

**Evaluation of Malocclusion and its Association with various Unfavorable Sequelae in Bhopal Population**

<sup>1</sup>Dr. Jeff Zacharia Nixon, Department of Orthodontics & Dentofacial Orthopaedics, Post Graduate Resident, RKDF Dental College and Research Centre, Bhopal, Madhya Pradesh

<sup>2</sup>Dr. Seema Lahoti, MDS, Department of Orthodontics & Dentofacial Orthopaedics, Professor, RKDF Dental College and Research Centre, Bhopal, Madhya Pradesh

<sup>3</sup>Dr. Neha Singh, Department of Orthodontics & Dentofacial Orthopaedics, Post Graduate Resident, RKDF Dental College and Research Centre, Bhopal, Madhya Pradesh

<sup>4</sup>Dr. Sameer Pathan, Department of Orthodontics & Dentofacial Orthopaedics, Post Graduate Resident, RKDF Dental College and Research Centre, Bhopal, Madhya Pradesh

<sup>5</sup>Dr. Abha Chansoria, Department of Orthodontics & Dentofacial Orthopaedics, Post Graduate Resident, RKDF Dental College and Research Centre, Bhopal, Madhya Pradesh

<sup>6</sup>Dr. Parul Diwakar, Department of Orthodontics & Dentofacial Orthopaedics, Post Graduate Resident, RKDF Dental College and Research Centre, Bhopal, Madhya Pradesh

**Corresponding Author:** Dr. Jeff Zacharia Nixon, Department of Orthodontics & Dentofacial Orthopaedics, Post Graduate Resident, RKDF Dental College & research Centre, Bhopal, Madhya

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**Abstract**

Malocclusion always has some deleterious effects in oral cavity as well as in general appearance and social behavior of an individual. Even though it is documented about various effects of malocclusion, there arises a need to check how much it's related to the malocclusion in a population. Here in this study, we selected 150 individuals from Bhopal population and assessed their oral cavity for malocclusions as well as prevalence of various effects of malocclusion.

We prepared a case sheet with questionnaires and various indices. Facial aesthetic index was used for assessment of facial profile, GSE scale for self- esteem assessment, Decayed missing filled tooth index for caries, Community periodontal index of treatment needs for Periodontal status, trauma by questionnaire, Halitosis by organoleptic rating and Tempero- mandibular disorders by World health organization' criteria. Class I malocclusions followed by class II malocclusions were found prevalent in Bhopal population. We found that we cannot generalize

the effects with a type of malocclusion. Even though malocclusion was present, the people of Bhopal found themselves satisfied with their appearance and were not affecting their self-esteem except those who presented with bimaxillary protrusion and class II profile. Trauma was found associated with cases of increased overjet. Halitosis was found in cases which are periodontally involved as well as in mouth breathers. Temporomandibular disorders were found associated with various malocclusions. It was more commonly seen associated with deep bite cases. Temporomandibular pain and deviation presented statistically significant results. Early management and preventive measures could control various unfavorable sequelae of malocclusion and a greater awareness should be created among the public about the treatment need.

**Keywords:** Malocclusion, Prevalence, Sequelae

### **Introduction**

Malocclusion is defined as a condition where there is a departure from the normal relation of the teeth to other teeth in same arch or to teeth in the opposing arch. There exists a controversy in defining malocclusion as a disease or as a morphological variation. From just correction of malocclusion, orthodontics has evolved as a branch of dentistry, which deals with the physical and emotional well-being of an individual.<sup>1</sup>

Malocclusion can affect an individual's appearance, self-esteem too along with increased prevalence of caries, periodontal deformities, Temporomandibular joint defects, trauma, and halitosis. Malocclusion and dento-facial deformity stay as the main reasons behind an individual's poor maintenance of oral health. It affects his/her social behavior as well. Malocclusion affects the social activities of an individual to a great extent. It withdraws him/her from social activities, and may cause

psychological problems too. It has psychological effect on the quality of life of an individual.<sup>2</sup>

Malpositioned teeth harbors food impaction and which in return help in formation of plaque and calculus. An individual lacks accessibility in the interdental areas which in turn helps in colonization of bacteria. All types of tooth malposition, such as diastemas, crowding, rotated teeth, incisor proclination, and mandibular molar tipping may result in early tooth loss due to the formation of periodontal pockets. Anterior deep bite causes stripping of gingiva and an anterior crossbite results in recession and mobility of lower incisors.

Dental caries is an infectious, irreversible multifactorial disease. Malocclusion can cause food retention and subsequently favors colonization of bacteria leading to formation of dental caries.<sup>3</sup> Malocclusion can cause pain and discomfort in temporomandibular region. Open bite, cross-bite, excessive overjet as often seen to be associated with temporomandibular disorders.<sup>4</sup> Halitosis can be simply defined as malodor. Halitosis always seems to be associated with malocclusion or in case of crowding where cleaning is affected along with malocclusion, other etiologic factors do exist. Halitosis tends to affect the social life of an individual, which restricts him from interacting with the society.<sup>5</sup>

Trauma to the soft tissues is also seen associated with malocclusion. Trauma in the mixed dentition period can affect the eruptive process of permanent successors. When any type of malocclusion is diagnosed, teeth should be aligned to redirect occlusal forces that act along the tooth axis which can cause trauma from occlusion. Increased overjet can result in trauma to the lips and it's more prone to fracture also.<sup>6</sup>

Malocclusion may not be a life-threatening condition. But it is important to be considered as it affects an individual's oral health as well as general well-being. This study aims

to find out prevalence of malocclusion and to determine the relationship of malocclusion with appearance, social esteem, periodontal status, dental caries, TMJ disorders, halitosis and trauma in Bhopal population.

### Material and Methods

We selected 150 samples from Bhopal population for our study. We selected subjects without gender or age specifications. The study was done in Department of Orthodontics and Dentofacial Orthopedics, RKDF dental college and research Centre, Bhopal.

Appearance of a patient was assessed by Facial aesthetic index.<sup>7</sup> Type of malocclusion was examined intra-orally. Self-esteem was assessed by GSE Scale, which involves a questionnaire with number coding. The average value was taken into account for assessing the self-esteem status<sup>8</sup>. Periodontal status was examined using CPITN index. The index teeth in each sextant were examined by running the CPITN probe around the entire sulcus of each tooth and the highest score recorded.<sup>9</sup> Prevalence of caries was examined by using DMFT method. History of dental trauma was recorded along with examination for traumatized teeth using Andreasen's epidemiological classification (2004) including World Health Organization (WHO) codes.<sup>6</sup> TMD was examined clinically and all signs and symptoms were asked to them as well following WHO criteria. Clicking was examined by palpation. TMJ pain and jaw deviation on opening and closing were also assessed.<sup>10</sup> Halitosis was marked using organoleptic rating.<sup>11</sup>

### Result

A total of 150 samples were selected for this study, comprising of 94 females and 56 males. Their ages ranged from 18 to 35. The study had revealed that Class I malocclusions are the most common kind of malocclusion found in Bhopal population (82.8%), followed by class II

(10.7%) and Class III (6.7%). Figure 1 shows the frequency of various malocclusions.

Straight profile was found in 70.7% of population, followed by bimaxillary protrusion (10%), Class II profile (12.7%) and Class III profile (6.7%). Frequency distribution is shown below in figure 2

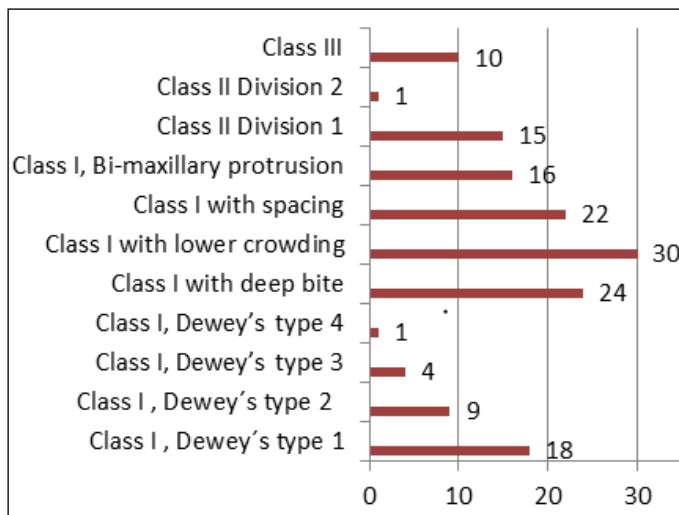


Figure 1: Frequency distribution of various malocclusions

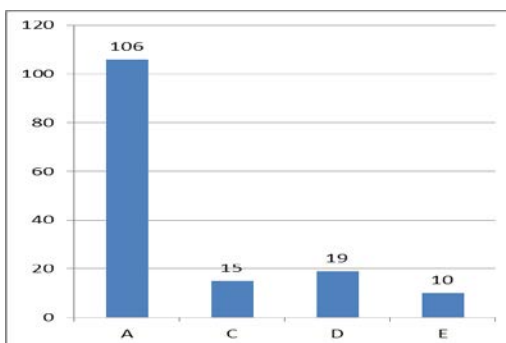


Figure 2: Various facial profiles. A: straight; c: Bimaxillary protrusion; D: Class II profile; E: Class III profile.

Self-esteem and its co-relation with malocclusion were assessed using a questionnaire and it was based on the grading like: 1: Not at all, 2: A little, 3: Probably, 4: Definitely. The histogram below shows the frequency of it in Bhopal population. None of them marked 4, which is indicative of a surety about self-esteem status and malocclusion. Self-esteem assessment showed that 45.33% of them are happy with their appearance and their

malocclusion do not affect their self-esteem. 33.33% (marked 3 in questionnaire) expressed a little concern about their malocclusion and its association with their self-esteem, which are cases of bimaxillary protrusion and Class II profile. Periodontal status was evaluated with help of CPITN index and the scoring and its frequency is shown in figure 4. Dental caries assessment was done with the help of DMFT scores and we obtained scoring from 0 to 8. The frequency distribution of the same is shown in figure 5. Periodontal issues and dental caries were found more associated with the situations that favor food lodgment. Halitosis was assessed by organoleptic method and grading was given. Majority had moderate malodor, represented by a scoring of 2, which is shown in figure 6

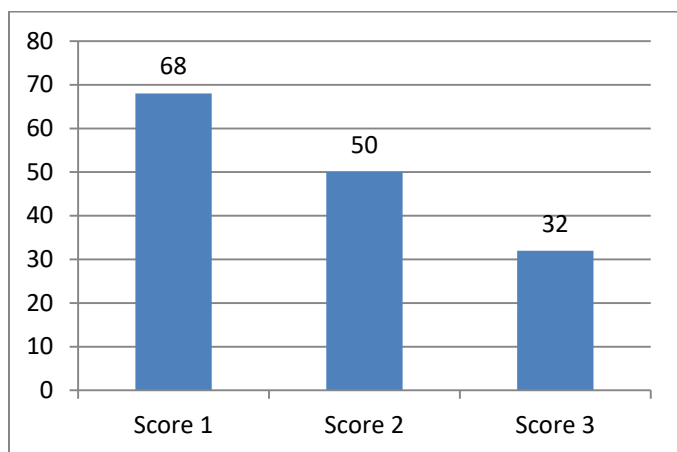


Figure 3: Frequency of self-esteem status

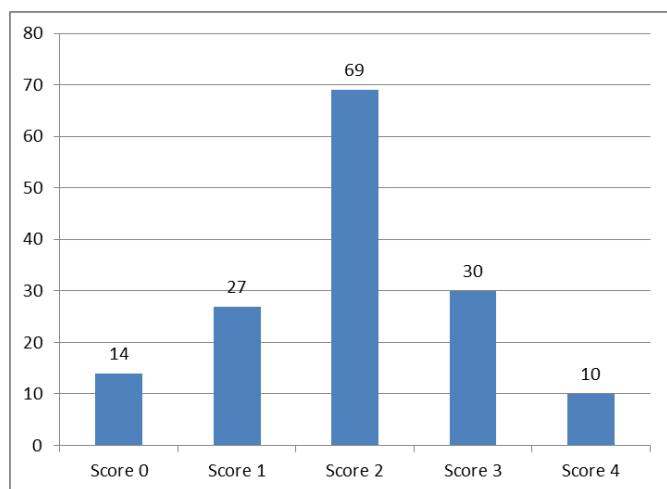


Figure 4: Frequency of periodontal problems as per CPITN index

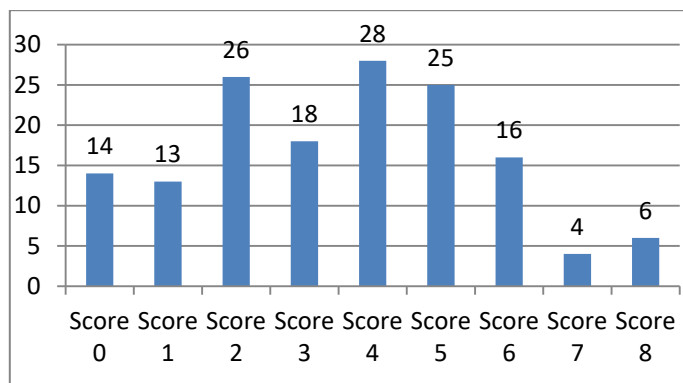


Figure 5: DMFT score

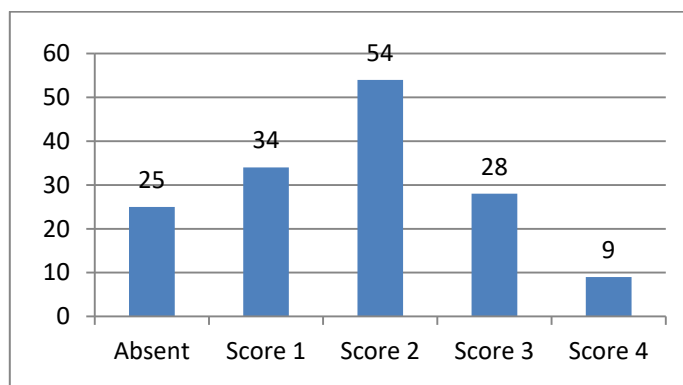


Figure 6: Halitosis scoring

Trauma assessment was done by examining the oral cavity and previous history was assessed by asking the subjects involved in study. Majority had a scoring of 0, suggesting no history of trauma and mostly found associated with cases of increased overjet.

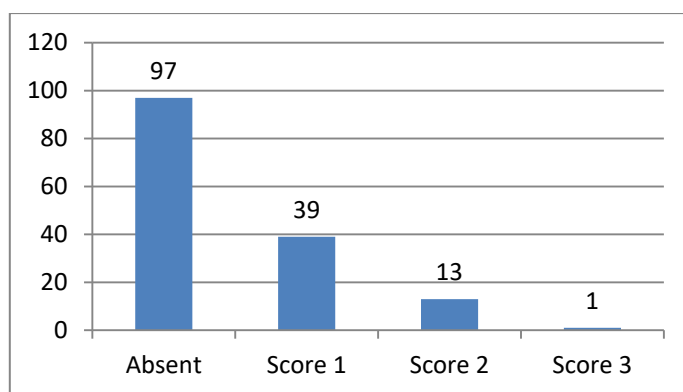


Figure 7: Trauma Scoring

TMJ examination was done by extra-auricular method and signs and symptoms of TMD were taken by proper history. Clicking sound, pain on opening and closing, deviation of jaw were assessed. TMJ pain was present for

74 % of the subjects and clicking sound was observed in 77.35 % of the subjects involved. Deviation of jaw was found in 78% of the population involved in study.

There was no statistically significant co-relation between age and various factors like self-esteem, periodontal status, DMFT score, trauma, halitosis, TMJ disorders. Chi square test and Pearson correlation test were performed for the same. There was no statistically significant relation found between self-esteem and malocclusion with a P value of 0.296. DMFT index for caries assessment also showed no significant relationship between caries and malocclusion (P value = 0.3). There was a significant relationship found between periodontal status and malocclusion. (P value = 0.01). Other factors like trauma and halitosis, TMJ clicking found no significant correlation with malocclusion. TMJ pain and jaw deviations were found to have significant co-relation with malocclusion. Class I malocclusions with deep bite and class II malocclusions had presented the same.

### Discussion

Gardiner defined malocclusion as a condition in which there is a departure from normal relation of the teeth to other teeth in the same arch or/ and to teeth in the opposing arch. The purpose of this study was to assess the prevalence of various effects of malocclusion in Bhopal population. We always talk about the ill effects of malocclusion and treatment need. With this study, we were aiming to figure out why, we should focus on the need of orthodontic correction and an assessment about the prevalence of its unfavorable sequelae. Malocclusion cannot be considered as a disease. In fact, it's a condition which can induce various dental diseases which has to be considered and taken care of. The general trend followed in majority of Indian population is to treat a dental disease when it disturbs his/her life badly. When it comes to malocclusion, an individual considers his/her physical

appearance and attractiveness as the criteria for a treatment decision, until and unless he/she is being advised by someone. Various authors discussed about unfavorable sequelae of malocclusion and we were trying to find out the prevalence of the same in Bhopal population.

Class I malocclusion showed the highest prevalence in Bhopal population. i.e. (82.8%), followed by class II (10.7%) and Class III (6.7%) malocclusions. We could find that majority possess a straight profile (70.7%). While we were assessing the self-esteem associated with malocclusions, we could find that majority of the population were happy with the way they look like. They were not really affected with the malocclusion or they believe that it doesn't affect much. But still 32% of study population, with 81% of females in it believed that it affected their self-esteem. Chi square test found statistically significant co-relation between gender and a self-esteem. Taibah SM and AL-Hummayani F M found that malocclusion had a negative effect on self-esteem. They found age as a factor associated with self-esteem and malocclusion.<sup>12</sup> We can say that malocclusion affects an individual's self-esteem based on the environment he/she is exposed to, like the kind of school / workplace. Class III malocclusion followed by bimaxillary protrusion were shown to affect the self-esteem of subjects more than any other kind of malocclusion. Nicodemo D et al made a hypothesis that class III subjects could present with low self-esteem and depressive disorders after his study.<sup>13</sup>

When we assessed the co relation between malocclusion and periodontal diseases, we found statistically significant co relation between scoring 1 & 2 with malocclusion. As per our study, we cannot say that periodontal diseases are sure unfavorable sequelae of malocclusion. Buckley L A did a study about relationship of malocclusion, gingival inflammation, plaque and calculus and found that gingival

inflammation is more done by calculus and plaque than malocclusion alone.<sup>14</sup> Goel et al found stated that there is no correlation between periodontal status and orthodontic treatment need.<sup>15</sup> Bollen A M in contrast found that there exists more periodontal diseases associated with malocclusion than in subjects without malocclusion.<sup>16</sup>

Caries assessment was done by obtaining DMFT score and we couldn't find any significant co relation between dental caries and malocclusion. Stahl F & Grabwoski R did a study about malocclusion and caries prevalence. They found that no conclusion can be made about relationship of caries and malocclusion in general. But still there was a significant parallelism between prevalence of caries and malocclusion.<sup>17</sup> we cannot state that dental caries are absolutely associated with malocclusion. Instead we could say that there is a high risk of caries in malocclusion especially with crowded, rotated teeth. Dental caries should be checked routinely and preventive measures should be started at the earliest. Early fluoride application and proper brushing habits with interdental cleaning aids can reduce the chances of caries.

Trauma due to any kind of malocclusion, especially bimaxillary protrusion was always a subject of concern. There are various studies which talk about the high incidence of trauma associate with various malocclusions. Subjects with increased over jet only had shown incidence of trauma in the anterior region. Gupta M et al also supported this statement as he stated that increased overjet, incompetent lips are the predisposing factors for trauma in anterior region.<sup>6, 18</sup>

Halitosis can be defined in simple terms as malodor. We had assessed the halitosis using organoleptic method which is purely dependent on the examiner and his perception about malodor. In general we can say that halitosis can be found associated with malocclusions which favor food and calculus accumulation. Again it is

not an absolute finding. It depends on the individual and his self-assessment as well. Literature says halitosis is usually found associated with mouth breathing habit. Grippaudo C et al found that various habits lead to development of mouth breathing and halitosis was found associated with them more.<sup>19</sup>

Temporo-mandibular disorders are mostly found associated with various malocclusions. And we can find many patients asking for TMD treatment. In our study we found them associated with deep bite cases and lower crowding cases. Mohlin et al supported the same with his study which showed that crowding is associated with TMD.<sup>20</sup> Sonenesen L and Svensson P found that TMD are more associated with deep bite.<sup>21</sup>

In general, we can speak about the various unfavorable sequelae of malocclusion. With this study, we would like to state that none of these effects are absolutely related with malocclusion. But we can surely say that malocclusion accounts for greater risk for the development of caries, halitosis, periodontal diseases, TMD, trauma. Certain malocclusion can affect the quality of life of individuals, not every case. We have to educate our population more about the need of dental health as well as the need for orthodontic treatment and reduce the risk of development of various dental diseases.

### **Conclusion**

A good awareness has to be created about the need of orthodontic treatment. With our study, we could find that general dental health is also greatly compromised in Bhopal population. So our focus should be in educating them about orthodontic treatment need as well as general dental health. We found that low self-esteem and periodontal issues are the most unfavorable factors associated with malocclusion. And moreover periodontal issues and dental caries are factors which can be made under control with good oral hygiene habits as well as

timely dental consultations. Trauma is more found associated with increased overjet, which has to be managed with timely intervention. Halitosis may be associated with mouth breathing or weak periodontal status, or it can be due to some systemic diseases as well. So the causative factor should be ruled out and treated. TMD needs to be assessed and treated with removable appliances or surgically depending on the growth status of patient.

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