

## Association of Dental Anomalies with Different Types of Malocclusions in Pretreatment Orthodontic Patients

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### Abstract:

**Background:** The study is planned to correlate the existence of dental anomalies with different types of malocclusion as the occurrence of anomalies is common in malocclusion.

**Materials and Methods:** The present study was conducted among 430 patients with different types of malocclusion as 161 patients having Class I, 203 with Class II, and 66 with Class III malocclusion. The age of the patients ranged from 12 to 15 years. Diagnosis was done on the basis of history, clinical, cephalometric, radiographs, and dental cast examination. The level of significance was set at  $P = 0.05$ .

**Results:** Most common anomaly was rotation of teeth (18.80%), followed by hypodontia (10.90%), and least occurring was gemination, fusion, talon's cusp, and dilacerations. 31.4% showed one dental anomaly, whereas 11.9% exhibited two or more dental anomalies. The highest mean value of all the dental anomalies was seen with severe cases of malocclusion and also significant differences were observed according to gender.

**Conclusions:** The present study investigated various dental anomalies in relation to malocclusion. It was found that 31.4% showed one dental anomaly, whereas 11.9% exhibited two or more dental anomalies. Hence, careful prior investigation of dental anomalies is necessary for better orthodontic treatment planning to reduce the complications.

**Key Words:** Dental anomaly, malocclusion, orthodontics

### Introduction

Malformations of the teeth are designated as dental anomalies,

including aberrant dimensions, morphology, numbers, and eruption pattern of teeth.<sup>1</sup> Dental anomalies have different etiologies as hyperactivity of the dental lamina, atavism, and conception of multifactorial inheritance. There is also evidence of the genetic link between dental anomalies and malocclusions.<sup>2</sup>

Numbers of anomalies can be recognized, but some anomalies are more common than others. Missing teeth are commonly seen as: Hypodontia is developmental missing of less than 6 teeth, oligodontia is developmental missing of six or more teeth, and anodontia is developmental missing of all dentition.<sup>3</sup>

Developmental anomalies of the dentition are seen in a number of patients with malocclusion.<sup>1</sup> The influence of anomalies on malocclusions has long been a worry to the profession of dentistry. Endo *et al.*<sup>4</sup> found the relation of craniofacial morphology with hypodontia among Japanese orthodontic patients. Previous studies have also shown that patients with malocclusion had more number of supernumerary and missing teeth.<sup>1,5</sup>

Akyalcin evaluated association between the Bolton ratio and overjet, which showed a significant relationship between Bolton ratio and the tooth size of overjet.<sup>6</sup> Orthodontic patients have a high prevalence of dental anomalies compared to the general population which complicates the treatment.<sup>7</sup>

Even though the association between orthodontic problems and dental anomalies has not been widely investigated, but some data of dental anomalies have shown an association with dentofacial characteristics. Therefore, this study is done to know the occurrence of dental anomalies among patients with different types of malocclusions.

### Materials and Methods

The present study was conducted among 430 patients having different types of malocclusion. The sample was selected from Pediatric and Orthodontic Speciality Clinics in Hyderabad. Of the total sample, 186 were boys, and 244 were girls. They were further divided according to Angle classification i.e. relationship between the first permanent maxillary and mandibular molar.<sup>8</sup> The study subjects were categorized into different types of malocclusion as Class I with 161 patients,

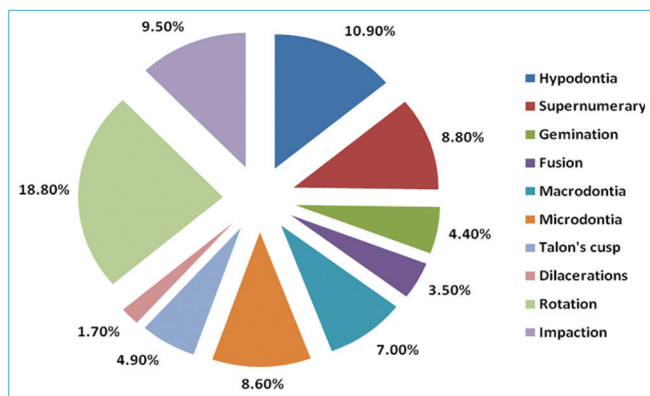
Class II with 203, and Class III with 66 patients.

Diagnosis for congenital tooth anomalies of each patient was done on the basis of history, clinical, cephalometric, radiographs, and dental cast examination. The age of the patients ranged from 12 to 15 years. Patients with a history of extraction, presence of any syndromes, cleft palate, and lip were excluded from the study.

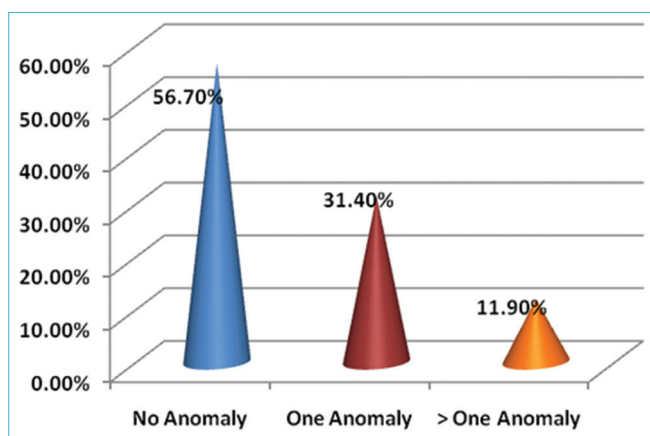
The data were collected and analyzed by SPSS 16.0 software (SPSS Inc., Chicago, IL, USA). Student's *t*-test and ANOVA test were used to obtain mean scores. Chi-square test was used to obtain the descriptive and frequency values. The level of significance was set at *P* = 0.05.

**Results**

The different dental anomalies found in this study with different frequencies were hypodontia, supernumerary teeth, germination, fusion, macrodontia, microdontia, talon's cusp, dilacerations, rotation of the tooth, and impaction. Most common anomaly was rotation of teeth (18.80%), followed by hypodontia (10.90%). Gemination, fusion, talon's cusp, and dilacerations were observed in less number of cases as shown in Graph 1. Of 430 patients, more than half (56.7%) had no dental anomaly, 31.4% showed one dental anomaly, whereas



**Graph 1:** Distribution of different types of dental anomalies.



**Graph 2:** Frequencies of dental anomalies observed among orthodontic patients.

11.9% exhibited two or more dental anomalies (Graph 2).

The highest mean value of all the dental anomalies was seen among subjects with Angle Class III modification, followed by Class II and a lesser amount of subjects with Class I found with anomalies. The difference in the entire Angle's classification was found to be significant (*P* = 0.000) as mentioned in Table 1. Twenty percent of the subjects had dental anomalies in the lower arch and around 18.6% in the upper arch. It was also found that 4.7% had anomalies both maxillary and mandible arch (Table 2).

It was further noticed that females were more likely to show anomalies than males (*P* = 0.040) (Table 3). According to the age groups, prevalence of dental anomalies was increasing with the years of age as mentioned in Table 4.

**Discussion**

Dental anomalies are commonly observed among patients with malocclusion than the comparable general population.<sup>9</sup> In the present study, most of the dental anomalies were observed among the subjects with Angle's Class III and Class II malocclusion, while few participants had anomalies with

**Table 1: Mean of dental anomalies in Angle's classification, (Class I, Class II and Class III).**

Angle's classification	No	Mean	SD	F value	Significant
Class I	161	0.35	0.832	13.855	0.000
Class II	203	0.93	1.217		
Class III	66	0.98	1.430		
Total	430	0.72	1.161		

SD: Standard deviation

**Table 2: Frequency of dental anomalies seen in relation to upper and lower archs.**

Arches	Dental anomalies	
	No	Percentage
Upper arch	80	18.6
Lower arch	86	20.0
Both arches	10	4.7
Total	176	43.3

SD: Standard deviation

**Table 3: Mean of dental anomalies seen in relation to gender.**

Sex	No	Mean	SD	Significant
Boys	186	0.62	0.992	0.040
Girls	244	0.85	1.342	

SD: Standard deviation

**Table 4: Mean of dental anomalies seen in relation to age groups.**

Age	No	Mean	SD	F value	Significant
12 years	101	0.66	0.983	0.576	0.631
13 years	86	0.62	0.935		
14 years	129	0.78	1.258		
15 years	114	0.80	1.338		
Total	430	0.72	1.161		

SD: Standard deviation

Class I malocclusion. Similarly, Basdra *et al.* (2001) found anomalies in close association with Class II malocclusion among German individuals.<sup>10</sup> Kocabalkan and Ozyemisci (2005) also identified reduced tooth size as a trait associated in patients with malocclusion.<sup>11</sup> It indicated that there is the presence of a common genetic factor that influence between skeletal growth and malocclusion.<sup>9</sup>

The study evaluates that 43.3% of the sample had anomalies, of which 31.4% had only one dental anomaly and around 11.9% showed more than one kind of anomaly. These findings were similar to the results of other studies.<sup>12,13</sup> However, Sogra *et al.* found that 12% of their study sample showed at least one dental anomaly, 5% showed more than one.<sup>14</sup> The prevalence rate of several dental anomalies in this study was higher than most of the earlier studies. This might be because the entire sample in this study had malocclusion, and it has greater tendency to show anomalies such as impaction, hypodontia, and supernumerary teeth.<sup>15</sup>

Hypodontia was seen among 10.9% of the study population and similar results were obtained by Vibhute *et al.* among pretreatment orthodontic patients in Western Maharashtra, India.<sup>1</sup> Dental agenesis, except third molars was seen at the rate of 8.5%, by Markovic.<sup>16</sup> It was also seen that 8.8% was found with supernumerary teeth and the results were higher than Locht among Danish Children showing 1.8% of supernumerary teeth.<sup>17</sup> Whereas, Basdra *et al.*, observed the prevalence of supernumerary teeth in general Caucasian population between 0.1% and 3.8% in the permanent teeth and 0.3-0.8% in primary teeth.<sup>10</sup>

This study shown that the percentage of microdontia was higher than macrodontia and the results were comparable with Vibhute *et al.*<sup>1</sup> Few participants were having fusion and germination as observed by the present authors and similarly, Altug-Atac, and Erdem showed the percentage of germination and fusion was 0.07% and 0.23%, respectively.<sup>7</sup> Dilaceration was observed in 1.7% of the subjects in this study. Method of radiography was used for diagnosis of root dilaceration.<sup>18</sup> However, Hamasha *et al.* shown occurrence of root dilacerations in 3.7% of the dentition. Dilacerations occurring in mesial and distal directions are clearly visible with radiographs, but those occurring in lingual and labial directions cannot be detected by radiographs.<sup>19</sup>

Ruprecht *et al.* reviewed 1581 patient and reported that males had a high occurrence of dental invagination than females. However, the present study observed a significant dominance of anomalies in females.<sup>15</sup>

### Conclusion

The study revealed that 43.3% of the participants demonstrated dental anomalies. The highest scores of dental anomalies were

seen among patients with Class II and Class III malocclusion. Most common occurring anomaly was rotation of teeth (18.80%), followed by hypodontia (10.90%) and most of the anomalies were observed in the mandibular arch. Hence, orthodontists should take this into consideration while planning treatment to reduce complications.

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