

Prevalence of Class II malocclusion in mixed dentition

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Abstract: Malocclusion is the abnormal alignment of teeth within the dental arches. The prevalence of malocclusion varies among populations based on the race, ethnicity, age and gender. Class II malocclusion is one of the most common malocclusion in various populations. Appraisal of distribution of malocclusion in children can facilitate early efforts to prevent developing malocclusion and its consequences and also reduce the complexity of orthodontic treatment. The present aim of this study is evaluate the prevalence of class II malocclusion in mixed dentition. A retrospective study was carried out in patients who visited Saveetha Dental College with mixed dentition. The data were collected from patients records analysed from the data of 86000 patients between June 2019-March 2020. The data recorded were entered and subjected to statistical analysis using SPSS software. Chi square test was done between age and gender among class II occlusion patients. Out of 4420 patients, 3484 patients had class II malocclusion. Among 3484 patients, 1942 (55.7%) were males and 1542 (44.3%) were females. Association between age and gender of class II patients was found to be statistically significant [$p < 0.05$]. The present study concludes that the prevalence of Class II occlusion in mixed dentition was found to be 78.9%. 10 year old patients had higher prevalence rates of class II occlusion among mixed dentition and least prevalence of class II malocclusion was seen in the 6 year old patients.

Keywords: Angle Class II, Gender, Mixed dentition, Prevalence study, School Age Population

INTRODUCTION

Class II skeletal malocclusion is a type of malocclusion where the molar relationship shows buccal groove of mandibular first molar distally positioned when in occlusion with the mesiobuccal cusp of the maxillary first molar. Class 2 malocclusion constitutes a significant percentage of the cases the orthodontist encounter in patients. Class II malocclusion is found in 15-30% of population in the world. It may bring about negative esthetic, psychological, and social effects in an individual's life. There are 2 subdivision types in Skeletal class 2 malocclusions; Class II division 1 and Class II division 2.

Proclination of upper incisors and/or retroinclination of the lower incisors by a habit or the soft tissues can result in an increased overjet in any type of skeletal pattern. In class II division 1, the lips are usually incompetent and patients try to compensate it via circumoral muscular activity, rolling the lower lip behind the upper incisors, or moving the tongue forward between the incisors, or a combination of all these items. This malocclusion could be caused by various adverse oral habits such as thumb-sucking habit following imbalances of the buccinator muscles and tongue force, and narrowing the maxillary arch. In addition, these habits usually procline the upper incisors and retrocline the lower incisors. In Class 2 division 2 subdivision, the incisors are retroclined, Active muscular lips are responsible for upper and lower retroinclination in this type.

Many Researchers have shown interest in the prevalence of class II malocclusions. A similar study was conducted by Eve Tausche, Olaf Luck, Winfried Harzer where they estimated the prevalence of malocclusions using the Index of Orthodontic Treatment Need

(IOTN) during the early mixed dentition period. Their study proved that the range of children estimated using the Dental Health Component of the IOTN to have a great or very great treatment need (grades 4 and 5) was 26.2 per cent. The results showed that deep overbite and overjet, both more than 3.5 mm, were the most frequent discrepancies, affecting 46.2 and 37.5 per cent of patients, respectively. An anterior open bite was registered in 17.7 per cent, crossbite in 8.2 per cent, and a reverse overjet in 3.2 per cent. Class II division I malocclusion has been noted to be the most common type. These discrepancies will be compensated during mandibular growth and development of the dental arch. Nevertheless, the findings indicate early development of progressive malocclusion symptoms.

Early interceptive treatment for orthodontic management is shown to be significantly relevant in mixed dentitions. The best treatment modalities for class II malocclusion in the mixed dentition phase includes using functional appliances either removable or fixed appliances. Removable appliances such as Activator, Bionator, Frankel, and Twin-block could be used. On the other hand, fixed appliances such as MARA, cemented Twin-block, or Herbst appliance can be also implemented. These appliances will mostly enhance further mandibular growth via mandibular advancement. In addition, headgears like Cervical, Highpull, and combination type,

can be used to provide extra oral force to restrict further maxillary growth. For better understanding of the perspective of development and etiology of the class II malocclusion we need more such researchers to help guide us into better treatment options.

MATERIAL AND METHODS

Study population:

This was a retrospective study carried out from records of patients with mixed dentition who visited Saveetha Dental College. It was a university based study setting. The data were collected by analyzing the records of 86000 patients between June 2019-March 2020. Records of patients in their mixed dentition who had completely erupted upper and lower first permanent molars were included in our study. Records of patients with malformed or grossly deformed or extracted permanent first molars were excluded from the study. The collected data includes the patient's age, gender and molar relation according to Angle's classification. Patient's records which were incomplete were excluded from the study. The data collected were cross verified with intraoral photographs and randomly selected records were verified by the second examiner. Patients with Class II molar relation were segregated and the data was tabulated separately.

2.2 Sample size:

Sample size is the total number of patients who visited Saveetha Dental College in their mixed dentition between 6-12 years old with Class II molar relation. Their distribution according to age, gender, and malocclusion were recorded.

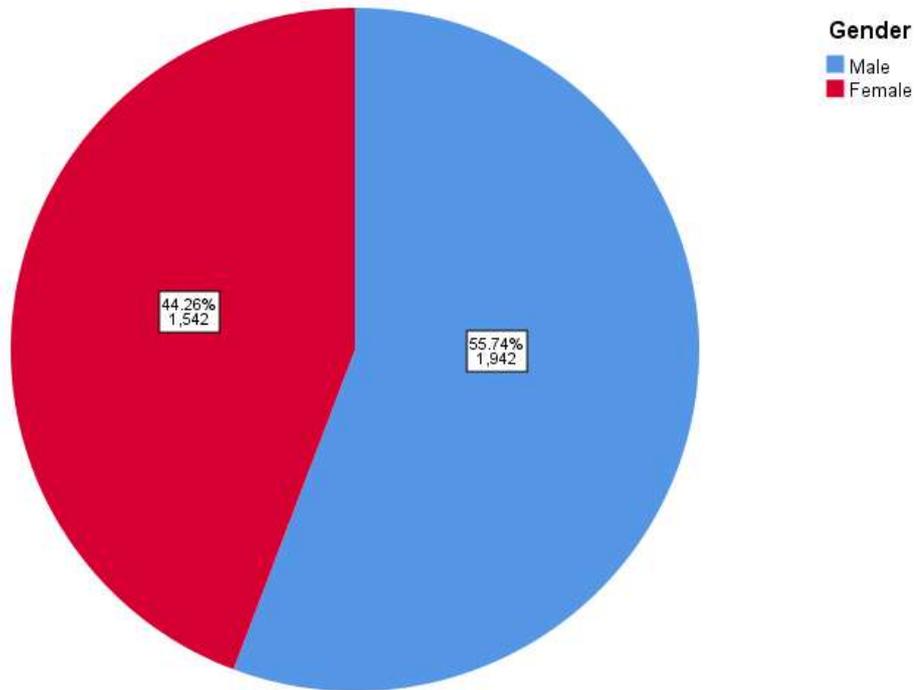
2.3 Ethical approval:

Ethical clearance was obtained from the Institutional Ethical Committee and Scientific Review Board [SRB] of Saveetha Dental College. SDC/SIHEC/2020/DIASDATA/0619-0320

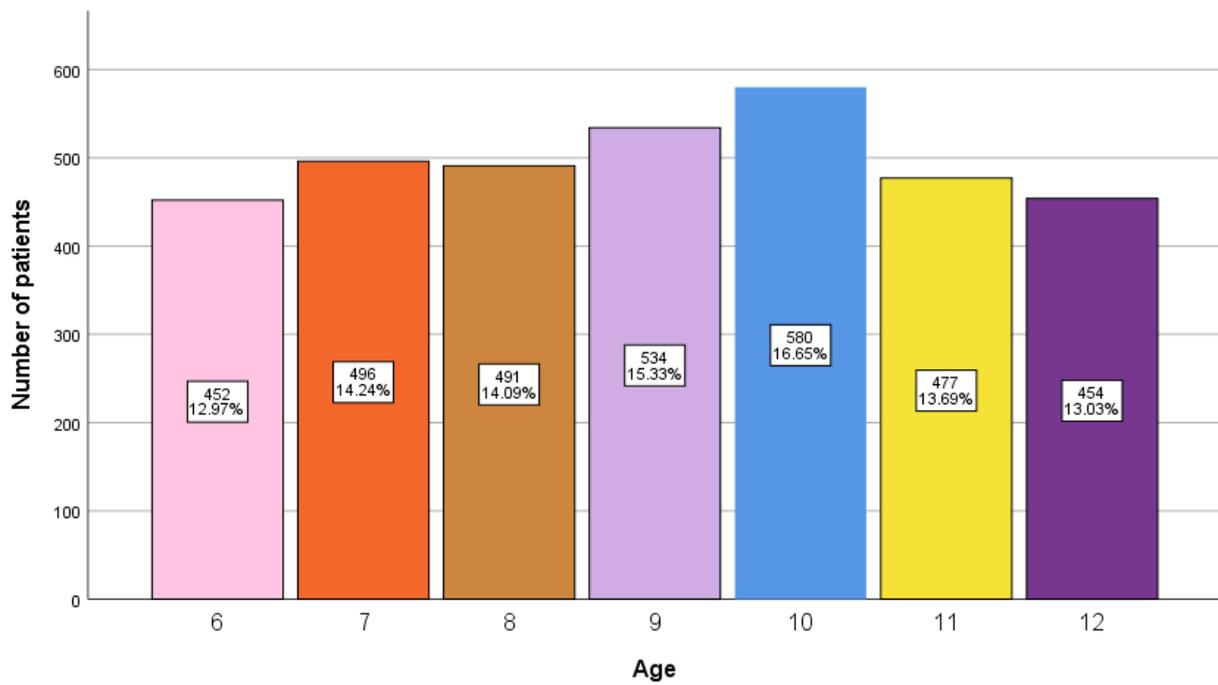
2.4 Data analysis:

The data collected were entered and subjected to statistical analysis using SPSS software. Descriptive statistics was done to find the prevalence of Class II for molar relation. The data was further stratified based on the age and gender. Independent variables were age and gender while dependent variable was the molar relationship. Chi square test was done to look for any association between the age and gender in the study population. The level of significance was kept at $p < 0.05$.

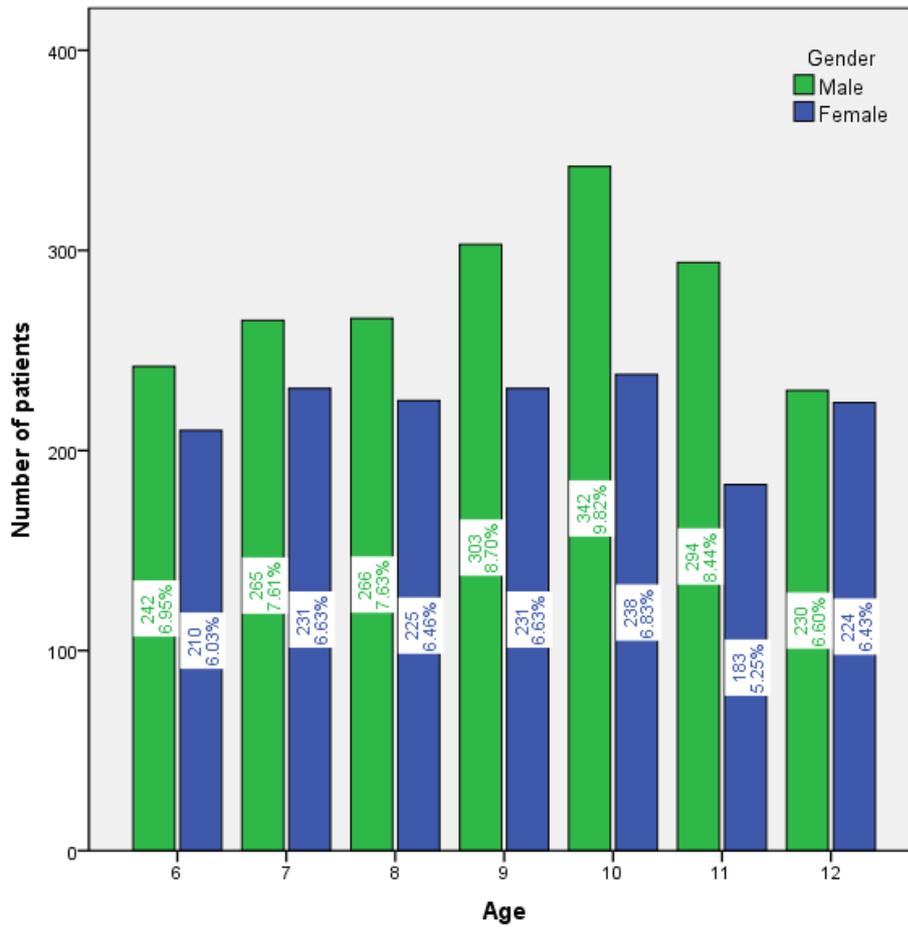
RESULTS AND DISCUSSION



Graph 2: Pie chart showing the distribution of study population based on gender.



Graph 3: Bar chart showing the distribution of Class II occlusion patients based on age.



Graph 4: Bar chart showing the association between age and gender of class II malocclusion among mixed dentition patients at various age groups.

According to Angle “occlusion is the normal relation of the occlusal inclined planes of the teeth when the jaws are closed”²⁴. Orthodontic anomalies have been associated with psychosocial distress, poor periodontal condition and impaired masticatory function and so should be regarded as a health problem²⁵.

The aim of this study is to find out the prevalence of class II malocclusion in mixed dentition who visited Saveetha Dental College. Totally 4420 patients reported with mixed dentition between 6-12 years old. Out of 4420 patients, 3484 (78.9%) had reported with class II malocclusion [graph 1]. Out of the total Class II population, 55.7% were males and 44.3% were females [graph 2]. Among 3484 records, 12.97% were 6 year old, 14.24% were 7 year old, 14.09% were 8 year old, 15.33% were 9 year old, 16.65% were 10 year old, 13.69% were 11 year old and 13.03% were 12 year old [graph 3]. Chi square test was done, and it was significant (p value = 0.011). Hence proving that there is significant association between age and gender of class I malocclusion. More of male patients [9.82%] had class II occlusion than female patients in the 10 yr old group [graph 4]. Similarly, more male prevalence was seen in all age groups except the 12 year old group, where the males and females were almost equal.

Studies done among the European population on 7-15 year old school children had reported the prevalence of Class II to be from 40.4% to 60.21%.^{26,27} Studies done among American population in 8-12 year old school children had reported a prevalence of 61.4% and 62.9% class II malocclusion.^{28,29} In our study, about 78.9% had reported with class II malocclusion in mixed dentition of 6-12 years patients, which is higher than the above studies.

Among asian population, the study done by Lew et al in Chinese school children in the age group of 12-14 yrs had reported the prevalence of class II malocclusion to be 58.8% which was lower than our present study³⁰. Whereas the study done by Alajlan et al in Saudi Arabian population on 7-12 year old school children with Class II occlusion had a prevalence of 70.4%, which was slightly lesser than our study results³¹. The study conducted by Rapenpatana et al on 8-9 years old school children in Thailand showed that 78.1% of children had class II malocclusion, which was very close to our study results³².

To summarise, our study results show that the prevalence of class II malocclusion is greater in our population when compared to the European^{26,27}, American^{28,29}, and Asian population except for the study done on the school children from Thailand³² which

showed prevalence of Class II occlusion in mixed dentition was similar to our study. The studies done on Arabian³¹ and Kerala school children showed prevalence of Class II occlusion to be more or less similar to our study.

CONCLUSION

In our study, the prevalence of Class II occlusion among mixed dentition in 6 to 12 year old patients was found to be 78.9% which was higher than most of the studies. Out of the class I patients, 55.7% were males and 44.3% were females. 10 year old patients had higher prevalence rates of class II occlusion among mixed dentition and least prevalence of class II malocclusion was seen in the 6 year old patients. There was a significant association between age and gender in our study sample.

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