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Prevalence of class III malocclusion and irreversible pulpitis in a known population and its treatment

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Abstract

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

Material and methods: This study was conducted to assess the prevalence of class III malocclusion and irreversible pulpitis. This study comprised of 123 participants. The subjects had been explained about the procedure and were asked to give consent. 23 out of 100 subjects refused to provide consent and hence they had been excluded from the study. overall, 100 subjects had been included in the study. All the participants underwent oral clinical examination. The prevalence of class III malocclusion and irreversible pulpitis had been assessed. The findings were tabulated. For the subjects with class III malocclusion, various appliances had been fabricated for treatment, while amongst those with irreversible pulpitis, root canal treatment had been planned. Statistical analysis was conducted using SPSS software.

Results: In this study, there were total 100 subjects of which, 56 were male and 44 were female. The prevalence of class III malocclusion was 26%. The prevalence of irreversible pulpitis was 39%. For the treatment of class III malocclusion, Frankel III appliance was given in 13 subjects, chin cup was provided to 8 patients and reverse pull headgear was fabricated for 5 individuals. For the management of irreversible pulpitis, root canal treatment was done in all the subjects.

Conclusion: The prevalence of class III malocclusion and irreversible pulpitis in this study was 26% and 39%, respectively. For the treatment of class III malocclusion, appliances like reverse pull headgear, chin cup and Frankel III appliance were given. The subjects with irreversible pulpitis were scheduled for root canal treatment.

Keywords: Root canal treatment, Class III malocclusion, Treatment, Prevalence

Introduction

The father of modern orthodontics, Edward Hartley Angle, in 1899 classified malocclusions in Class I, Class II, and Class III based on permanent first maxillary and mandibular molars relationship and alignment (or lack of it) of teeth with reference to the line of occlusion.¹ Gradually, Angle's classification was modified and additional information such as jaw relationship and the pattern of growth were also included. Thus, a Class III jaw relationship suggests that the mandible has acquired a more mesial position in relation to the maxilla and/or cranial base.^{2,3} Occasionally, due to dental compensation, sometimes there is Class I dental relationship on the Class III skeletal base.

Further, Charles Henry Tweed classified Class III malocclusions as a pseudo Class III malocclusion with normal mandible and underdevelopment of maxilla (category A) and skeletal Class III malocclusion with prognathic mandible or an underdevelopment of maxilla (category B).⁴

Dental caries is one of the most prevalent diseases with a reported global estimate of 29.4% affecting more than 2.3 billion people worldwide.^{5,6} It can progress to involve the pulp where a part of it may become incapable of self-repair thus, resulting in irreversible pulpitis.⁷ The diagnosis, however, may not reflect the actual histological status of the pulp as it is assumed based on clinical symptoms and crude diagnostic tools.⁸ Conventionally, irreversible pulpitis has been treated with pulpectomy as it is a predictable approach.^{9,10}

Evidence-based histological studies have shown that in teeth with irreversible pulpitis, the microbial invasion is limited to just the coronal portion with the absence of inflammation in the radicular pulp.¹¹

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

Material and methods

This study was conducted to assess the prevalence of class III malocclusion and irreversible pulpitis. This study comprised of 123 participants. The subjects had been explained about the procedure and were asked to give consent. 23 out of 100 subjects refused to provide consent and hence they had been excluded from the study. overall, 100 subjects had been included in the study. All the participants underwent oral clinical examination. The prevalence of class III malocclusion and irreversible pulpitis had been assessed. The findings were tabulated. For the

subjects with class III malocclusion, various appliances had been fabricated for treatment, while amongst those with irreversible pulpitis, root canal treatment had been planned. Statistical analysis was conducted using SPSS software.

Results

Table 1: Gender-wise distribution of subjects

Gender	Number of subjects	Percentage
Male	56	56
Female	44	44
Total	100	100

In this study, there were total 100 subjects of which, 56 were male and 44 were female.

Table 2: Prevalence of class III malocclusion

Prevalence	Class III malocclusion	Percentage
Present	26	26
Absent	74	74
Total	100	100

The prevalence of class III malocclusion was 26%.

Table 3: Prevalence of irreversible pulpitis

Prevalence	Irreversible pulpitis	Percentage
Present	39	39
Absent	61	61
Total	100	100

The prevalence of irreversible pulpitis was 39%.

Table 4: Treatment of class III malocclusion

Treatment	Number of subjects	Percentage
Frankel III appliance	13	50.0
Chin cup	08	30.7
Reverse pull headgear	05	19.3

Total	26	100
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For the treatment of class III malocclusion, Frankel III appliance was given in 13 subjects, chin cup was provided to 8 patients and reverse pull headgear was fabricated for 5 individuals.

For the management of irreversible pulpitis, root canal treatment was done in all the subjects.

Discussion

In the traditional concept, when pulp inflammation reaches a certain degree, it is diagnosed as irreversible pulpitis, and root canal therapy (RCT) is generally performed to remove pulp tissue completely. However, RCT could cause losses in vascularity and eventually make the tooth more prone to fracture.¹² Although RCT was the standard of care, the long-term preservation rate of offending teeth after RCT was significantly lower than that of vital teeth, and this phenomenon was particularly significant in molars.¹³ This could be because vital teeth with more soft and hard tissues have a stronger resistance to occlusal forces within the physiological range.¹⁴ In order to retain more soft and hard tissues compared to RCT, vital pulp therapy (VPT) is considered a promising personalized treatment for irreversible pulpitis by removing a certain amount of pulp, according to pulpal status. VPT conforms to the trend of minimally invasive endodontics. The remaining vital pulp could promote the physiological development of the roots of young permanent teeth with incomplete apical foramen.^{15,16}

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

In this study, there were total 100 subjects of which, 56 were male and 44 were female. The prevalence of class III malocclusion was 26%. The prevalence of irreversible pulpitis was 39%. For the treatment of class III malocclusion, Frankel III appliance was given in 13 subjects, chin cup was provided to 8 patients and reverse pull headgear was fabricated for 5 individuals. For the management of irreversible pulpitis, root canal treatment was done in all the subjects.

Perez AS et al¹⁷ estimated the prevalence of pulp and periapical pathologies and their distribution according to sex, age, affected teeth, and etiological factors found in patients the DEPeI, FO, UNAM Endodontic Postgraduate Program during the period 2014–2019. The data collected were from the records of the Single Clinical File of patients treated at the Endodontic Specialization Clinic, DEPeI, FO, UNAM, period 2014–2019. The following

variables were recorded for each endodontic file: diagnosed pulp and periapical pathology, sex, age, affected tooth, and etiological factor. Descriptive statistical analysis was performed with 95% CI (Confidence intervals). Of all the registers reviewed, irreversible pulpitis (34.58%) and chronic apical periodontitis (34.89%) proved to be the most prevalent pulp and periapical pathologies, respectively. The female sex predominated (65.36%). The age group that requested the most endodontic treatment, according to the records reviewed, was 60 or older (36.99%). The most treated teeth were the upper first molars (24.15%) and lower (36.71%), and the most prevalent etiological factor was dental caries (84.07%). Irreversible pulpitis and chronic apical periodontitis were the most prevalent pathologies. The predominant sex was female, and the age group was 60 years or older. The first upper and lower molars were the most endodontically treated teeth. The most prevalent etiological factor was dental caries.

Alogaibi YA et al¹⁸ 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.

Conclusion

The prevalence of class III malocclusion and irreversible pulpitis in this study was 26% and 39%, respectively. For the treatment of class III malocclusion, appliances like reverse pull headgear, chin cup and Frankel III appliance were given. The subjects with irreversible pulpitis were scheduled for root canal treatment.

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