

## Prevalence of Mandibular Anterior Teeth Crowding in Mixed Dentition Subjects Reporting to a University Hospital in Chennai City

Research Article

Fathima Bareera Rezvi<sup>1</sup>, Ravindra Kumar Jain<sup>2\*</sup>, Manjari Chaudhary<sup>3</sup>

<sup>1</sup> Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India.

<sup>2</sup> Associate Professor, Department of Orthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India.

<sup>3</sup> Senior Lecturer, Department of Oral Medicine and Radiology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India.

### Abstract

Crowding or deficiency in tooth size arch length is one of the most common reasons that people seek orthodontic treatment for themselves or their children. Diagnosis of this helps us determine the necessity for early interceptive orthodontic treatment. The aim of this study was to evaluate the prevalence of mandibular anterior teeth crowding in mixed dentition subjects among the South Indian population in patients visiting a private dental hospital from June 2019 to April 2020. The study population included orthodontic patients with crowding in mandibular anterior teeth, selected by non-probability purposive sampling. Data was collected and then subjected to statistical analysis. Out of 3652 patients aged between 6-12 years, 9.4% of the patients reported mandibular anterior teeth crowding. The results of the study were subjected to Chi-square tests. There was no significant association between mandibular anterior teeth crowding and gender ( $p$  value $>0.05$ ). There was significant association between mandibular anterior teeth crowding with age ( $p$  value $<0.05$ ). Mandibular anterior teeth crowding was commonly seen in subjects with Class I malocclusion. Within the limits of the study prevalence of mandibular anterior crowding was 9.4%. Mandibular anterior teeth crowding was significantly associated with age, but no association was found with gender.

**Keywords:** Mandibular Anterior Teeth; Crowding; Prevalence; Mixed Dentition.

### Introduction

Recognizing mandibular anterior teeth crowding at an early stage, is important for interceptive orthodontic treatment planning [1]. There is an increase in the number of parents who are concerned about the possibilities of dental crowding in their children's future, aesthetic reasons being one of the major concerns [2], along with a psychosocial benefit that is provided by straight teeth [3]. Dental crowding is defined as a disparity in the relationship between tooth size and jaw size, leading to imbrications and rotations of the teeth [4]. Mandibular anterior teeth crowding is one of the most frequent malocclusion in children [5, 6].

Longitudinal studies evaluating mandibular anterior teeth crowding were performed in primary, mixed and permanent dentitions [4, 5], [7-10]. In this study [2] it was mentioned that indicators

of crowding in the primary dentition may lead to future anterior crowding during mixed dentition. The mesiodistal size of the primary canines, maxillary and mandibular dental arch length are factors for possible crowding in mixed dentition.

Size of the dental arch is an important factor in determining crowding in the dentition. Smaller dental arch along with larger teeth are associated with crowding [6-11]. When the eruption of permanent lateral incisors take place, an average of 1.6mm of additional space is required for the perfect alignment of the four permanent incisors [12, 13]. This type of slight crowding has been reported to be solved by a slight increase in the intercanine width and labial positioning of the permanent incisors relative to primary incisors [14, 15].

The space available in the anterior region is minimum when the permanent lateral incisors have erupted [12], but subsequently

#### \*Corresponding Author:

Ravindra Kumar Jain,  
Associate Professor, Department of Orthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India.  
E-mail: ravindrakumar@saveetha.com

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the difference in size of deciduous and permanent teeth along with leeway space, manage anterior teeth crowding temporarily. In pediatric dentistry and orthodontics, there is a necessity to distinguish between young children who have a tendency to develop future problems of space for the mandibular incisors and children who have temporary problem [16-18].

Direction of mandibular growth, early loss of primary molars, arch dimensions, oral musculature, incisor and molar inclination are factors that affect the severity of crowding. The determination of factors that lead to anterior mandibular teeth crowding in the mixed dentition is of utmost importance for treatment planning. Previously our team had conducted numerous clinical studies [19-29] and case reports [30-33] over the past 5 years. Now we are focussing on retrospective studies.

This study aims to evaluate the prevalence of mandibular anterior teeth crowding in mixed dentition subjects reporting to a university hospital in Chennai city.

## Materials and Methods

### Study Design and Study Setting

This retrospective cross-sectional study was conducted in a university hospital in Chennai city to evaluate the prevalence of mandibular anterior teeth crowding in mixed dentition subjects. The study included a total of 3652 subjects who reported to the Orthodontics department at Saveetha Dental College during June 2019 - March 2020. Digital records were used to retrieve the data. Ethical approval was obtained from the Institutional Ethical Committee - SDC/SIHEC/2020/DIASDATA/0618-0319.

### Study population and sampling

Inclusion criteria for the study was subjects within 6-12 years of age with mandibular anterior teeth crowding in mixed dentition who reported to our institution. The exclusion criteria was subjects not within the above age group and those with mandibular

posterior teeth crowding data. After assessment of the university patient data registry, case records of 3652 patients were included in the study.

### Data Collection

Data of 3652 subjects were reviewed and noted for mandibular anterior teeth crowding in mixed dentition. The collected data included the following parameters: Patients details: Name, Age, Gender, Patient identification number, presence of mandibular anterior teeth crowding in mixed dentition and dental malocclusion were recorded. Relevant Data was entered in Microsoft Excel Sheet. Repeated and incomplete data was excluded. Data verification was done by an external reviewer.

### Statistical Analysis

The collected data was validated, tabulated and analysed with Statistical Package for Social Sciences for Windows, version 20.0 (SPSS Inc., Chicago, IL, USA) and results were obtained. Categorical variables were expressed in frequency and percentage. Chi-square test was used to test associations between categorical variables. P value <0.05 was considered statistically significant.

## Results and Discussion

The following results were obtained from our study. Out of 3652 subjects, 370 of them (9.4 %) had mandibular anterior teeth crowding (Figure 1). Prevalence was almost similar in both genders. No significant association was found between gender and mandibular anterior teeth crowding, ( $p>0.05$ ) (Figure 2). With increasing age, the prevalence of crowding also increased. There was significant association between age and mandibular anterior teeth crowding ( $p=0.000$ ) (Figure 3). Class I malocclusion had a higher prevalence of crowding (8.6%) when compared to others. There was significant association between Class I dental malocclusion and mandibular anterior teeth crowding ( $p=0.000$ ) (Figure 4).

**Figure 1.** bar chart represents the prevalence of mandibular anterior teeth crowding. X axis represents Yes (Blue) and No (Green) and Y axis represents the percentage of patients. The prevalence of mandibular anterior teeth crowding was present in 9.4% of the patients.

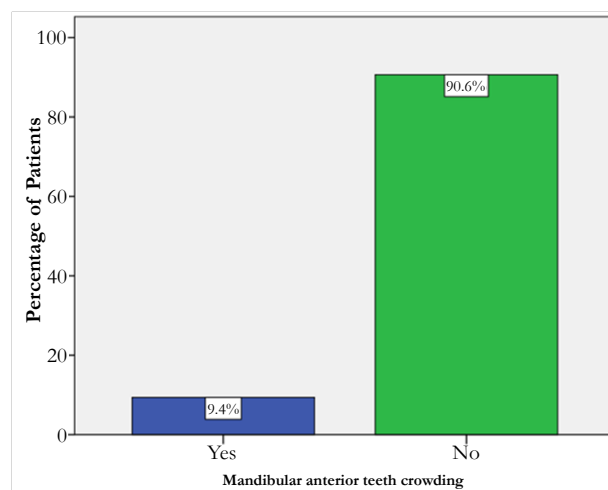


Figure 2. bar chart represents the association between gender and mandibular anterior teeth crowding. X axis represents the gender and Y axis represents the number of patients. Prevalence of mandibular anterior teeth crowding was almost similar in both genders. Chi square test was done [Pearson Chi square = 0.019<sup>a</sup>, df = 1, p = 0.891 (p>0.05)] which showed no significant association was found between gender and mandibular anterior teeth crowding.

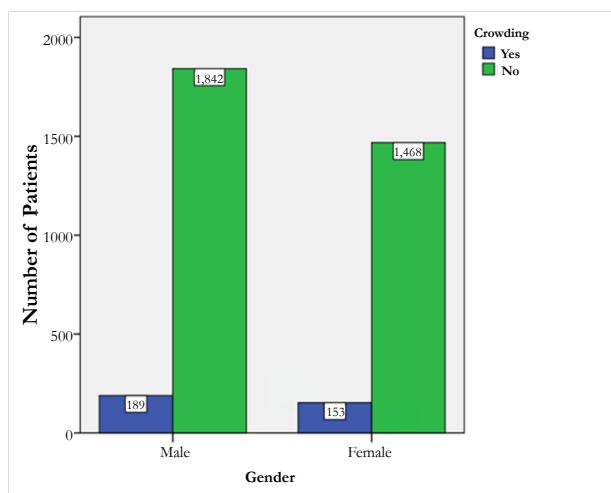


Figure 3. bar chart represents the association between age and mandibular anterior teeth crowding. X axis represents Age (6-12 years) and Y axis represents the number of patients. With increasing age, the prevalence of crowding also increases. Chi square test was done [Pearson Chi square 116.373<sup>a</sup>, df = 6, p = 0.000 (p<0.05)] which shows that there is significant association between age and mandibular anterior teeth crowding.

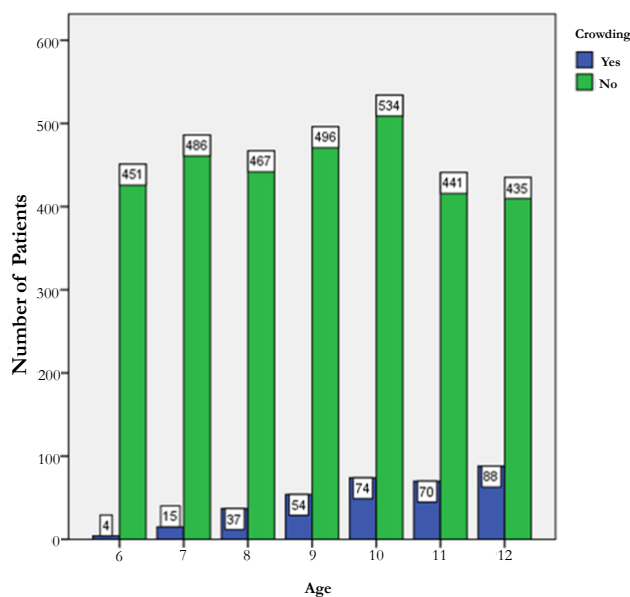
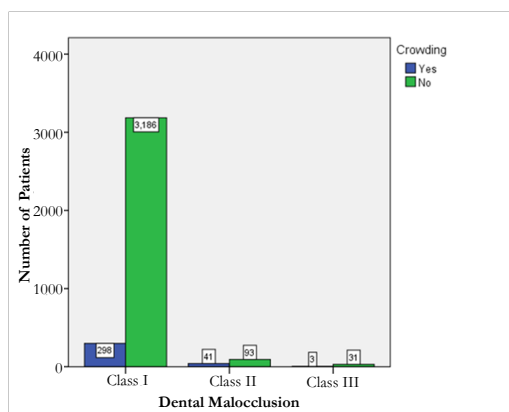


Figure 4. bar chart represents the association between dental malocclusion based on molar relation and mandibular anterior teeth crowding. X axis represents dental malocclusion based on molar relation and Y axis represents the number of patients. Chi square test was done [Pearson Chi square = 73.885<sup>a</sup>, df = 2, p = 0.000 (p<0.05)] which shows that there is significant association between dental malocclusion based on molar relation and mandibular anterior teeth crowding.



According to our study, the prevalence of mandibular anterior teeth crowding was found to be around 9.4%. This is similar to the studies conducted by Reddy et al., [34] and Kumar et al., [35], where they had a prevalence of lower anterior teeth crowding of 11.8% and 12% respectively. But according to Brito et al., [36] and Silva et al., [37] the prevalence was found to be 26.8% and 29% respectively, higher than our study findings.

Our study has no significant association between gender and mandibular anterior teeth crowding. Reddy et al., [34] and Tschill et al., [38] also stated similar findings as our study, in which the former stated that there was no association between males and females and mandibular anterior teeth crowding, with a p value of 0.153 and the latter stated no significant association between gender and crowding, with  $p > 0.05$ . Contradicting our study results, Yu et al., [39] stated that crowding had a significant association with gender, in which  $p = 0.001$

There was significant association between mandibular anterior teeth crowding and age, with  $p = 0.000$ . With increasing age the prevalence of crowding also increased in our study. Studies by Yu et al., [39] and Mugonzibwa et al., [40] state a similar finding to our study. The former had a p value of 0.006 and the latter had a p value of 0.001, showing statistically significant association, supporting our study results. But in contrast, Al-Sehaibany et al., [41] stated that there was no association between age and mandibular anterior teeth crowding.

We also observed a significant association between crowding and dental malocclusion. Prevalence of crowding was more in Class I dental malocclusion subjects, when compared to others. These findings are similar to those of Khan et al., [42] and Sayin et al., [43], where the p value was found to be 0.001 and 0.017 respectively. Sayin et al., had a Class I - 21.4%, Class II - 4.4% and Class III - 1.4%, which is similar to our study of Class I - 8.6%, Class II - 1.4% and Class III - 0.1%.

An orthodontist will have to weigh the risks and benefits as to when to initiate treatment. Certain malocclusions may become more complex later on, with increasing age, while some malocclusions benefit from an early phase of treatment. In other cases, the desire to initiate treatment early must be weighed against the tendency to over-treat patients, committing them to prolonged orthodontic treatment plans, which may lead to patient burnout, higher risks of decalcification and gingivitis and the additional burden of cost. It is essential for the orthodontist to monitor growth and development to determine the appropriate time to initiate treatment.

Our study has its own limitations. Further studies should be conducted considering the oral habits, history of orthodontic treatment for better outcomes.

## Conclusion

Within the limits of the study, it was concluded that the prevalence of mandibular anterior crowding was 9.4% among mixed dentition subjects. With increasing age, the prevalence of crowding also increased and gender had no influence on crowding. Class I malocclusion based on molar relation was commonly associated with mandibular anterior teeth crowding.

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## Author's Contribution

First author (Fathima Bareera Rezvi) performed the analysis, and 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. Manjary Chaudhary) participated in the study and revised the manuscript. All the authors have discussed the results and contributed to the final manuscript.

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Jordan University of Science and Technology, Jordan.

E-mail: [f\\_hattab@hotmail.com](mailto:f_hattab@hotmail.com)