal of Oral Implantology*. 2012; **38:** 779-791.

7. Kokich V. Early management of congenitally missing teeth. *Seminars in orthodontics*. 2005; Elsevier.

8. Ben-Bassat Y, Brin I. Skeletodental patterns in patients with multiple congenitally missing teeth. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2003; **124:** 521-525.

9. Endo T, Yoshino S, Ozoe R, Kojima K, Shimooka S. Association of advanced hypodontia and craniofacial morphology in Japanese orthodontic patients. *Odontology*. 2004; **92:** 48-53.

10. Leifert S, Jonas IE. Dental anomalies as a microsymptom of palatal canine displacement. *Journal of Orofacial Orthopedics/ Fortschritte der Kieferorthopädie*. 2003; **64:** 108-120.

11. Amini F, Rakhshan V, Babaei P. Prevalence and pattern of hypodontia in the permanent dentition of 3374 Iranian orthodontic patients. *Dental Research Journal (Isfahan)*. 2012; **9:** 245-250.

12. Thongudomporn U, Freer TJ. Prevalence of dental anomalies in orthodontic patients. *Australian Dental Journal*. 1998; **43:** 395-398.

13. Hamasha AA, Al-Khateeb T. Prevalence of fused and geminated teeth in Jordanian adults. *Quintessence International*. 2004; **35:** 556-559.

14. Altug-Atac AT, Erdem D. Prevalence and distribution of dental anomalies in orthodontic patients. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2007; **131:** 510-514.

15. Uslu O, Akcam MO, Evirgen S, Cebeci I. Prevalence of dental anomalies in various malocclusions. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2009; **135:** 328-335.

16. Qalab A AA, Amjad N, Amjad M. Frequency of dental anomalies in various malocclusions.in orthodontic patients. *Pakistan Oral and Dental Journal*. 2010; **30:** 119-122.

17. Kositbowornchai s. Prevalence and distribution of dental anomalies in pretreatment orthodontic Thai patients. *Khon Kaen University Dental Journal*. 2010; **13:** 92-100.

18. Montasser MA, Taha M. Prevalence and distribution of dental anomalies in orthodontic patients. *Orthodontics (Chic)*. 2012; **13:** 52-59.

19. Grover PS, Lorton L. The incidence of unerupted permanent teeth and related clinical cases. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology*. 1985; **59:** 420-425.

20. Kocabalkan E, Ozyemisci N. Restoration of severe hypodontia associated with microdontia by using an overdenture: a clinical report. *Chinese Medical Journal (Engl)*. 2005; **118:** 350-352.

21. Endo T, Ozoe R, Kubota M, Akiyama M, Shimooka S. A survey of hypodontia in Japanese orthodontic patients. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology*. 2006; **129:** 29-35.

22. Basdra EK, Kiokpasoglou M, Stellzig A. The Class II Division 2 craniofacial type is associated with numerous congenital tooth anomalies. *European Journal of Orthodontics*. 2000; **22:** 529-35.

23. Brook AH. Dental anomalies of number, form and size: their prevalence in British schoolchildren. *Journal of the International Association of Dentistry for Children*. 1974; **5:** 37-53.