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Dental Arch Crowding in Permanent Dentition Among Class I And Class Ii Div 1 Malocclusion

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ABSTRACT

Crowding of dental arches is a common malocclusion and it involves improper alignment of the anterior or posterior teeth. The primary objective of the study was to evaluate the severity of crowding in subjects with Class I and Class II malocclusions. This retrospective study was performed using case records of subjects visiting a private dental college. The present study included 200 subjects with equal distribution of class I and class II malocclusions. Data on type of malocclusion and other associated factors was recorded and tabulated. Analysis of the data was performed using SPSS, descriptive statistics and Chi square tests were done. The study reported 53% mild crowding, 31% severe crowding and 16% moderate crowding in class 1 malocclusion whereas in Class II division 1 malocclusion 50% severe crowding, 46% mild crowding, 4% moderate crowding was observed. Within the limits of the present study, it can be concluded mild crowding was more prevalent followed by severe and moderate crowding in class I malocclusion whereas in Class II division 1 malocclusion severe crowding was more common followed by mild and moderate crowding. No significant association between the type of malocclusion and the severity of crowding was noted.

INTRODUCTION

According to Edward Angle(1899) the term malocclusion can be defined as teeth that are mal aligned or mal-arranged in the dental arches. According to him a class I occlusion is when the mesiobuccal cusp of upper 1st permanent molar occludes in the mesiobuccal groove of the lower 1st permanent molar and both maxillary and mandibular teeth are arranged in line of occlusion [1]. Malocclusion can be defined as an occlusion in which there is a malrelationship between the arches in any of the planes or in which there are anomalies in tooth position beyond the normal limits. [2–4]. Dental crowding can be defined as a discrepancy between tooth size and arch size leading to malocclusion of the dental arches [5]. One of the etiology for crowding includes an evolutionary reduction in jaw size and tooth size [6]. Previous studies have reported the major reason for malocclusion being evolutionary decrease in jaw size without corresponding reduction in the tooth size. However, in this regard divided opinion has been observed among investigators since many of them have reported a larger tooth size anchored in small arches as a cause of crowding [7]. Another study implicated only large tooth size as a contributing factor in crowding. Contradictory to this another study by Kaundal et

al., reports both large tooth size and small jaw as a combined contributing factor for malocclusion.[8]

An increasing concern for dental appearance among adolescents has been observed [9,10]. The literal meaning of malocclusion is bad bite or altered arrangement of the teeth. [2,11,12]. Malocclusion has both physiological and psychological components associated and an individual with malocclusion avoids social contacts leading to loss of career opportunities and lack of confidence.[13,14]

Pain is seldom a feature of malocclusion and it's impact on an individual is mostly in terms of quality of life, discomfort, social and functional limitations.[11,15–17]. The reasons to develop malocclusion could be genetic or environmental and/or a combination of both. There is also the influence of a wide range of local factors such as adverse oral habits, tooth anomalies, form and developmental position of teeth which can lead to malocclusion. [18–21] Malocclusion has been shown to affect oral health, increasing the prevalence of dental caries and leading to temporomandibular joint disorders.[2,10,22] A population based difference has been reported in the prevalence of malocclusion, with variations based on age and gender. The prevalence of malocclusion in India ranges between 20% and 43%. [11,23–25]. Orthodontic treatment plays a pivotal role in correction of malocclusion.Previously we have focused our research on various invitro and invivo studies. [26–45] We have currently shifted our focus to this retrospective analysis. The benefits of orthodontic treatment includes correction of aesthetic components, restoring function leading to an overall improvement in the quality of life of an individual. [46–48].

The main objective of this study was to evaluate the severity of crowding in Class I and Class II malocclusion in the South indian population.

MATERIAL AND METHOD
Study design and Study setting
The present hospital-based retrospective study was carried out using digital case records of 200 patients who reported with crowding and had either a Class I and Class II div 1 malocclusion. These patients had reported to a private dental college from june 2019 to march 2020 seeking orthodontic treatment. Equal number of patients in both types of malocclusions were included in the study sample. Ethical clearance to conduct this study was obtained from the scientific Review Board of the hospital (SDC/SIHEC/2020/DIASDATA/0619-0320).

Sampling
Case records of 200 patients who reported with crowding and had either Class I and Class II div 1

malocclusion were included in the study. Cross verification of the data for errors was done. Each case record was verified for the general information of the patients and whether the skeletal or dental malocclusion was identified using the diagnostic criteria mentioned in the case records and clinical photographs. Other malocclusions and missing data were excluded from the study.

Data collection and tabulation
A single calibrated examiner evaluated the clinical photographs of 200 patients and graded them based on severity and Type of malocclusion. Data was tabulated in excel and was imported to SPSS where the variables were defined.

RESULTS AND DISCUSSION
IBM SPSS version 20 was used for performing statistical analysis. Descriptive analysis of the gender, type of malocclusion and severity was done. Chi – square test was done for association between type of malocclusion and severity. Results were tabulated and represented graphically.

The study included 200 patients who were categorized into 100 Class I and 100 Class II div 1 malocclusion. The severity of crowding in class I malocclusion was as follows- 53% of the patients had mild crowding, 31% had severe crowding and 16% had moderate crowding. In Class II div 1 malocclusion 50% of patients had severe crowding, 46% had mild crowding and only 4% had moderate crowding(Figure 3). Study conducted by Gul-e-Erum[49] in a sample of Pakistani population reported that mild maxillary crowding was the most common finding in all malocclusion categories while mild mandibular crowding was most frequently recorded in all malocclusion categories except in Class I malocclusion where moderate and severe crowding were equally prevalent which is in consensus with the present study.

Nanjannawar[50] stated that in a sample of Indian patients 40% of subjects had maxillary crowding while 50.4% had mandibular crowding. They also reported that mild maxillary crowding was most commonly seen in all malocclusion categories except for Class I category, where severe crowding was more common which is contradictory to the present study. Sayin[51] reported that moderate maxillary and mild mandibular crowding were most commonly noted in all malocclusion categories in an orthodontically referred Turkish population.

The limitations in this study include a small sample size and a limited population. A similar study should be conducted as a multicentre study with a larger sample size so that the results can be generalized.

CONCLUSION

Within the limits of the present study, it can be concluded that mild crowding was more prevalent followed by severe and moderate crowding in class I malocclusion. In Class II div 1 severe crowding was more prevalent followed by mild and moderate crowding but there was no significant association between the type of malocclusion and the severity of crowding.

AUTHOR CONTRIBUTIONS

First author (Jitesh.S) performed the analysis, interpretation and wrote the manuscript. Second author (Dr.Ravindra Kumar Jain) contributed to conception, data design, analysis, interpretation and critically revised the manuscript. Third author (Dr.Madhulaxmi) participated in the study and revised the manuscript. All the three authors have discussed the results and contributed to the final manuscript.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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Self.

ETHICAL CLEARANCE

It is taken from "Saveetha Institute Human Ethical Committee" (Ethical Approval Number-SDC/SIHEC/2020/DIASDATA/0619-0320)

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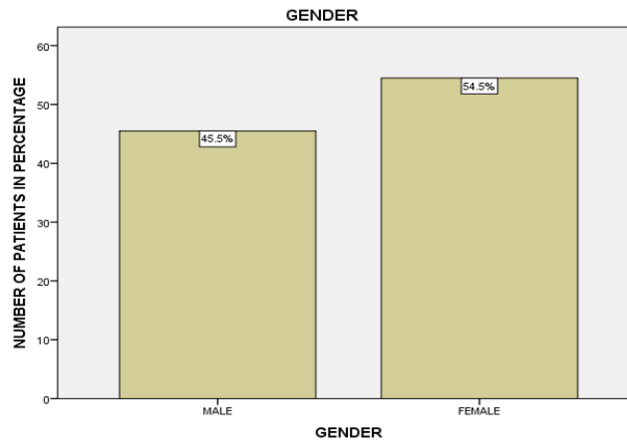
Figure 1: Bar graph depicting gender distribution of the Class I and Class II div 1 malocclusion . X axis represents the gender and Y axis represents the percentage of the subjects in the present study; Out of 200, 91(45.5%) were males and 109(54.5%) were females.
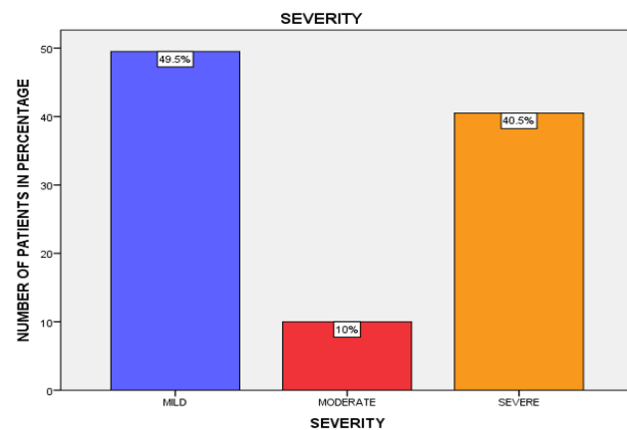

Figure 2: Bar graph depicts the severity of crowding in Class I and Class II div 1 malocclusion . X axis represents the severity of crowding whether its mild(blue), moderate(red) or severe(orange) and Y axis represents the number of the patients in percentage and in this present study about 49.5% had mild crowding, 10% had moderate and 40.5% had severe dental arch crowding.
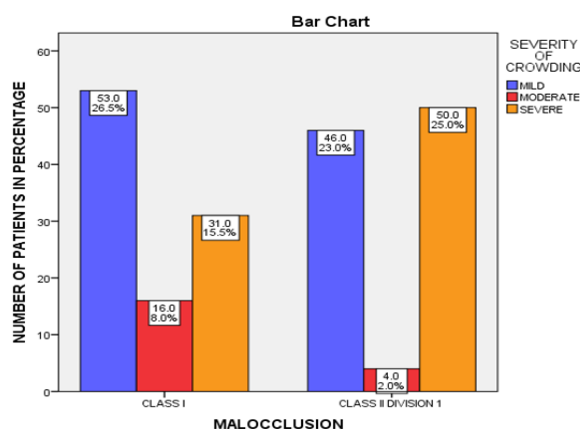

Figure 3 : Bar graph depicts the association between the severity of crowding and the type of malocclusion. X axis represents the type of malocclusion and Y axis represents the total count of the subjects in percentage. There was a higher incidence of mild crowding(blue) in Class I malocclusion and severe crowding(orange) in Class II div 1 ,however there was no statistically significant association between severity of crowding and type of malocclusion as determined by Pearson's Chi-Square test (Pearson's Chi-Square value - 12.152 , df:2, P = 0.02(<0.05); Statistically not significant).