

Prevalence Of Class III Malocclusion In Mixed Dentition

Research Article

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Abstract

Etiology of class III malocclusion is multifactorial. It results from a disturbance of normal development, rather than from any pathological process. Based on various combinations of skeletal components, patients with class III malocclusion exhibit a wide range of underlying skeletal and craniofacial features. Prevalence of class III malocclusion can vary among different racial and ethnic groups. The aim of this study is to determine the prevalence of class III malocclusion in mixed dentition in a private dental institute. A study was carried out by collecting data by reviewing patients data and analysing the data of 86000 patients between June 2019 and March 2020 at the private dental institute. The sample size that was taken included 4420 number of children with mixed dentition aged 6-12 years old, who came to the private dental institute for consultation. The dental malocclusion status was analysed and recorded. Data of children that had class III malocclusion were segregated and analysed with gender and age distribution. Data was statistically analysed using SPSS 2.0 (IBM 2019) PC Version for Windows, Chi-Test was conducted. Result was recorded. Out of 4420 patients, 395 patients had class III malocclusion. The study revealed that the prevalence of class III malocclusion in a private dental institute was only 8.9%, predominantly male patients. About 395 had class III malocclusion which included 211(53%) were male patients and female patients were 184(47%). Statistically, the association of age and gender among patients with class III malocclusion was not significant ($p > 0.05$), [Pearson Chi Square Test Value= 5.394; df= 6; p value= 0.494 (> 0.05)]. As a conclusion, the prevalence of Class III malocclusion in mixed dentition in the private dental institute was found to be 8.9%.

Keywords: Angle Class III, Gender, Mixed Dentition, Prevalence Study, School Age Population.

Introduction

Malocclusion is defined as an irregularity of the teeth or a mal-relationship of the dental arches in any of the planes, otherwise in which presence of anomalies in tooth position, number, form, and developmental position of teeth.[1] Although malocclusion is not a life-threatening problem, it can be considered as a public health problem due to its high prevalence.[2] Malocclusions features as the third highest prevalence among world-wide dental public health priorities.[3] Moreover, it also leads to problems associated with esthetic, poor oral hygiene, chewing, speech articulation and undesirable development of the jaw bones.

Based on sagittal relations of teeth and jaw, malocclusion can be

divided mainly into three types, as described by Angle in his classification. A class III malocclusion is one in which the lower molar is mesially positioned relative to the upper molar.[4] Maxillary retrognathism or and mandibular prognathism or both can results in type III malocclusion.[5]

The mixed dentition is the developmental period after the permanent first molars and incisors have erupted, and before the remaining deciduous teeth are lost. When the first permanent molar erupts, their relationship is determined by that of the primary molars. The molar relationship tends to shift at the time the second primary molars are lost and the adolescent growth spurt occurs. The amount of differential mandibular growth and molar shift into the leeway space determines the molar relationship as

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the permanent dentition is completed.[6]

The prevalence of malocclusion in a particular population is necessary to provide a basis for planning preventive and interceptive orthodontics and could be used to decide about growth modification treatment modalities depending upon severity of malocclusion [7, 8] Based on various combinations of skeletal components patients with class III malocclusion exhibit a wide range of underlying skeletal and craniofacial features. The prevalence of class III malocclusion, which can vary among different racial and ethnic groups as shown by comparative studies [9-12]. For example, Mongoloid populations (Japanese, Koreans and Chinese) with class III phenotypes present with characteristic features such as acute anterior cranial base angle and a prominent and elongated mandible with a short and hypoplastic maxilla, while normal maxillary size and position were observed for Caucasians' [13, 14].

It is accepted that skeletal class III malocclusion establishes itself early in life, is not a self-correction disharmony and may be associated with maxillary constriction. Intervention at the early deciduous dentition stage has been recommended. In particular, the prepubertal treatment of class III malocclusion by means of rapid palatal expansion and facemask protraction yields favorable growth corrections in both maxilla and the mandible.[15] In a controlled long term study, where treatment was done before the prepubertal growth phase showed a stable increment in the maxillary skeletal width, while patients treated after the puberty growth phase showed only dento alveolar effect after the follow-up of 8 years. It is very critical to make a decision for developing class III malocclusion on whether to treat or wait for further growth and dental development. The timing of early treatment is crucial for a successful outcome. If a malocclusion is identified early, simple preventive and interruptive measures can prevent a developing malocclusion [16]. Knowing the prevalence of malocclusion in a population can help us in early prediction of the developing malocclusion. Previously our team has a rich experience in working on various research projects across multiple disciplines The [17-31].

Therefore the current study was conducted to evaluate the prevalence of skeletal class III malocclusion in mixed dentition in a private dental hospital.

Materials 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 was collected by analyzing the records of 86000 patients between June 2019-March 2020. Records of 6 to 12 year old 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. [32] 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 III molar relation were segregated and the data was tabulated separately.

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 III molar relation. Their distribution according to age, gender, and malocclusion were recorded.

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

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 III 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

A total of 4420 patients with mixed dentition, aged between 6-12 years old visited our hospital out of which 395 patients (8.9%) had class III occlusion [Figure 1]. In patients with class III, about 211 patients were male (53.42%) and 184 patients were female (46.58%) [Figure 2].

The majority of patients with class III occlusion were from the age group of 6 year old with 77 patients (19.49%). Whereas, 11 year olds had the least number of class III occlusion (11.39%). The age distribution also showed that 7 year olds had 57 patients (14.43%), 8 year olds had 56 patients (14.18%), 9 year olds had 50 patients (13.16%), and finally 12 years olds had 58 patients (14.94%) [Figure 3].

The males had more Class III occlusion compared to female patients in the age group of 6 years old. However, Chi square test showed the association between gender and age distribution among patients with class III malocclusion showed no significant difference as the p value was more than 0.05 (p value = 0.494). Implying no association between age and gender of patients with Class III occlusion in mixed dentition [Figure 4].

This research aimed to find out the prevalence of class III malocclusion in children with mixed dentitions, aged between 6-12 years old who visited a private dental college, in Chennai. Out of 4420 patients with mixed dentition, only 8.9% patients had class III malocclusion. The gender distribution showed 46.58% were female and 53.42% were males. Among the age group of 6-12 years old, the highest number of patients with class III malocclusion were seen in the 6 year old group.

The study done among Nigerian population on 11-18 year old children had reported the prevalence of class III to be 2% [33]. Studies done among the European population on 7-15 year old

Figure 1: The bar graph shows the total number of patients with mixed dentition and number of class III malocclusion patients with mixed dentition reported to the private dental institute. X axis represents distribution of patients with mixed dentition and Y axis represents the number of patients. The graph explains that among all the 4420 patients (pink) with mixed dentition, 395 patients (8.9% - light blue) were reported with class III malocclusion.

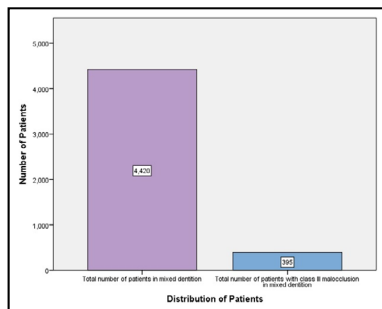


Figure 2: Pie chart showing the distribution of Class III population based on gender. It shows that more number of males (blue) had class III occlusion when compared to females (green).

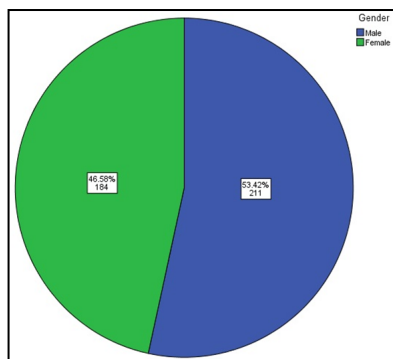


Figure 3: The bar chart depicts the age distribution of patients with class III malocclusion. X axis represents age of the patients and Y axis represents the number of patients who had class III malocclusion. The graph shows that prevalence of class III malocclusion was highest in 6 year old patients (19.49% - purple) followed by 12 year old patients (14.94% - beige) and the least prevalence was seen in 11 year old patients (11.39% - grey).

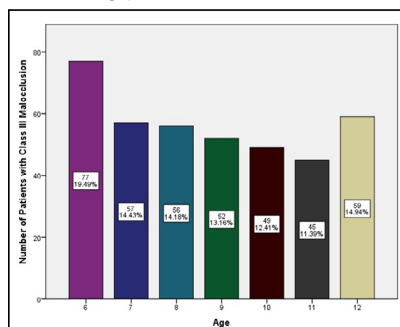
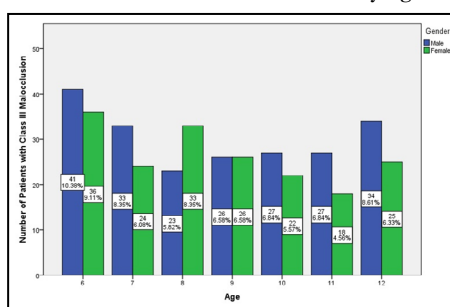


Figure 4: Bar chart shows association between age and gender distribution of patients with class III malocclusion. X axis shows the age and gender distribution and Y axis shows the number of patients with class III malocclusion. The Chi square Test done to find the association between gender and age distribution among patients with class III malocclusion did not show any significant association (p value = 0.494).



school children had reported the prevalence of Class III to be from 3.2% [34] and 5.21%. [35] Studies done among American population in 8-12 year old school children had reported a prevalence of 10% [36] and 9.1% [37] class III malocclusion. In our study, about 8.9% had reported with class III malocclusion, which was higher than prevalence in Nigerian and European populations but similar to the prevalence seen in the American populations.

Among the Asian population, the study done by Danaie et al [38]

in Iran children in the age group of 7-9 years old had reported the prevalence of class III malocclusion to be 2.1% which was lower than our present study. Another study which was done in Isfahan City of Iran, showed a prevalence of 7.8%, which was almost similar to the results of the present study. Whereas a study done in Shanghai, China, the population of 7-9 year old school children with Class III occlusion had a prevalence of 5.9% [39], which was lesser than present study results. The study conducted in Lebanon on 9-15 years old school children showed that 5.1%

of the children had class III malocclusion [40], which was lesser to current study results. A study conducted by Alajlan et al [41] in Saudi Arabia (Hail city) in the age group of 7-12 years old had reported the prevalence of class III malocclusion to be 8.3% which was very similar to the present study results.

In Indian population, the study conducted in the State of Karnataka by Siddegowda et al [42] showed a prevalence of class III to be 3.1% among children of 10-12 years old. Whereas, a study done in only one city of Karnataka (Bangalore) among 8-12 years old schoolchildren showed a class III prevalence of 0.6% [43]. Another study from different states of India (Kerala), showed a class III prevalence of 4.1% among children aged 10-12 years old [44]. A study conducted in Maharashtra, showed a prevalence of 1% among the 10-16 years old children [45]. In a study conducted in Nalgonda, Telangana, the prevalence of class III malocclusion was 7.8% among the children aged between 6-10 years old [46]. All the studies from different regions of India showed a lesser prevalence of Class III malocclusion in mixed dentition when compared to the present study, except for the Nalgonda region which had a almost similar class III prevalence with the present study.

To summarise, our study results show that the prevalence of class III malocclusion is greater in our population when compared to the other European and Asian population except for the study done on the school children from America, Iran and Saudi Arabia whose prevalence of Class III malocclusion in mixed dentition was almost similar to the present study. The studies done on school children from different parts of India showed prevalence of Class III malocclusion to be less compared to present study. However, the prevalence of Class III in the children from Nalgonda was similar to the prevalence in our population.

The high prevalence of class III prevalence in our study was due to the different study settings. Present study was conducted in a dental hospital set up and hence the prevalence of malocclusion could have been higher when compared to the general population. Whereas, previous studies were based on a school setting.

This study was based on data from a single university hospital based center, which could be argued as a limitation but this type of a setting has helped us to achieve higher sample size with high internal validity which enabled us to provide better results. It would be interesting to do a multi centered study based on school children in the future and to compare the results of the study with our results. Our institution is passionate about high quality evidence based research and has excelled in various fields [47-57].

Conclusion

To conclude, the prevalence of Class III in mixed dentition was found to be 8.9%, with almost equal distribution of males and females. 6 year old patients had higher prevalence rates of class III occlusion among mixed dentition and least prevalence of class III malocclusion was seen in the 11 year old patients.

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