Original Research Paper

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Dental Anomalies Encountered During Regular Orthodontic Treatment in Indore, Madhya Pradesh: A Research Article

Abstract:

Background: In routine treatment procedures, an orthodontist encounters various dental anomalies in the oral cavity of the patients. These anomalies mainly affect the occlusion as well as the length of the arch of the jaw mainly in the anterior region. Therefore, it is important to know these anomalies which helps in proper orthodontic diagnosis and treatment plan

Materials and Methods: The present study included a total of 887 patients, out of which 427 patients are male and 460 patients are female. The orthopantomogram radiograph was analyzed. For checking the malocclusion,the one trained examiner was there for assessing the molar relationship (according to the angle's definition)

Results: In the present study, we have observed dental anomalies like Impaction, Hyperdontia, Dilaceration, Dens Evaginatus, Dens Invaginatus,Taurodontism,Transposition,Gemination and Fusion occurs most commonly in male. While other anomalies like Hypodontia, Microdontia,Macrodontia,Peg-shaped lateral incisor,and Concrescence occur most commonly in females

Conclusion: In the present study, the prevalence of dental anomalies was 25.9%. The most common dental anomaly seen is Impaction

Key-words: Dental Anomaly, Orthodontics, Malocclusion

Introduction:

Anomaly is defined as "abnormality or deviation from the average norm of anatomy, function or position of teeth". The word anomaly is taken from the greek word anomalos which means irregular[1].

The normal epithelium-mesenchymal interactions include a heterogenous series of molecule signaling, receptors as well as transcription control systems. Interruption of epithelium-mesenchymal interactions considerably modified the normal odontogenesis which leads to the development of anomalous tooth[2,3]. There are over 300 genes which are expressed in teeth answerable for odontogenesis. Defects in any of these genes lead to altered tooth morphology[4].

The anomalies of the tooth can be divided into developmental anomalies or congenital anomalies. These anomalies may be confined to a single tooth or they may involve multiple teeth. It is important to note that acquired anomalies of a tooth are

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[1]HIMANSHU SINGH, [2]URVASHI TOMAR, [3]PRATIK GUPTA, [4]BHUVNESH AIREN, [5]RANJAN MANI TRIPATHI, [6]MAGESH KUMAR

[1,2]Department of Oral and Maxillofacial Pathology and Oral Microbiology Index Institute of Dental Sciences, Indore

[3]Department of Prosthodontics & Crown & Bridge Desh Bhagat Dental College,Mandi Gobindgarh,Punjab

[4,5]Department of Public Health Dentistry Index Institute of Dental Sciences, Indore,

[6]Department of Periodontics Index Institute of Dental Sciences, Indore,

Address for Correspondence: Dr. Himanshu Singh MDS
Associate Professor
Department of Oral and Maxillofacial Pathology and Oral Microbiology Index Institute of Dental Sciences, Indore, Madhya Pradesh, India-452016
Email: himanshustar3g@gmail.com

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induced after tooth development, whereas the developmental anomalies are induced during the tooth development[5,6].

There are various dental anomalies that disturbs the normal occlusion. Various dental anomalies include Fusion, Concrescence, Dens in Dente, Dens Evaginatus, Dens Invaginatus, Gemination, Microdontia, Macrodontia, Enamel pearls, Peg shaped lateral incisors, Taurodontism, Agenesis, Impaction, Microdontia, Hypodontia, Hyperdontia, Transposition, Supernumerary tooth etc[7].

In routine treatment procedures, an orthodontist encounters various dental anomalies in the oral cavity of the patients. These anomalies mainly affect the occlusion as well as the length of the arch of the jaw mainly in the anterior region. Therefore, it is important to know these anomalies which helps in proper orthodontic diagnosis and treatment plan[8,9,10].

So keeping this fact in mind, we have conducted this study to observe the various types and prevalence of dental anomalies which is encountered in daily practice in the orthodontic treatment procedures.

Materials and Methods:

The present study was conducted in the Department of Orthodontics and Dentofacial Orthopaedics. The patient details are also collected from private dental clinics. The total duration of the present study was 8 months. The present study included a total of 887 patients, out of which 427 patients are male and 460 patients are female. The patient consent has been taken.

The main aim of the present study was to check the frequency of different dental anomalies present in the oral cavity. Other criteria's like distribution of dental anomalies in males and females, the prevalence and distribution of dental anomalies in different types of Malocclusion and which dental anomaly frequently occurs in which portion of the jaw i.e. in the maxilla or mandible are also observed in present study.

So keeping the main aim and other criteria of the study in our mind, we have made inclusion and exclusion criteria for the patient, which are mentioned below.

Inclusion criteria for the patient :

1. Age from 14 years to 30 years
2. No previous history of orthodontic treatment, orthognathic surgery, major facial surgery,or trauma to the facial region.
3. Absence of cleft lip, cleft palate-cleft lip, cleft palate.
4. Cooperative patient

Exclusion criteria for the patient :

1. Presence of any syndrome or metabolic disorders, chronic diseases, cancer
2. History of extraction of permanent teeth
3. Oral submucous fibrosis or other patient having mouth opening less than 3 fingers.

The orthopantomogram radiograph was analyzed in detail by assigned operators. In case of any issues regarding the dental anomaly, we have taken an intra-oral periapical x-ray. In some cases, we have used dental casts. A proper checkup of the oral cavity was also done.

For checking the malocclusion, the one trained examiner was there for assessing the molar relationship (according to the angle's definition). All the data were collected and sent for statistical analysis.

Results:

The present study was performed to evaluate prevalence and distribution of dental anomalies examined in males and females. Orthodontically treated patients included 121 males and 109 females. The percentage of dental anomalies was seen to be high in males (7.49%) as compared to the females (5.65%). Hypodontia in males were seen in 3.04% of cases and in females it was present in 3.47% followed by other dental anomalies(Table 1 and Graph 1).

Dental Anomaly	Male	Female	P value
Impaction(Excluding 3rd Molar)	32	26	0.05
Hypodontia	13	16	0.63
Hyperdontia	13	8	0.63
Microdontia	11	13	0.15
Macrodontia	6	8	0.16
Dilaceration	11	6	0.06
Dens Evaginatus	6	4	0.08
Dens Invaginatus	3	2	0.65
Peg Shaped Lateral Incisor	4	8	0.01
Taurodontism	2	1	0.30
Concrescence	2	3	0.89
Transposition	8	6	0.9
Gemination	4	3	0.30
Fusion	6	5	0.80
Total Anomaly	121	109	0.01

Graph 1: percentage of dental anomalies seen commonly in male and females

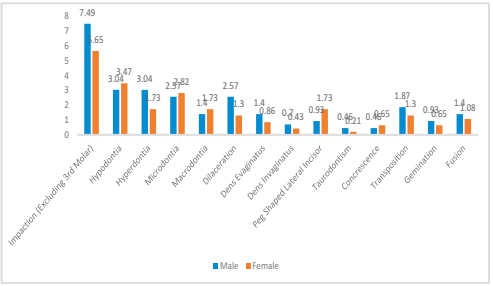

Table 2 showed that the sample distribution of dental anomalies in the maxillary molar and mandibular incisor were the most common ones. However, impacted teeth were mostly seen in the maxillary teeth (33) than the mandible. Maxillary teeth were seen to be highly affected with hypodontia (18) than the Mandibular teeth. Moreover, Maxillary teeth were seen to be affected with only affected Peg Shaped Lateral Incisor (13).

Dental Anomaly	Maxilla	Mandible
Impaction	28	33
Hypodontia	18	14
Hyperdontia	15	08
Microdontia	17	07
Macrodontia	09	05
Dilaceration	04	14
Dens Evaginatus	02	09
Dens Invaginatus	05	00
Peg Shaped Lateral Incisor	13	00
Taurodontism	01	02
Concrescence	02	03
Transposition	03	11
Gemination	05	02
Fusion	07	04

Graph 2: Percentage and distribution of dental anomalies among different malocclusions

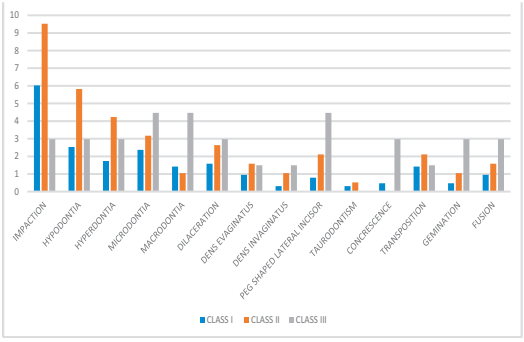

Table 3 and Graph 2 represents the dental anomalies with a different type of malocclusion that have been divided into three categories. For the result robustness **T STATISTICS was used to obtain the p-value in the present study,** to understand the association between class I, class II and class III. It shows that impaction and fusion were highly significant***(p= 0.001)*** within the groups. No correlation were found in anomalies such as Hypodontia, Hyperdontia, Microdontia, Macrodontia, Dilaceration, Dens Evaginatus, Dens Invaginatus, Peg Shaped Lateral Incisor,Taurodontism and Gemination.

Dental Anomaly	CLASS I	CLASS II	CLASS III	Total	P value
Impaction	38 (6.02 %)	18 (9.52 %)	02 (2.98 %)	58 (8.6%)	0.001
Hypodontia	16 (2.53 %)	11 (5.82 %)	02 (2.98 %)	29 (5.4%)	0.542
Hyperdontia	11 (1.74 %)	08(4.23 %)	02 (2.98 %)	21(2.2%)	0.652
Microdontia	15 (2.37 %)	06 (3.17%)	03 (4.47 %)	24(4.9%)	0.569
Macrodontia	09 (1.42 %)	02 (1.05 %)	03 (4.47 %)	14(1.8%)	0.785
Dilaceration	10 (1.58 %)	05 (2.64 %)	02 (2.98 %)	17 (1.5%)	0.132
Dens Evaginatus	06 (0.95 %)	03 (1.58 %)	01 (1.49 %)	10 (0.89%)	0.985
Dens Invaginatus	02 (0.31 %)	02 (1.05%)	01 (1.49 %)	5(0.25%)	0.550
Peg Shaped Lateral Incisor	05 (0.79 %)	04 (2.11 %)	03 (4.47 %)	12 (0.23%)	0.827
Taurodontism	02 (0.31 %)	01 (0.52 %)	00 (0.00%)	3(0.01%)	0.985
Concrescence	03 (0.47%)	00 (0.00 %)	02 (2.98 %)	5(0.9%)	0.002
Transposition	09 (1.42 %)	04 (2.11 %)	01(1.49 %)	14 (1.8%)	0.658
Gemination	03 (0.47 %)	02 (1.05 %)	02 (2.98 %)	7 (1.2%)	0.111
Fusion	06 (0.95 %)	03 (1.58 %)	02 (2.98 %)	11 (1.1%)	0.001
Total Anomaly	133	70	27	230	

Discussion:

The present study makes important benefit to the expanding literature on epidemiology as well as the prevalence of various dental hard tissue anomalies. Studies like ours are meaningful because these types of studies provide indications or clue regarding regional divergence in the incidence of dental anomalies. At present, there is a dearth of data from India on this subject.

In the present study, a total of 887 patients participated. Out of these 887 patients, only 230 (25.9 %) patients show different types of dental anomalies.

Various studies show different prevalence. In a study done by Kumar et al, they observed that the prevalence rate of dental anomalies was 16.7 %[11]. Shokri et al show a prevalence rate of 29%[12]. According to Ezoddini et al, the prevalence rate of dental anomalies was 40.8 %[13]. But in our study, the prevalence rate of dental anomalies was 25.9%.

In our study, we have observed that the most common dental anomaly is impaction. This finding is similar to the study conducted by Al-Jabaa AH and Aldrees. They also observed that Impaction was the most common dental anomaly[14]. In a study done by Thongudomporn and Freer, they observed that Invagination followed by the Impaction is the most common dental anomaly[15]. But in our study, we find that Impaction was the most common dental anomaly.

As per the study done by Aldhorae et al, the most common dental anomaly seen in their study is Impaction (14.47 %)[16]. Similar findings were seen in our study i.e. most common dental anomaly in our study is Impaction (6.53 %). In their study, Al Jabaa observed that 5.9 % of their subjects shows macrodontia[14]. But in our study,1.57 % of patients show Macrodontia. According to a study done by Patil, the prevalence rate of Macrodontia is 0.2 %[17]. But in our study,we have observed a prevalence rate of 1.57 %.

In the study done by Ezoddini , they find Dilaceration (15 %) as a more common dental anomaly[13]. But in our study, the Impaction is the most common dental anomaly. According to Aldhorae, the prevalence of Dilaceration in their study is 5.07 %[16]. But in our study, the prevalence rate of Dilaceration is 1.91%. The prevalence of Dilaceration according to Patil is 0.5 % whereas in our study, the prevalence rate is 1.91 %[17].

In the study done by Ezoddini, the prevalence rate of Taurodontism is 7.5 %, but in our study, the prevalence rate is 0.33 %[13]. In another study done by Patil, they observed the prevalence rate of Taurodontism as 0.4 %[17]. But in our study, it was 0.33 %, which is almost equal to the study done by Patil.

According to Saberi, they found the prevalence rate of Taurodontism as 5.38 %, while in our study it was 0.33%[18].

According to the study done by Patil, the prevalence rate of Transposition is 0.1 %[17], while in our study, it was 1.57 %. According to Saberi, the prevalence rate of Transposition is 0.18 % whereas in our study it was 1.57 %[18]. Also, Ezoddini observed that Taurodontism, Supernumerary teeth (hyperdontia),and Dilaceration were seen more prevalent in male patient[13]. Similar findings are seen in our study. In addition to the above dental anomalies, Impaction, Dens Evaginatus, Dens Invaginatus, Transposition, Gemination, and Fusion are also more prevalent in males.

Ezoddini noted that Impaction was more commonly seen in the female patient. But in our study, we observed that Impaction is more commonly seen in male patient[13]. The prevalence rate of Dens Invaginatus in the study done by Aldhorae is 1.58 %[16]. But in our study,the prevalence rate is 0.56 %

As per the Aldhorae, the prevalence rate of Dens Evaginatus is 1.91 %, but in our study,the prevalence rate is 1.12%[16]. The rate of the prevalence of Taurodontism is 0.91 % according to Aldhore in their study. In our study, we observe the prevalence rate of Taurodontism 0.33%[16].

According to the study done by Pedreira et al, there is some association found between the dental anomalies and malocclusions. In their study, they observed that impaction has a high prevalence rate in class III malocclusion and a lower prevalence rate in class I malocclusion[19].This result is different from our result. In our study, we observed that impaction has a high prevalence rate in class I malocclusion followed by class II malocclusion and class III malocclusion.

In their study, Al-Jabaa found dental anomalies were seen most commonly in class I malocclusion which is followed by class II malocclusion and class III malocclusion[14]. Similar findings were observed in our study.

Conclusion :

In the present study, the prevalence of dental anomalies was 25.9%. The most common dental anomaly seen is Impaction. The data of the present study cannot be hypothesized to all age groups as well as an ethnic group. More studies are required to analyze the prevalence of dental anomalies in more cases of the orthodontic populations displaying from various age groups, races as well as malocclusion severity.

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