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Prevalence of Class III Malocclusion in Known Population and Its Treatment with Myofunctional and Orthopaedic Appliances.

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KEYWORDS

Class III Malocclusion, Skeletal, Dental, Myofunctional appliances, Orthopaedic appliances.

ABSTRACT:

Background: This study was conducted to assess the prevalence of class III malocclusion in a known population and its treatment using myofunctional and orthopaedic appliances.

Material and methods: This study comprised of 100 participants who underwent oral clinical examination. The prevalence of malocclusion was assessed. The subjects were explained about the procedure and were asked for written consent. The subjects who were willing to participate in the study had been included in the study. Different myofunctional and orthopaedic appliances had been fabricated for the subjects with class III malocclusion. Statistical analysis was conducted using SPSS software.

Results: In this study, there were 100 subjects, of which, malocclusion was observed in 46 (46%) subjects. Among 46 subjects with class III malocclusion, 25 (54.3%) were male and 21 (45.6%) were females. For skeletal class III malocclusion, reverse pull headgear was given in 12 subjects and chin cup was given in 10 subjects. For dental class III malocclusion, reverse twin block appliance was given in 11 subjects, Frankel III appliance was given in 9 subjects and removable mandibular retractor was given in 4 subjects.

Conclusion: The prevalence of malocclusion in this study was 46%. Majority of the subjects were male. The skeletal malocclusion had been corrected with orthopaedic appliances like reverse pull headgear and chin cup while the dental class III malocclusion had been corrected with myofunctional appliances like removable mandibular retractor, Frankel III appliance and reverse twin block appliance.

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Introduction

The incidence of Class III malocclusion comprises a meagre amount of the average orthodontic practice, but these are among the most demanding and at the same time rewarding cases to treat effectively and comprehensively. In the bygone days, Class III malocclusions were believed to be solely due to the prognathic mandible.[1] Present knowledge of aetiology has revealed that it can occur due to maxillary retrognathism, mandibular prognathism, or a combination of both. Another possible aetiology can be due to a centric relation-centric occlusion shift leading to a mesial shift of the lower arch in the truancy of a true maxillomandibular skeletal discrepancy (pseudo-Class III).

Therefore, the treatment strategy must be devised considering a myriad of factors such as the growth status, age, the severity of the skeletal dysplasia, severity of dental malocclusion, and patient compliance. According to a systemic review and meta-analysis conducted by Daniel et al.[2], the average prevalence of Class III malocclusion in combined sample of all races is 7.04% with a range from 0 to 26.67%. Populations from Southeast Asian countries showed the highest Angle's Class III malocclusion prevalence rate of 15.80%.[3-5] The European studies had an average prevalence rate of 4.88%, and Indian populations had the lowest prevalence rate of 1.19 %.[6-8]

This study was conducted to assess the prevalence of class III malocclusion in a known population and its treatment.

Material and methods

This study comprised of 100 subjects who underwent oral clinical examination. The prevalence of malocclusion was assessed. The subjects were explained about the procedure and were asked for written consent. The subjects who were willing to participate in the study had been included in the study. Different myofunctional and orthopaedic appliances had been fabricated for the subjects with class III malocclusion. Statistical analysis was conducted using SPSS software.

Results

Table 1: Prevalence of malocclusion

Prevalence of malocclusion	Number of subjects	Percentage
Present	46	46
Absent	54	54
Total	100	100

In this study, there were 100 subjects, of which, malocclusion was observed in 46 (46%) subjects.

Table 2: Gender-wise distribution of subjects having class III malocclusion

Gender	Number of subjects	Percentage
Males	25	54.3
Females	21	45.6
Total	46	100

Among 46 subjects with class III malocclusion, 25 (54.3%) were male and 21 (45.6%) were females.

Table 3: Treatment of class III malocclusion

Type of malocclusion	Treatment	Number of subjects
Skeletal	Reverse pull headgear	12
	Chin cup	10
Dental	Reverse twin block appliance	11
	Frankel III appliance	09
	Removable mandibular retractor	04

For skeletal class III malocclusion, reverse pull headgear was given in 12 subjects and chin cup was given in 10 subjects. For dental class III malocclusion, reverse twin block appliance was given in 11 subjects, Frankel III appliance was given in 9 subjects and removable mandibular retractor was given in 4 subjects.

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Discussion

Due to increasing awareness regarding malocclusion and more concern about esthetic in the general population in present days, it is necessary for a dentist to have immense knowledge and skills about the diagnosis and treatment planning of the malocclusion to meet patient's expectations. Nowadays, the patient reports to a clinician at very early age for the correction of malocclusion. The prevalence rate of Class III malocclusion varies according to different racial categories. The mean incidence rate in Caucasians is 1%–4%,[9] with higher being found in Asians (4%–14%).[10]The etiology of Class III malocclusion is multifactorial. However, hereditary is the main etiological factor.

Other factors include environment, habits, and race. Class III malocclusion is mainly due to skeletal component, dentoalveolar component, and combination of both. Prognathic mandible, retrognathic maxilla, or combinations of both are the features of skeletal Class III malocclusion. Dentoalveolar component presents with retruded mandibular incisors and protruded maxillary incisors for dentoalveolar compensation.[11]

This study was conducted to assess the prevalence of class III malocclusion in a known population and its treatment.

In this study, there were 100 subjects, of which, malocclusion was observed in 46 (46%) subjects. Among 46 subjects with class III malocclusion, 25 (54.3%) were male and 21 (45.6%) were females. For skeletal class III malocclusion, reverse pull headgear was given in 12 subjects and chin cup was given in 10 subjects. For dental class III malocclusion, reverse twin block appliance was given in 11 subjects, Frankel III appliance was given in 9 subjects and removable mandibular retractor was given in 4 subjects.

Alogaibi YA et al (2020)[12] assessed the prevalence of malocclusion and orthodontic treatment needs in a Saudi sample of Jeddah city. A cross-sectional (descriptive) study was performed in 2017 among 3016 subjects (1507 females and 1509 males) selected according to stratified random sampling design. The inclusion criteria were Saudi students aged between 14-18 years with no craniofacial deformities or syndromes and no orthodontic treatment carried out. Malocclusion was assessed using the modified Bjork *et al.* system, and Angle's classification and orthodontic treatment need to be evaluated by using the IOTN (DHC). Descriptive, associations and gender differences were assessed by one-way ANOVA, Chi-square, and Fisher exact tests. Data was analyzed using STATA version 13.0 (StataCorp, College Station, Texas, USA). Statistical significance was set at $P < 0.05$. Approximately 12% of the participants had normal occlusion, 57% had Class I malocclusion, 17% had Class II malocclusion, and 14% had Class III malocclusion. The highest prevalence of malocclusion traits was for displacement, followed by a crossbite. The IOTN results revealed slight need for orthodontic treatment in (n = 795-26%) moderate/borderline in (n = 1166-39%), and great need in (n = 1055-35%). Class II and III malocclusion, OJ, reverse overjet, scissor bite, open bite, midline discrepancies, and crowding were significantly higher in males than females ($P < 0.05$). Overall, there was a high prevalence of malocclusion and high orthodontic treatment need. The most common malocclusion was Class I. The most common orthodontic treatment need was moderate to borderline.

Alyami D et al (2023)[13] determined the prevalence of malocclusions and the need for orthodontic treatment in a sample of school-going adolescents in the Najran city, Kingdom of Saudi Arabia (KSA). This cross-sectional study was conducted among 1094 school-going Saudi male adolescents. The age range of the sampled adolescents was 13–18 years, and none of them had any history of orthodontic treatment. A survey chart related to malocclusion was designed and filled up after clinical examination by a single experienced and calibrated examiner. The need for orthodontic treatment was assessed using the Index of Orthodontic Treatment Need (IOTN). The present study's findings demonstrated 61.2% of the samples with Angle's Class I malocclusions, 27.5% with Class II, and 11.4% of samples with Class III malocclusion. A significant difference was observed between the different classes of malocclusion ($P < 0.001$). Most samples presented normal overjet, crossbite, and no reverse overjet, deep bite, or open bite. The number of samples with no treatment need was 573 (52.37%), with slight treatment in 185 (16.91%) samples, moderate treatment needs in 123 (11.24%) samples, and severe and extreme treatment needs were 109 (9.96%) and 104 (9.50%), respectively. A significant difference

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was observed between the samples with no or slight treatment need (grades 1 and 2), moderate need (grade 3), and definite treatment need (grades 4 and 5) ($p < 0.001$). The prevalence of malocclusion and IOTNs among the sample of school-going adolescents in the Najran city was 47.63%. However, 9.63% of those samples required immediate attention for orthodontic treatment.

Conclusion

The prevalence of malocclusion in this study was 46%. Majority of the subjects were male. The skeletal malocclusion had been corrected with orthopaedic appliances like reverse pull headgear and chin cup while the dental class III malocclusion had been corrected with myofunctional appliances like removable mandibular retractor, Frankel III appliance and reverse twin block appliance.

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