

## Age and Gender Association of Class III Malocclusion among Subjects Reporting to a University Hospital in Chennai City - A Retrospective Study

Research Article

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### Abstract

Malocclusion is a misalignment or incorrect relation between the teeth of the two dental arches when they approach each other as the jaws close. Class III malocclusion is skeletally characterized by an overgrowth of the mandible (mandibular prognathism), an undergrowth of the maxilla (maxillary deficiency), or a combination of both. The aim of this study was to assess the age and gender association of Class III malocclusion in the outpatient population visiting a Private Dental college. This was a retrospective study done using case records of the outpatient population visiting a Private Dental college. Out of 86,000 patients who reported to dental college, 269 patients who had Class III malocclusion were included in the study. Data about type of class III and other associated factors was recorded and tabulated. Analysis of the data was performed using SPSS version 20. Descriptive statistics and Chi square tests were done. The male predominance (65.8%) was noted. Almost equal distribution among dental (53.5%) and skeletal (46.5%) was noted. Skeletal class III was more common in Adolescents and children compared to dental class III whereas dental Class III was common in adults. There was no statistically significant association between gender and class III malocclusion p value >0.05 and a statistically significant association was found between age group and type of class III malocclusion. Class III malocclusion was most commonly reported in the 19-30 years age group, P value <0.05. Within the limits of the present study, class III malocclusion was more prevalent in males than females and skeletal class III malocclusion was most common in children and adolescents whereas dental class III was common in Adults.

**Keywords:** Dental; Malocclusion; Skeletal.

### Introduction

Angle classification has prevailed over the last century as a simple, quantifiable method to test malocclusion prevalence within populations. However, what Angle defined as a “normal occlusion” should, in fact, be considered the “ideal” occlusion given the strict criteria he used in his classification. This ideal occlusion is rather uncommon and has driven researchers to disagree on how much deviation from the ideal should be accepted as normal [1, 2].

Class III malocclusion is characterized by an overgrowth of the mandible (mandibular prognathism), an undergrowth of the maxilla (maxillary deficiency), or a combination of both [3, 4] The prevalence of Class III malocclusion has been described between

1% [5, 6] to over 10% [7], depending on ethnic background [5, 6], sex [7, 8] and age [9]. It has been reported that approximately 75% of Class III cases in male Caucasians have a skeletal origin and are a result of mandibular prognathism or macrognathia [10, 11]. The prevalence of Class III malocclusion among Caucasian people ranges from 0.48% to 4% [5, 12, 13]. But compared to Caucasian people the prevalence of class III malocclusion is higher in Japanese population. It rises as high as 10% [14, 15] Diagnosis and treatment of class III malocclusion are choked up with contradiction in the type, timing and duration of treatment. To know the exact aetiology of any dentofacial characteristics genetic evaluation is mandatory. The effects of genetic association in orthodontic treatment are poorly understood [16, 17].

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Although there has been extensive literature concerning the genetic basis of the dentofacial abnormalities and malocclusions, data provided by these studies were quite sparse [18, 19]. Furthermore, surveys dealing with genetics constituted only 0.5% of the total in orthodontic journals since the 1980's [20, 21]. To date, many investigations have focused largely on treatment modalities and outcomes, with little being accomplished toward an understanding of the aetiology of class III phenotype and potential relationship between the genetic components or how genetic factors may influence the response to treatment [22]. In spite of the continually increasing data on malocclusion prevalence, little has been done to consolidate this information in a comprehensive and critical way [23, 24]. Although no protocol has been enacted governing the methods of Angle class III malocclusion prevalence studies, a review and meta-analysis of the available literature will be helpful in establishing guidelines for future researchers [25]. Previously our team has a rich experience in working on various research projects across multiple disciplines [26, 40]. Now the growing trend in this area motivated us to pursue this project.

The aim of this study was to assess the age and gender association of Class III malocclusion in the outpatient population visiting a Private Dental college.

## Materials and Methods

### Study design and Study setting

The present hospital-based retrospective study was carried out using digital case records of 269 patients who reported with Class III malocclusion from 86,000 patients attending the dental college from June 2019 to March 2020 seeking orthodontic treatment. Ethical clearance to conduct this study was obtained from the scientific Review Board of the hospital (SDC/SIHEC/2020/DI-ASDATA/0619-0320).

### Sampling

Case records of 269 patients who reported with Class III malocclusion were included in the study. Inclusion criteria was patients with class III malocclusion visiting the dental college in the specified period of time, patients referred for orthodontic correction of Class III malocclusion. Cross verification of the data for errors was done. Each case was verified for the general information of the patients, whether its skeletal or dental malocclusion was identified using the diagnosis mentioned in the case records and clinical photographs. The exclusion criteria was other malocclusions and missing or incomplete data.

### Data collection and Tabulation

Exclusion criteria eliminated cases that had other malocclusions; cases with no clinical photograph and cases that were not approved by the concerned faculty in the hospital. A single calibrated examiner evaluated the clinical photographs of 269 patients and graded them based on skeletal and dental malocclusion. Data was tabulated in excel and was imported to SPSS where the variables were defined.

## Results & Discussion

IBM SPSS version 20 was used for statistical analysis. Descriptive analysis of the age group, gender, type of class III distribution was done. Chi – square test was done for association between age, gender and type of Class III. Results were tabulated and represented graphically. A male dominance (65.8%) over females (34.2%) was noted (Figure 1). In the type of Class III malocclusion, almost equal distribution among dental (53.5%) and skeletal (46.5%) was noted (Figure 2). There was no statistically significant association between gender and class III malocclusion (Chi square value - .934, DF - 1, p value = 0.33 (>0.05)) (Figure 4) and a statistically significant association was found between age group and type of class III malocclusion it was most commonly

Figure 1. Bar graph depicting gender distribution of the Class III malocclusion. X axis represents the gender and Y axis represents the percentage of the subjects in the present study; 177(66%) males, 92(34%) females.

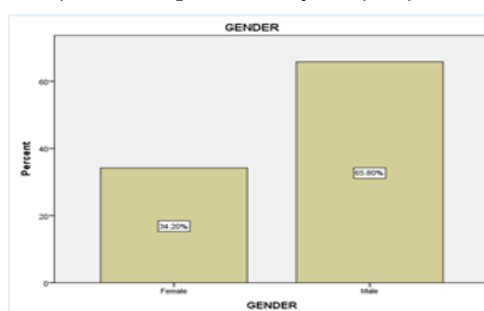


Figure 2. Bar graph depicting the Classification of Class III malocclusion. X axis represents the type of malocclusion and Y axis represents the percentage of the subjects in the present study; 125(46.5%) skeletal and 144(53.5%) dental Class III malocclusion.

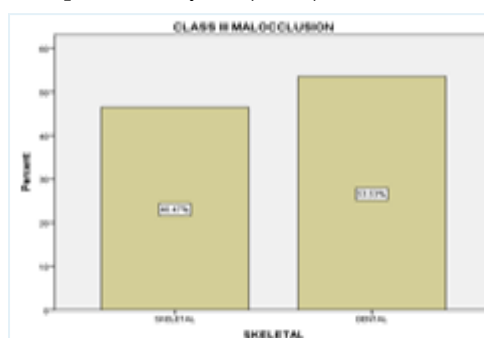


Figure 3. Bar graph representing the association between age groups and the type of Class III malocclusion. X axis represents the age group and Y axis represents the number of subjects with class III malocclusion. Chi square association was done and found to be significant. Pearson's Chi-Square value - 15.797 , DF-2, P = 0.01 (<0.05), Statistically significant proving age association, both types of class III malocclusions were common in the age group of 19-30 yrs when compared to the other age groups.

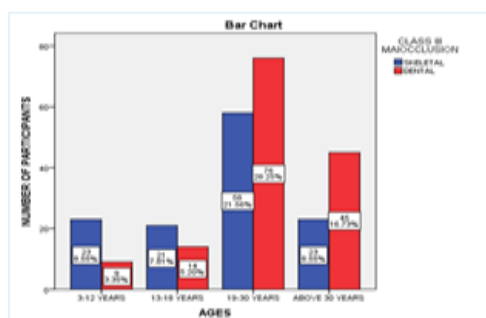
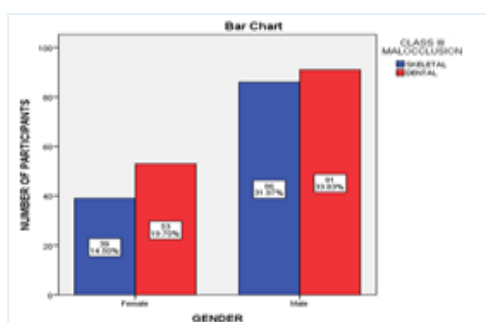


Figure 4. Bar graph representing the association between the gender and the type of Class III malocclusion. X axis represents the gender and Y axis represents the total number of participants. More number of males reported with class III malocclusion. Association was tested by Chi square test and was found to be non-significant. Chi square value - .934, DF - 1, p value = 0.33 (>0.05) statistically not significant, hence class III malocclusion was not associated with gender.



reported in the 19-30 years age group (Pearson's Chi-Square value - 15.797, DF-2, P = 0.01 (<0.05))(Figure 3). Skeletal class III was more common in adolescents and children whereas dental Class III was common in adults compared to skeletal. (Figure 3).

This study shows that in class III malocclusion 65.8% were more prevalent in males than females (34.2%). Out of 269 subjects with class III malocclusion, 125 (46.5%) were skeletal and 155 (53.5%) were dental malocclusion. Skeletal class III malocclusion was most common in children and adolescents, whereas dental class III was common in Adults.

Onyaso et al.(41)who reported that males were found to have significantly more of classes II and III molar relationships than females which supports this study where as Baccetti et al reported that females were found to significantly more of classes III molar relationships than females which contradicts our study study (42). From other articles, Chinese and Malaysian groups showed a much higher mean prevalence rate than other racial groups: 15.69% and 16.59%, respectively [43-45]. This is consistent with previous reports of higher rates of Angle class III malocclusion among Asian populations.

Baccetti et al reported that Class III malocclusion is associated with a significant degree of sexual dimorphism in craniofacial especially after the age of 13 and female subjects with Class III malocclusion present with significantly smaller linear dimensions in the maxilla, mandible, and anterior facial heights when compared with male subjects during the circumpubertal and postpubertal periods which supports our study[42].

Angle class III malocclusion rates among the three Middle East-

ern groups in this study are fairly similar. However, previous studies indicated a wide range of rates from 1.3% in Israeli Arabs to 15.2% in Iranians [46-48]. Additionally, many different rates appear forIranians: 2.1%, 7.8%, 9.2%, and 15.2% [49]. However, a 1969 study of Egyptians [50] showed a rate of 4%. Agreement of previously reported Angle class III prevalence data appears to be haphazard at best among Middle Eastern populations. Furthermore, major discrepancies appear to exist among populations within individual countries.

Our institution is passionate about high quality evidence based research and has excelled in various fields [51-61]. We hope this study adds to this rich legacy.

The limitation in this study is its smaller sample size. A similar study should be conducted on a larger scale involving a large number of samples and twins for more reliable results. Hence, further extensive studies should be done in this field of research.

### Conclusion

Within the limits of the present study, class III malocclusion was more prevalent in males than females but no significant difference was noted. Both skeletal class III malocclusion and dental class III were most common in the age group of 19-30 yrs and in children skeletal class III was more common than dental class III malocclusion.

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