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**Original** Article

## Prevalence of malocclusion in permanent dentition among adolescents of age 13-16 years old – A Cross sectional Study

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## **ABSTRACT:**

Background: Malocclusion is a problem since old times. It is more severe in developing countries like India which causes problems to the oral health and leads to social and the psychological problems. The purpose of the study was to determine the prevalence of malocclusion in permanent dentition among adolescents. Material and methods: This cross-sectional study was conducted over the period of 1 year in a sample size of 140 adolescents' age 13-16 years. Before the beginning of study, a written informed consent was obtained from the participant's parents. Adolescents undergoing orthodontic treatment or with a history of previous orthodontic treatment, previous history of permanent teeth extraction, and craniofacial deformities or syndrome were not included in the study. The occlusal parameters recorded by examiners include molar and canine relationship, overbite, overjet, anterior open bite, spacing, crowding, anterior crossbite, scissors bite, and posterior crossbite. Statistical analysis was done by using SPSS, version 22 (SPSS, Inc., Chicago, IL) and p<0.05 was considered statistically significant. Results: In our study a sample of 140 participants of age 13-16 years were selected in which 74 were males whereas 66 were females. A symmetric Class I molar relationship was found in 57.14% of the participants; Class II was found in 9.28% and Class III in 14.28%. The most common canine relationship was symmetric Class I followed by symmetric Class II and Class III, which were observed in 51.42%, 15%, and 13.57% of the sample, respectively. The study showed that 69.28% had overjet between 1-3 mm, 90% had overbite with 1-3 mm overlap, Open bite was present in 4.28% participants between 1 and 3 mm, Anterior cross bite was present in 8.57% while the unilateral and bilateral posterior cross bite were found in 9.28% and 1.42%, respectively. Scissors bite was not present in any participant. 17.85% and 15.71% of the participants had crowding in the anterior segments of the maxilla and the mandible, respectively, crowding was present in the posterior segments with 4.28% of the participant in the maxilla and 3.57% in the mandible, 17.85% of the participants had spacing in the anterior segment of the maxilla and 9.28% in the anterior segment of the mandible. Conclusion: In our study, class I molar and canine relationship are more prevalent with normal overjet, and normal overbite. Crowding is more prevalent than spacing followed by increased overjet, and increased overbite, posterior crossbite, anterior open bite, and anterior crossbite. Keywords: Malocclusion, adolescents, Class I molar relationship.

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## **INTRODUCTION:**

"A malocclusion is defined as irregularity of the teeth or a molar relationship between the dental arches beyond the range of what is accepted as normal.<sup>1</sup> Malocclusion is considered one of the most common dental problems together with dental caries, gingival disease and dental fluorosis.<sup>2</sup> Malocclusion may cause unpleasant appearance, impaired oral function, speech problems, temporomandibular disorders, increased susceptibility to trauma and periodontal disease.<sup>3</sup> At all social levels, wellaligned teeth and a pleasing smile reflects positive status,

and irregular or protruding teeth reflects negative status.<sup>4,5</sup> In majority, balanced facial feature is considered to be pleasing to the eye in each race and sex.<sup>6</sup> The prevalence of malocclusion has been found to vary in different countries, ranging from 88.1% in Colombia,7 62.4% in Saudi Arabia,<sup>8</sup> 20-35% in United States<sup>9</sup> and 20-43% in India.<sup>10</sup> The purpose of the study was to determine the prevalence of malocclusion in permanent dentition among adolescents.

## MATERIAL AND METHODS:

This cross-sectional study was conducted over the period of 1 year in a sample size of 140 adolescents' age 13-16 years. Before the beginning of study, a written informed consent was obtained from the participant's parents. Adolescents undergoing orthodontic treatment or with a history of previous orthodontic treatment, previous history of permanent teeth extraction, and craniofacial deformities or syndrome were not included in the study. The occlusal parameters recorded by examiners include molar and canine relationship, overbite, overjet, anterior open bite, spacing, crowding, anterior crossbite, scissors bite, and posterior crossbite. Angle's classification system was used for evaluating molar relationship. Bilateral canine relationships were evaluated according to the relationship between the tip of the maxillary canine and the embrasure between the mandibular canine and first premolar. Patients with different sagittal molar and canine relationships on the left and right sides were categorized asymmetric molar and canine relationship, as respectively. Overbite or the vertical overlap of incisors was recorded by measuring the vertical distance from the incisal edge of the maxillary central incisor to the incisal edge of the corresponding mandibular incisor. Overjet or the horizontal overlap of incisors was recorded by measuring the greatest distance between the incisal edges of the maxillary central incisor and the labial surface of the corresponding mandibular incisors. Crowding and spacing were scored subjectively when the sum of the labio-lingual contact point displacements or spaces of adjacent teeth were at least 2 mm in each segment, respectively. Anterior crossbite was scored as present when one or more of the maxillary incisors occluded lingual to the mandibular incisors. Anterior open bite was recorded when there was no vertical overlap between the maxillary and mandibular incisors. Posterior crossbite and scissors bite were scored if one tooth, more than one tooth, or whole segment was abnormally malposed buccally or lingually with reference to opposing teeth. Statistical analysis was done by using SPSS, version 22

(SPSS, Inc., Chicago, IL) and p<0.05 was considered statistically significant.

## **RESULTS:**

In our study a sample of 140 participants of age 13-16 years were selected in which 74 were males whereas 66 were females. Majority of participants had symmetric molar relationship (80.7%) and symmetric canine relationship (80%), while remaining had asymmetric molar and canine relationships. A symmetric Class I molar relationship was found in 57.14% of the participants; Class II was found in 9.28% and Class III in 14.28%. The most common canine relationship was symmetric Class I followed by symmetric Class II and Class III, which were observed in 51.42%, 15%, 13.57% of the sample, respectively. Table 3 shows the distribution of overjet, overbite, open bite, cross bite, spacing, and crowding in the study sample. The study showed that 12.85% of the participants had negative overjet or edge to edge relationship, 69.28% had overjet between 1-3 mm, 14.28% had overjet between 4-6 mm, and only 3.57% had overjet of more than 6 mm. The majority of the participants i.e. 90% had overbite with 1-3 mm overlap, while 8.57% showed 4-6 mm overlap and only 1.42 % with more than 6 mm overbite. Open bite was present in 4.28% participants between 1 and 3 mm and only 1.42% had open bite between 4 and 6 mm whereas 0.71% had more than 6mm open bite. Anterior cross bite was present in 8.57% while the unilateral and bilateral posterior cross bite were found in 9.28% and 1.42%, respectively. Scissors bite was not present in any participant. 17.85% and 15.71% of the participants had crowding in the anterior segments of the maxilla and the mandible, respectively. The results showed less crowding in the posterior segments with 4.28% of the participant in the maxilla and 3.57% in the mandible. On the other hand, 17.85% of the participants had spacing in the anterior segment of the maxilla and 9.28% in the anterior segment of the mandible.

## Table 1: Distribution of gender

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Gender	N(%)	p-value	
Male	74(52.85%)	< 0.05	
Female	66(47.14%)		
Total	140 (100%)		

#### Table 2: Prevalence of molar and canine relationship

N	%
80	57.14
13	9.28
20	14.28
27	19.28
72	51.42
21	15
19	
28	20
	N   80   13   20   27   72   21   19   28

Occlusal parameters		%
	N	
Over jet		
Negative-0 mm	18	12.85
1-3 mm	97	69.28
4-6 mm	20	14.28
>6 mm	5	3.57
Over bite		
1-3 mm	126	90
4-6 mm	12	8.57
>6 mm	2	1.42
Open bite		
1-3 mm	6	4.28
4-6 mm	2	1.42
>6 mm	1	0.71
Anterior cross bite	12	8.57
Posterior cross bite		
Unilateral	13	9.28
Bilateral	2	1.42
Scissors bite	0	0
Crowding		
Anterior segments-maxilla	25	17.85
Anterior	22	15.71
segment-mandible		
Posterior	6	4.28
segment-maxilla		
Posterior	5	3.57
segment-mandible		
Spacing		
Anterior	25	17.85
segments-maxilla		
Anterior	13	9.28
segment-mandible		

## Table 3: Prevalence of over jet, over bite, open bite, cross bite, spacing, and crowding in the study sample.

## **DISCUSSION:**

In our study a sample of 140 participants of age 13-16 years were selected in which 74 were males whereas 66 were females. Majority of participants had symmetric molar relationship (80.7%) and symmetric canine relationship (80%), while remaining had asymmetric molar and canine relationships. A symmetric Class I molar relationship was found in 57.14% of the participants; Class II was found in 9.28% and Class III in 14.28%. The most common canine relationship was symmetric Class I followed by symmetric Class II and Class III, which were observed in 51.42%, 15%, 13.57% of the sample, respectively. Table 3 shows the distribution of overjet, overbite, open bite, cross bite, spacing, and crowding in the study sample. The study showed that 12.85% of the participants had negative overjet or edge to edge relationship, 69.28% had overjet between 1-3 mm, 14.28% had overjet between 4-6 mm, and only 3.57% had overjet of more than 6 mm. The majority of the participants i.e. 90% had overbite with 1-3 mm overlap, while 8.57% showed 4-6 mm overlap and only 1.42 % with more than 6 mm overbite. Open bite was present in 4.28% participants between 1 and 3 mm and only 1.42% had open bite between 4 and 6 mm whereas 0.71% had more than 6mm open bite. Anterior cross bite was present in 8.57% while the unilateral and bilateral posterior cross bite were found in 9.28% and 1.42%, respectively. Scissors bite was not present in any participant. 17.85% and 15.71% of the participants had crowding in the anterior segments of the maxilla and the mandible, respectively. The results showed less crowding in the posterior segments with 4.28% of the participant in the maxilla and 3.57% in the mandible. On the other hand, 17.85% of the participants had spacing in the anterior segment of the maxilla and 9.28% in the anterior segment of the mandible.

Almalky NM et al conducted a study and results of the study shows that Class 1 malocclusion had the highest frequency of 67.13%, class II div-1 was 14.53%, class II div-2 was 10.7%, class III was 7.61%. The normal overjet and overbite values were highest 57.4%, 52.6%, respectively. Frequency of Crowding was observed in 63%, anterior cross bite was 17% and posterior cross bite was 21.4%.<sup>11</sup>

A study by Albakri FM et al showed that the Molar Class I relation involved the highest percentage of the sample (71.2%) while Class II relation involved only 23% which was four times of Class III (5.8%). The maxillary arch crowding was present in 23.2% of the sample which was double than that of spacing. Whereas, the mandibular arch crowding was present in 28% of the sample which was three times more than spacing (8.8%). The open bite was present in 4% of the sample while deep bite was present in 9.6%.<sup>12</sup>

Asiry MA et al conducted a study and results showed that Class I molar relationship was observed in 1219 (61%) of the total sample, while Class II and III molar relationships were observed in 326 (16.3%) and 154 (7.7%), respectively. Class I–III canine relationships were seen in 1255 (62.8%), 231 (11.6%), and 112 (5.6%) of the sample, respectively. Normal overbite was found in 1490 (74.6%) of cases, while 1515 (75.8%) had normal overjet. The most prevalent malocclusion trait was crowding (26.6%), followed by spacing (20.6%), increased overjet (19.5%), increased overbite (19.4%), posterior crossbite (8.5%), and anterior open bite (6.1%).<sup>13</sup>

A study by Al Jadidi L et al showed that there was a high prevalence of Class I jaw relationship (86.2%). About 81.6% of the sample studied had Class I molar relationship and 73.8% had Class I incisors relationship. About 61.4% of the sample had no contact displacement, while 5.2% had contact displacement >4 mm. Severe crowding in the maxilla was found in 2.3% while spacing was found in 24.2%. Only 8.6% of the sample studied had an overjet >6 mm while 16.3% had a deep bite and 0.2% had anterior open bite of >4 mm.<sup>14</sup>

## **CONCLUSION:**

In our study, class I molar and canine relationship are more prevalent with normal overjet, and normal overbite. Crowding is more prevalent than spacing followed by increased overjet, and increased overbite, posterior crossbite, anterior open bite, and anterior crossbite.

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