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Prevalence of Class Iii Malocclusion in Permanent Dentition - A Retrospective study

S.S. SHIVANNI[1], ARVIND S[2*], DR. BALAKRISHNA R N[3]

[1]Saveetha Dental College and Hospitals, Saveetha Institute Of Medical and Technical Sciences, Saveetha University, Chennai, India.
[2]Reader, Department of Orthodontics, Saveetha Dental College and Hospitals, Saveetha Institute Of Medical and Technical Sciences, Saveetha University, Chennai, India.
[3]Senior Lecturer, Department of oral and maxillofacial surgery, Saveetha dental college and hospitals, Saveetha institute of medical and technical sciences, Saveetha University, Chennai -600077
*Corresponding Author
Email ID: 151501003.sdc@saveetha.com[1], arvind.sdc@saveetha.com[2], balakrishnarn.sdc@saveetha.com[3]

Abstract: The prevalence of malocclusion varies greatly among different race, ethnicity and geographic locations. Knowledge about the prevalence of malocclusion among the population helps in the early diagnosis and to provide a customized treatment plan for that population. The main aim of this study is to assess the prevalence of class III malocclusion in permanent dentition. The data were collected by analyzing the records of 86000 patients between June 2019-March 2020. The study includes 37756 patients above the age of 12 years in their permanent dentition who reported to the University in Chennai. The results were analysed and graphs were tabulated using SPSS software. Out of the total patients assessed, 365 patients (0.96%) had class III malocclusion among which 242 were males and 123 were females. It was further found that among the 365 patients, prevalence of class III malocclusion was 75.34% and class III subdivision was 24.66%. Chi square test done between type of malocclusion and gender was found to be insignificant with P value of 0.933. Within the limitations of the study, it was found that prevalence of class III malocclusion was less in our population with no significant difference in distribution among males and females.

Keywords: Angle Class III, Gender, Innovation, Permanent dentition, Population, Prevalence study.

INTRODUCTION

Malocclusion is an abnormal occlusion in which teeth are not in a normal position in relation to adjacent teeth in the same jaw and/or the opposing teeth when the jaws are closed. Patients may face several problems due to malocclusion such as esthetics, plaque accumulation, caries, difficulties in mastication and speech, development of a temporomandibular disorder related to parafunctional habits and tooth hypersensitivity due to trauma from occlusion.(Davies 2007) The etiology of malocclusion is a multifactorial problem with no one specific cause. It is mainly the interplay between the genetic factors and environmental factors which contribute to the appearance of different types of malocclusions.(Heimer, Tornisiello Katz, and Rosenblatt 2008), (Almeida et al. 2006) The prevalence of malocclusion varies based on ethnicity, age, gender, race etc.(Zere et al. 2018)(Bukhary 2005), (Nomura et al. 2009)(Clerck, De Clerck, and Proffit 2015)

In the year 1899, Edward H. Angle classified malocclusion based on the molar relation. It is the most commonly used classification in orthodontic practice till date. According to Angle, malocclusion can be classified into Class I, Class II and Class III relation based on the occlusion of permanent first molars. Class III malocclusion occurs when the mesiobuccal cusp of the upper first molar lies posterior to the buccal groove of the lower first molar.(Angle 1899)

Class III malocclusion represents a growth related disturbance with mandibular prognathism or maxillary retrognathism or both when compared to cranial base.(Clerck, De Clerck, and Proffit 2015) It's prevalence varies greatly within different races and geographic locations.(Zere et al. 2018) The features of class III malocclusion include concave facial profile, negative overjet and anterior crossbite.

Knowledge about the prevalence of malocclusion among the population helps in the early diagnosis and to provide a customized treatment plan for that population. Our team has conducted various comparative studies/reviews (A. S. Felicita 2017b, [a] 2017; Samantha et al. 2017; Ramesh Kumar et al. 2011; Sivamurthy and Sundari 2016; Dinesh et al. 2013), in vitro studies (A. Felicita, Chandrasekar, and Shanthasundari 2013; Pandian, Krishnan, and Kumar 2018; Sandhu, Sandhu, and Bansal 2012) and cohort studies (Kamisetty et al.

2015; Vikram et al. 2017; A. S. Felicita 2018; Rubika, Sumathi Felicita, and Sivambiga 2015; Krishnan, Pandian, and Kumar S 2015; Jain, Kumar, and Manjula 2014) over the past 5 years but now we are concentrating more on prevalence studies, hence the reason for this study.

Our department is passionate about research we have published numerous high quality articles in this domain over the past years ((Kavitha et al. 2014) , (Praveen et al. 2001),(Devi and Gnanavel 2014), (Putchala et al. 2013), (Vijayakumar et al. 2010), (Lekha et al. 2014b, [a] 2014) (Danda 2010) (Danda 2010) (Parthasarathy et al. 2016) (Gopalakannan, Senthilvelan, and Ranganathan 2012), (Rajendran et al. 2019), (Govindaraju, Neelakantan, and Gutmann 2017), (P. Neelakantan et al. 2015), (PradeepKumar et al. 2016), (Sajan et al. 2011), , (Prasanna Neelakantan, Grotra, and Sharma 2013), (Patil et al. 2017), (Jeevanandan and Govindaraju 2018), (Abdul Wahab et al. 2017), (Eapen, Baig, and Avinash 2017), (Menon et al. 2018), (Wahab et al. 2018), (Vishnu Prasad et al. 2018), (Uthrakumar et al. 2010), (Ashok, Ajith, and Sivanesan 2017), (Prasanna Neelakantan et al. 2015).

Thus the main aim of the study was to find out the prevalence of dental class III malocclusion among permanent dentition population.

MATERIALS AND METHODS

This is a retrospective study that was conducted in a university hospital based setting. Patient records were collected after obtaining ethical approval from the Institutional Ethical committee of the University (Ethical approval number- SDC/ SIHEC/ 2020/ DIASDATA/ 0619-0320). The data were collected by analyzing the records of 86000 patients between June 2019-March 2020. Patients above 12 years age in their permanent dentition, with Class III molar relationship, with complete intraoral records including photographic records were included in the study. Patients with missing, deformed or grossly destroyed permanent first molars were excluded from the study. Patients with incomplete records were also excluded from the study. Intraoral records were cross verified with the intraoral photographic records. A total of 37756 case sheets were selected, reviewed and cross verified by two other reviewers.

The gender, molar relation, the type of Class III were recorded from all the included records. Patients with Class III molar relationships were further stratified into Class III and Class III subdivision if the molar relation on one side was Class III and another side was Class I.

Data of the gender, molar relation and type of malocclusion were tabulated in the excel sheet. Independent variables were age and gender while dependent variable was the molar relationship. The data was then transferred to SPSS (version 23) for doing statistical analysis. Descriptive statistics were done for the prevalence of class III and Chi square test was done to find the association between gender and type of class III malocclusion. The level of significance was kept at $p < 0.05$.

RESULTS AND DISCUSSION

Out of 37756 patients, 365 patients [0.96%] had class III malocclusion [Figure 1]. Among the 365 patients, 275 (75.34%) had class III malocclusion and 90 (24.66%) patients had class III sub-division. The prevalence of Class III was more predominant in males (66.30%) when compared to females (33.70%) [Figure 2]. Among the Class III patients, 75.34% had class III and 24.66% had class III subdivision. Among all class III malocclusion patients, 49.86% males and 25.48% females had Class III; and 16.44% of males and 8.22% females had class III subdivision. Chi square test showed no significant difference in the association of gender among patients with Class III malocclusion (p value = 0.993) [Figure 3].

In the present study, class III malocclusion was prevalent in only 0.96% of the study population. Maged Sultan Alhammadi et al, stated that in permanent dentition, the global distribution of class III was about 5.93%.((Gelgör, Karaman, and Ercan 2007; Baral 2015; Alhammadi et al. 2018) The current study was similar to a study done by Graber et al which states that the prevalence of class III malocclusion in the United States among all age groups was only about 1% of the total population.(Graber et al. 2016) A study by Chukuredi Ochi Onyeaso et al, shows prevalence of class III was 12% of adolescents among Nigerian population.(Onyeaso 2004) Another study done among Nigerian children aged 12-14 years reported a prevalence of 11.8%.(Mtaya, Brudvik, and Astrom 2009) A similar study by Ibrahim Ethan Gelgor et al, among adolescents of Central Anatolia shows a prevalence of 10.3%.(Gelgör, Karaman, and Ercan 2007). Our study showed a lower prevalence rate of class III malocclusion compared to the above studies.

The highest prevalence of 15.8 % has been observed in Southeast Asian populations in his study.(Ngan and Moon 2015) A study by Prakash Baral et al done in western Nepal shows that class III was prevalent in 8.2% Aryan and 15.6% Mongoloid races.(Gelgör, Karaman, and Ercan 2007; Baral 2015) In a study done among Asian men of age 17-22 years, it is seen that Chinese and Malaysian men showed relatively higher prevalence of angle class III malocclusion (15.69% and 16.59%, respectively). Whereas Indian men showed a relatively lower prevalence as compared to other races.((Ishii et al. 1987; Soh, Sandham, and Chan 2005) The incidence of class III malocclusion among adolescents of Kerala, South India was 8% which was higher than the current study.(Sundareswaran and Kizhakool 2019) A study done in Jaipur, India shows a prevalence of 1.4% among

the age group of 16-26 years which is similar to the prevalence seen in our study. (Sharma, Chugh, and Trehan 2009)

To summarise, the prevalence of Class III malocclusion in Indian population is less compared to other Asian countries which have higher prevalence. The prevalence of Class III malocclusion in our population was comparatively lesser than most of the previous studies done on various populations except the study done on american population and North Indian population.(Graber et al. 2016), (Sharma, Chugh, and Trehan 2009)

An attempt was made in this study to identify the prevalence of Class III malocclusion among patients in their permanent dentition who reported to our university dental hospital. However, this study was conducted in a limited geographic location with selective sampling. The future scope of the study is to conduct the study among a larger population not restricted only to the dental hospital setup and to include other malocclusions.

CONCLUSION

Class III malocclusion was less prevalent in (0.96%) our population. Class III malocclusion was more prevalent in males (66.30%) when compared to females (33.70%) but there was no significant association between the malocclusion and gender. Among the Class III patients, 75.34% had class III occlusion and 24.66% had class III subdivision.

Authors Contributions

First author (S.S.Shivanni) performed the analysis, and interpretation and wrote the manuscript. Second author (Dr.Arvind S) contributed to conception, data design, analysis, interpretation and critically revised the manuscript. Third author (Dr.Balakrishna.R.N) participated in the study and revised the manuscript. All the three authors have discussed the results and contributed to the final manuscript.

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Conflicts of Interest

There are no conflicts of interest.

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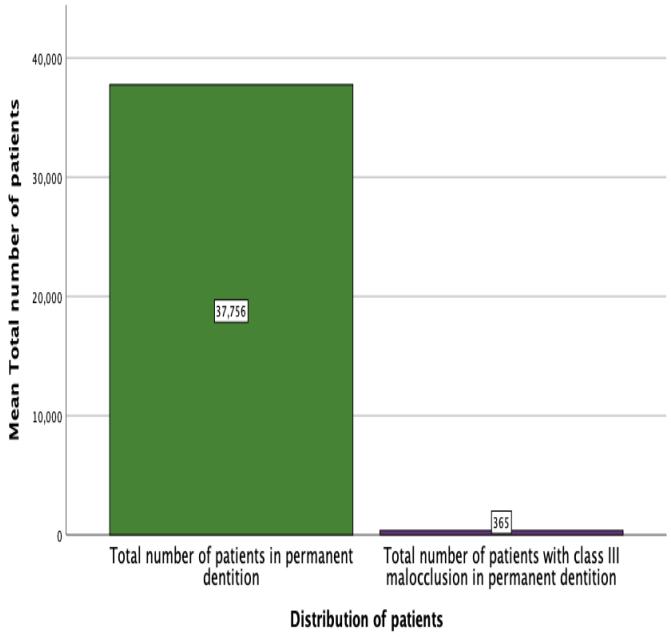

Fig.1: Bar graph represents total number of patients with permanent dentition and total number of class III patients with permanent dentition. X axis represents distribution of patients and Y axis represents total number of the patients. There were 37756 patients with permanent dentition (Green) out of which, 365 patients had class III malocclusion (Purple).

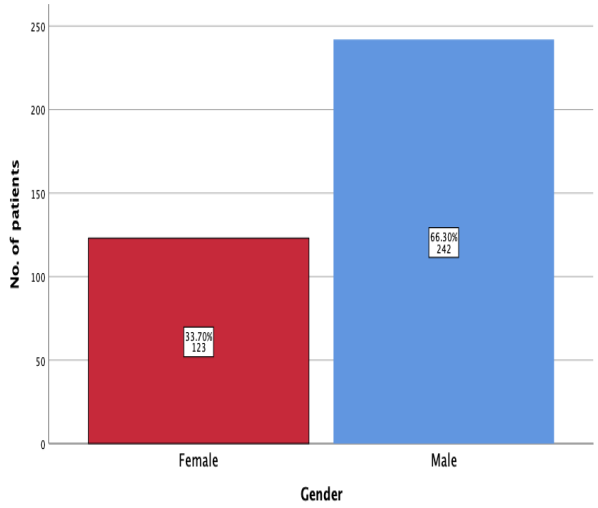

Fig.2: Bar chart represents gender distribution among permanent dentition patients with class III malocclusion. Out of 365 patients, 66.30% were males (Blue) and 33.70% were females (Red).

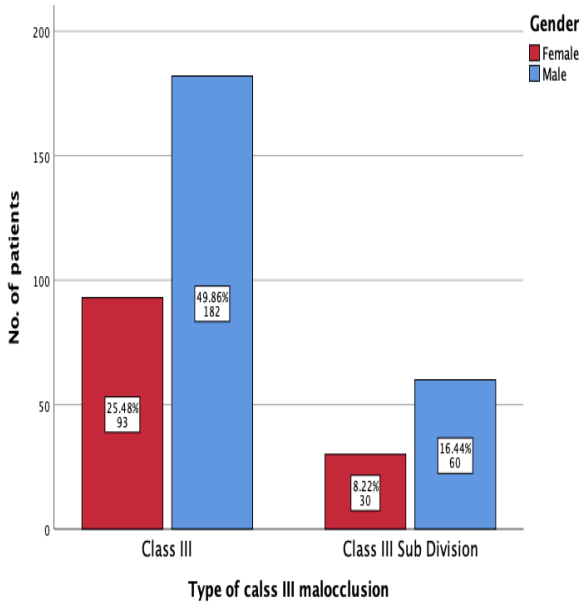

Fig.3: Bar graph represents the total number of patients with class III malocclusion in permanent dentition with 75.34% class III and 24.66% class III subdivision. X axis represents distribution of malocclusion based on type and Y axis represents number of cases based on gender. 49.86% males (blue) and 25.48% females (red) had Class III; while 16.44% of males (blue) and 8.22% females (red) had class III subdivision. Chi square test done between type of malocclusion and gender was found to be not significant with a P value of 0.933 (p>0.05).