



## Patterns Of Dental Anomalies In Patients Attending For Orthodontic Treatment In King Abdul-Aziz Medical City, Riyadh Saudi Arabia

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### Abstract

The aim of this was to investigate the patterns of dental anomalies and treatment options among orthodontic patients in king Abdul-Aziz medical city (KAMC) Riyadh, Saudi Arabia.

**Method:** This cross-sectional study, chart review was conducted in King Abdul-Aziz Medical City (KAMC) in a period of time between 2016 to June 2017 in out patient's orthodontic clinic. Two hundred and ninety-nine (299) patients' files were reviewed for both Digital Orthopantomographs (OPG) and dental records. These records were reviewed for congenitally missing teeth (hypodontia), supernumerary teeth, impactions, transposition, infraposition, and any other unusual conditions that can be assessed with OPG. Treatment options were divide into (fixed orthodontics appliance, surgical, restorative, combination treatment or follow up) according to the orthodontists' notes. (SPSS) version 24.0 was used to analyze the data. Result: The most common finding of dental anomalies was hypodontia (33.78%), impaction (29.1%), retained primary teeth (7.02%), infraposition (2.68%), respectively. The least anomalies were transposition (0.33%) and supernumerary teeth (0.33%). Other findings anomalies represented by (2.68%) such as (peg-shaped laterals, Microdontia, or dilacerations teeth.

**Keywords:** Dental Anomalies, Orthodontic Treatment, Hypodontia, Impaction, Retained Primary Teeth, Infraposition, Supernumerary, Peg Shaped Laterals

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### Introduction

Dental anomalies are known as the craniofacial abnormalities in position, function of the teeth, bones, and tissues of the jaw and mouth. An abnormal differentiation of the dental lamina and tooth germs will result in dental anomalies. These differentiations of the dental lamina and tooth germs are the result of genetics and environmental factors during development and it is known as polygenic or multifactorial inheritance <sup>(1)</sup>. However, in comparison dental anomalies with oral diseases such as dental caries and periodontal diseases, are relatively low in number, but can pose a problem during treatment planning. They present with malocclusion, esthetic and functional problem, and possible disposition to other oral diseases. Hence, their clinical management is usually complicated <sup>(2)</sup>.

Congenitally missing teeth) hypodontia) is one of the most common observed developmental dental anomalies. It is occurred in approximately 25% of the population worldwide, most common representation of this anomaly is the third molars (2). Other observed dental anomalies are supernumerary teeth, fused teeth and peg lateral incisors and other more, which is will elevated the difficulties, complication of orthodontic treatment <sup>(3)</sup>.

In Saudi Arabia, several studies had been carried out in different regions on developmental dental anomalies. The first study, which described the different types of dental anomalies in Saudi Arabia, was done in 1989. It carried out on 2393 children in Gazan region to identify the prevalence of different types of dental anomalies, and compared the results with the Western World due to the lack of similar studies in the Saudi Arabia at that time<sup>(4)</sup>. Another study in Saudi Arabia by Al-Emran et al in the same era, investigated that the most common occurring anomalies are impacted teeth 10.4%, infrapositioning 9.4%, persistence (Retained primary teeth) 4.2%, and agenesis (hypodontia) 4.0%<sup>(5)</sup>. The last study was in 2013 by Al-jabba A. et al studied the prevalence of dental anomalies in orthodontic clinic at the College of Dentistry, King Saud university in Saudi Arabia on a total of 602 patients. Their results were 36.54% of patient's development with dental anomaly; impacted teeth conclude the highest finding 51.4%, followed by hypodontia 20%<sup>(6)</sup>.

### Materials and methods:

In our current study, we were targeting adult age group from 14 to 30 years old who are coming to Ministry of National Guard, KAMC, dental clinics, Riyadh. The patients will be examined for most common occurring developmental dental anomalies and treatment options. The previous studies in Saudi Arabia have mainly focused on children, so our current study will increase the knowledge base about dental anomalies in adults, also we will include the third molars in contrast of previous studies done in Saudi Arabia.

This cross-sectional study, chart review was conducted in King Abdul-Aziz Medical City (KAMC) in a period of time between 2016 to June

2017 in out patient's orthodontic clinic.

Inclusion criteria are patients with digital OPG and dental notes were available, age group from 14-30 years old, both genders and no medical compromised affected teeth development. While, Patients with history of orthodontic treatment, previous history of extraction, syndromes like Down's syndrome, cleidocranial dysostosis, cleft lip and palate, and congenital diseases were excluded. No socio-economic classification was attempted and ethnic differences are not subjected. 1211 files were reviewed, only 299 files meet our inclusion and exclusion criteria.

The data retrieved from medical records of KAMC. The sample size was calculated using Raosoft software. With the target population of 1000 in last 2 years, 95% confidence level and 5% margin of error. The optimal sample size calculated was 278.

Dental records and digital Orthopantographs (OPG) were reviewed to determine the prevalence of impacted teeth, congenital missing teeth (hypodontia), retained primary teeth, supernumerary teeth, transpositions, infraposition, and any unusual other findings. Distribution of anomalies among gender, and age groups and treatment for each anomaly also had been analyzed. All data were entered on excel sheet and transferred to (SPSS)version 24.0 for analysis. Differences in incidences rates were analyzed by using Fisher Exact Test.

### Result:

Among 299 chart reviewed 107 (35.79%) were for males and 192 (64.21%) females. In 226 (75.58%) of the patients had at least one dental anomaly (Table 1).

<b>Gender</b>	Male	(107) 35.79%
	Female	(192) 64.21%
<b>Age (Mean, SD)</b>	19.63 4.40	
<b>Age group</b>	(14-19)	(168) 56.19%
	(20-25)	(93) 31.10%
	(26-30)	(38) 12.71%
<b>Total number of anomalies</b>	(226) 75.58%	
<b>Anomalies</b>	Hypodontia	(101) 33.78%
	Impaction	(87) 29.10%
	Retained primary tooth	(21) 7.02%
	Infraposition	(7) 2.34%
	Supernumerary	(1) 0.33%
	Transposition	(1) 0.33%
	Other	(8) 2.68%

**Table 1:** Demographic profile of the patients and dental anomalies distribution.

The distribution of dental anomalies according to gender, which conclude that the male (77.55%) have shown more anomaly than females (74.48%) (Table 2).

168(56.91%) of dental anomalies occurring in age group 14-19 years following by 93(31.10%) in group of 20-25 years and the least group of dental anomalies are 26-30 years around 38(12.71%) (Table3).

Anomalies	Male	Female	P. value
<b>Impaction</b>	35.63% (31)	64.36% (56)	1.0000
<b>Hypodontia</b>	37.63% (38)	62.37% (63)	0.7022
<b>Infraposition</b>	28.57% (2)	71.43% (5)	1.0000
<b>Transposition</b>	100% (1)	0.00% (0)	0.3579
<b>Retained primary tooth</b>	42.86% (9)	57.14% (12)	0.4873
<b>Supernumerary</b>	100% (1)	0.00% (0)	0.3579
<b>Others</b>	12.5% (1)	87.5% (7)	0.2666
<b>Total</b>	<b>(77.55%)</b>	<b>(74.48%)</b>	

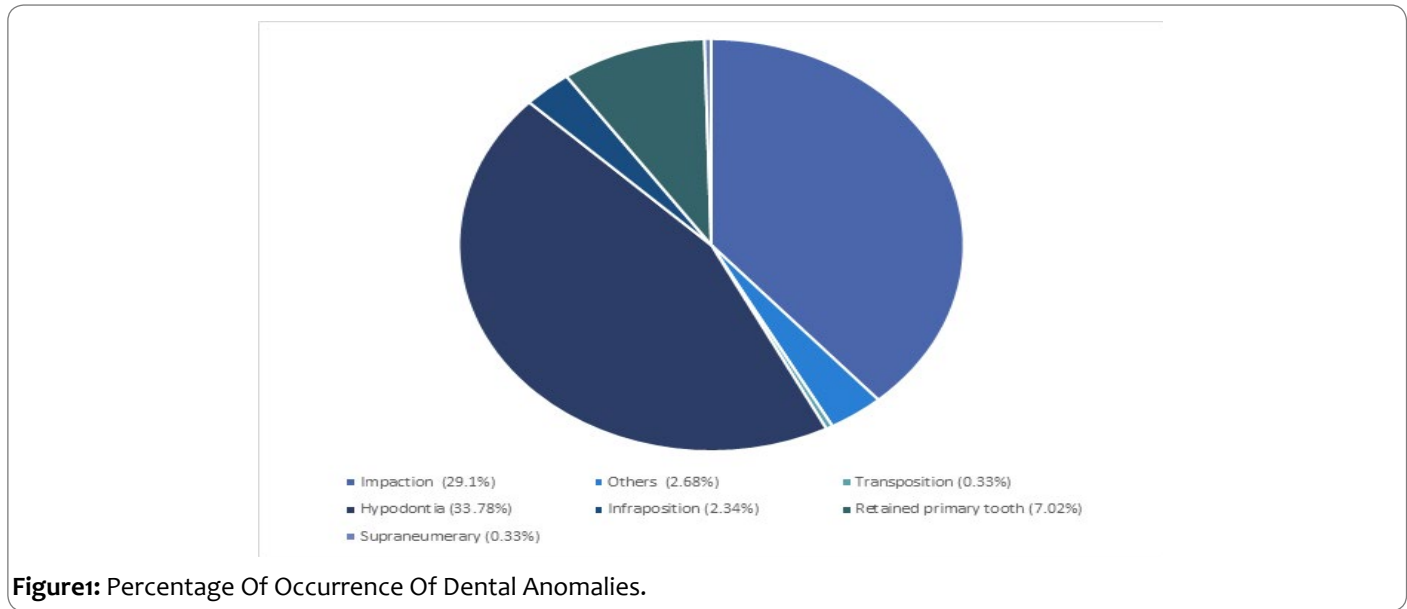
**Table2:** Distribution of anomalies across gender.

Anomalies				
	total	14-19	20-25	26-30
<b>impaction</b>	87	20.24	40.86	39.47
<b>hypodontia</b>	101	30.36	38.71	36.84
<b>infraposition</b>	7	3.57	1.08	0.00
<b>transposition</b>	1	0.60	0.00	0.00
<b>Retained primary teeth</b>	21	8.33	7.53	0.00
<b>supernumerary</b>	1	0.60	0.00	0.00
<b>others</b>	8	3.57	1.08	2.63
<b>Total percentage of age group</b>		(168)56.19%	(93)31.10%	(38)12.71%

**Table 3:** distribution of dental anomalies according to different age groups:

The most common finding of dental anomalies was hypodontia (33.78%), impaction (29.1%), retained primary teeth (7.02%), infraposition (2.68%), respectively. The least anomalies were transposition (0.33%) and

supernumerary teeth (0.33%). Other findings anomalies represented by (2.68%) such as (peg-shaped laterals, Microdontia, or dilacerations teeth) (Figure 1).



**Figure1:** Percentage Of Occurrence Of Dental Anomalies.

Hypodontia was the most common anomaly and statistically non-significant (table 2). It was predominated in 63(32.81%) female compared to 38(35.51%) males. Mandibular molars (33.77%) were the highest congenitally missing tooth (Hypodontia), specifically the mandibular left third molar (18.39%). Followed by maxillary anterior teeth by (11.69%), specifically maxillary right lateral incisor (4.35%).

Impacted teeth had the same distributions as hypodontia in mandibular molar (19.4%) particularly mandibular right third molars (9.70%) and the anterior maxillary teeth (17.05%) common in maxillary right canine (8.03%).

Retained primary teeth (7.02%) which are the maxillary anterior teeth

were the most frequent retained teeth (4.68%), especially in maxillary right canine (2.68%). Follow by mandibular molars retained by (3.34%), highly incidence in mandibular left second molars were the most retained molar (1.67%).

Infraposition found among patients by (2.34%), most found in mandibular premolars (1.66%), followed by mandibular left second premolars (0.67%) and with only (0.66%) in anterior mandibular.

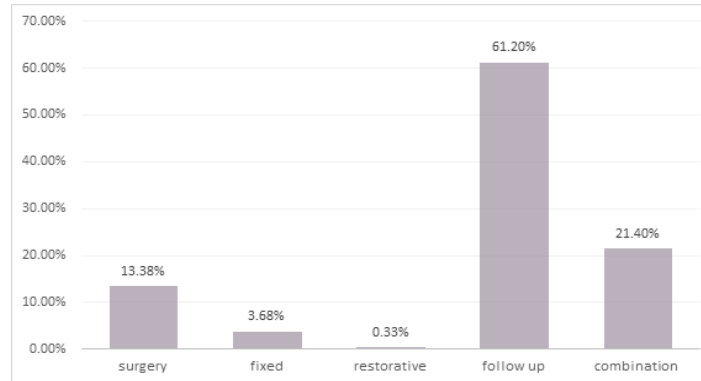
The least anomalies, which have equal findings, are transposition and supernumery (0.33%). The transposition only one case was found in maxillary anterior teeth, which change was between central and lateral teeth. While, Supernumery tooth found in the maxillary posterior area (distomolar) (Table 4).

Dental anomalies	Maxillary anterior teeth	Mandibular anterior teeth	Maxillary premolar	Mandibular premolar	Maxillary molars	Mandibular molars
<b>Hypodontia</b>	35(11.69%)	3(0.99%)	14(4.68%)	15(5.02%)	86(28.76%)	101(33.77%)
<b>Impaction</b>	51(17.05%)	4(1.34%)	4(1.33%)	4(1.33%)	45(15.05%)	58(19.4%)
<b>Retained primary teeth</b>	14(4.68%)	1(0.33%)	-	-	6(2%)	10(3.34%)
<b>Infraposition</b>	-	2(0.66%)	-	5(1.66%)	-	-
<b>transposition</b>	2(0.66%)	-	-	-	-	-
<b>supernumery</b>	-	-	-	-	1(0.33%)	-

**Table 4:** Distribution of dental anomalies according regions.

According to the orthodontists' notes, there are different treatment options for dental anomalies. The first option is to follow-up (61.20%), followed by combined treatment (surgical and fixed orthodontic appli-

ance) (21.40%), third treatment option was surgical treatment (13.38%), and for fixed appliance was offered to (3.68%). Restorative treatment was limited to less than 1% of patients (figure2).



**Figure2:** Percentage Of Treatment Options.

**Discussion:**

The dental anomalies classified to many groups according to:

A-Number of teeth:

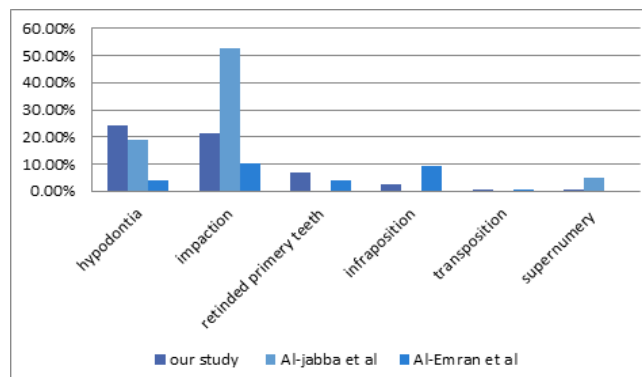
- Hypodontia: Congenital lacking of one or more permanent teeth<sup>(15)</sup>.
- Supernumery tooth: Additional tooth present in the oral cavity, which is, exceeds the normal teeth numbers in different location and morphology<sup>(16)</sup>.

B-Patterns of eruption:

- Impaction tooth: A tooth failed to erupt in susceptible period and will not erupted later without intervention<sup>(17)</sup>.
- Retained primary tooth: A primary tooth, which doesn't follow the physiological exfoliation for many reasons<sup>(18)</sup>.
- Transposition: tooth that erupted in another tooth's position and this anomaly happened between two adjacent or non-adjacent teeth<sup>(19)</sup>.
- Infrapositiona tooth: A tooth had ankylosed after replantation or trauma that will not compensate to the normal occlusion<sup>(20)</sup>.

The present of dental anomalies, if not carefully considered and diagnosed by dentist, can be complicated the orthodontic treatment plan. Some frequent dental anomalies are need a combination treatment might be surgical or restorative intervention before orthodontic treatment, which will make it more complicated, and expensive treatment.

Hypodontic teeth were the most common anomaly in this study (33.78%) included third molars, and highly in female more the male with no significant effect (P=0,7022). However, when we exclude the third molars Hypodontia was (22.37%) in comparing our study to Al-Jabaa et al 2013 where they reported (20%) (6), while Al-Emran et al 1990 was found only (4%)<sup>(5)</sup>. An observation increase incidence of hypodontia among generation depending to measurement of previous studies. (Figure 3)



**Figure3:** Comparison of dental Anomalies distribution between different studies in Saudi Arabia



The second highest effected tooth was the maxillary lateral incisors and followed by mandibular second premolars <sup>(5)(7)(6)(9)</sup>.

Impaction is the second most common anomaly found, and the mandibular molars are the most common found in comparing to the result with last study on Saudi population of third molars impaction <sup>(10)</sup>, as well as worldwide <sup>(11)</sup>. In this study, diagnosis of third molars impaction based on classification of Pell Gregory, and winter's angulations. The impactions of maxillary canines are the second highest finding which is similar in compared to the others' results <sup>(5)(6)</sup>. Retained primary teeth are highly reported in this study, which always associated with congenital missing and impaction of permanent teeth <sup>(12)</sup>. Females more affected than males, primary mandibular molars and primary maxillary canines had the most common persistence teeth.

One of the rare dental anomalies is a transposition tooth; in this study, only one case was found between central and lateral.

Supernumerary teeth in Salem et al <sup>(4)</sup> who investigated around 2,393 of Saudi children, found only 0.5% of the children had at least one supernumerary. In this study the only one case found out of 299 of the sample occurred in a male patient in the posterior area of molars teeth (distomolar).

According to AL-Emran's study <sup>(5)</sup>, the combination treatment was the most common used treatment. That because his study was exclusion the 3rd molars during investigating the dental anomalies to the hypodontia and impaction. But in our current study when the third molars included, following-up the anomalies was the appropriate treatment. Furthermore, comparing to our study to AL-Emran's study without involving the 3rd molars, the results are the same for the most appropriate common second used treatment, which is the combination treatments.

### Conclusion

Variations of dental anomalies are commonly seen in dental clinics. Careful diagnosis and simplified treatment plan is needed to reduce complications. Although, Patients with dental anomalies are primary seeking treatment in orthodontic clinic, orthodontic treatments is not the first the treatment choice.

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