

Original Research

Prevalence and treatment of malocclusion with myofunctional appliances, dental caries, partial edentulism and periodontitis in children of a known population.

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Abstract

Background: This study was conducted to assess the prevalence of malocclusion with myofunctional appliances, dental caries, partial edentulism and periodontitis in children of a known population.

Material and methods: In this study, 100 children aged from 11-20 years were included. Full mouth examination of all the participants was carried out. Informed consent was recorded from these participants before starting the procedure. The mean age of the children was 15.7 years. Statistical analysis was conducted using SPSS software. It was found that 10 children had class 2 malocclusion; hence for them, twin block appliance and jasper jumper appliance were fabricated.

Results: It was found that out of 100 participants, 35 had dental caries, 30 had periodontitis, 25 had partial edentulism and 10 had class 2 malocclusion. The subjects having dental caries underwent root canal treatment followed by composite filling and crown. The subjects having periodontitis got scaling done followed by root planning. They were advised to rinse their mouth with warm salty water 2-3 times a day. The subjects who had few of their teeth missing got fixed partial dentures. And in the subjects having class 2 malocclusion, twin block appliance was given in 6 subjects and in the remaining 4 subjects, jasper jumper was given.

Conclusion: In the present study, dental caries was the most prevalent among the children followed by periodontitis, partial edentulism and class 2 malocclusion, respectively. Root canal treatment was performed to treat dental caries followed by composite filling and crown placement. Scaling and root planning was done in subjects having periodontitis. FPDs were planned for those having missing teeth. Twin block appliance and Jasper Jumper appliances were used in children to treat class 2 malocclusion.

Keywords: dental caries, RCT, periodontitis, scaling, FPD, twin block, jasper jumper, prevalence, treatment.

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Introduction

Malocclusion is defined as any mal-relationship of dental arches with or without an irregularity of the teeth.¹ Malocclusion is considered as a developmental disorder and a public dental health problem having high prevalence and treatment needs.² Altered oral functions like mastication, speech, swallowing, etc may lead to oro-facial adaptability which may result in malocclusion. This ultimately disturbs the

individual's social wellbeing.³ In most of these studies, Angle's classification has been widely used as a qualitative epidemiological tool.^{1,2,3} Several studies on the prevalence of occlusal traits in different populations have been reported in the orthodontic literature and such a study on an isolated human population can provide valuable information about the causes of malocclusion.⁴

Management of dental caries has changed significantly in recent years.⁵⁻⁷ The most contemporary practical approaches are based on early caries detection and prevention. They are also built on making a diagnosis based on risk indicators and risk factor assessment.⁸

Periodontitis is one of the most common ailments affecting the teeth, leading to the destruction of the supporting and surrounding tooth structure.⁹ The term "periodontitis" is build up of two words, i.e., "periodont-" meaning "structure surrounding the teeth" and "itis" means "inflammation." Periodontitis is originally a disease originating from the gingival tissue which if left untreated results in penetration of inflammation to the deeper tissues, altering the bone homeostasis causing tooth loss.⁹ Periodontal disease has a multifactorial origin.¹⁰

Edentulism or complete tooth loss is prevalent worldwide among older people. Earlier studies have

shown that edentulism affects the health and the overall quality of life of the elderly.¹¹

Hence, this study was conducted to assess the prevalence of malocclusion with myofunctional appliances, dental caries, partial edentulism and periodontitis in children of a known population.

Material and methods

In this study, 100 children aged from 11-20 years were included. Full mouth examination of all the participants was carried out. Informed consent was recorded from these participants before starting the procedure. The mean age of the children was 15.7 years. Statistical analysis was conducted using SPSS software. It was found that 10 children had class 2 malocclusion; hence for them, twin block appliance and jasper jumper appliance were fabricated.

Results

Table 1: prevalence of various dental anomalies.

Dental anomalies	Number of subjects	Percentage
Dental caries	35	35%
Periodontitis	30	30%
Partial edentulism	25	25%
Class 2 malocclusion	10	10%
Total	100	100%

It was found that out of 100 participants, 35 had dental caries, 30 had periodontitis, 25 had partial edentulism and 10 had class 2 malocclusion.

Table 2: treatment of the dental anomalies.

Dental anomalies	Treatment
Dental caries	Root canal treatment followed by composite filling and crown.
Periodontitis	Scaling and root planning
Partial edentulism	Fixed partial dentures
Class 2 malocclusion	Twin block appliance

The subjects having dental caries underwent root canal treatment followed by composite filling and crown. The subjects having periodontitis got scaling done followed by root planning. They were advised to rinse their mouth with warm salty water 2-3 times a day. The subjects who had few of their teeth missing got fixed partial dentures. And in the subjects having class 2 malocclusion, twin block appliance was given in 6 subjects and in the remaining 4 subjects, jasper jumper was given.

Discussion

The World Health Organization, in 1987, defined malocclusion under the heading handicapping dentofacial anomaly, as "an anomaly which causes disfigurement or which impedes function, and requires treatment if the disfigurement or functional defect was likely to be an obstacle to the patient's physical or emotional well-being".¹¹ Angle defines malocclusion as "any deviation from the normal occlusion of teeth".¹² Often mistaken for a disease, malocclusion is a developmental condition that has a

profound impact on the self-esteem and social acceptance of an individual. The need for early detection and treatment of malocclusion is highlighted by its role in the development of periodontitis, dental caries, temporo-mandibular disorders and trauma. Moreover, malocclusion adversely affects oral functions like mastication, swallowing and speech.¹³ Root canal, or endodontic treatment, is a procedure in which an inflamed or infected pulp is removed, and the inside of the tooth is cleaned, disinfected, then filled and sealed with a restorative material. The procedure has a high success rate, although persistence of symptoms or infection recurrence can occur in 10% to 15% of cases.¹⁴ Tooth survival over two to 10 years following initial root canal treatment was shown in a systematic review to range between 86% and 93%.¹⁵ Class II malocclusions are most commonly seen in orthodontic practice; they may be either skeletal or dental, presenting with different clinical manifestations. Globally, an approximate estimation shows over 20% prevalence of Class II malocclusion in North America, Europe and North

Africa.¹⁶ In 1981, McNamara study found that 60% of the Class II malocclusion occurred in children having retrognathic mandible.¹⁷ The goal of the present-day orthodontic treatment is to attain optimal facial esthetics in addition to normal dental occlusion. This is achievable only if the underlying jaw bases are in harmony with each other. Functional appliances have been in use from many years; several varieties of removable functional appliances like Activator, Bionator, Frankel, and Twin Block are used for the correction of Class II malocclusions.¹⁸ The primary objective of using these functional appliances is to modify or redirect mandibular growth to correct a skeletal discrepancy.¹⁹ Hence, this study was conducted to assess the prevalence of malocclusion with myofunctional appliances, dental caries, partial edentulism and periodontitis in children of a known population.

In this study, it was found that out of 100 participants, 35 had dental caries, 30 had periodontitis, 25 had partial edentulism and 10 had class 2 malocclusion. The subjects having dental caries underwent root canal treatment followed by composite filling and crown. The subjects having periodontitis got scaling done followed by root planning. They were advised to rinse their mouth with warm salty water 2-3 times a day. The subjects who had few of their teeth missing got fixed partial dentures. And in the subjects having class 2 malocclusion, twin block appliance was given in 6 subjects and in the remaining 4 subjects, jasper jumper was given.

Khan MI et al¹⁶ evaluated the dentoskeletal effects produced by the Twin Block appliance for the correction of Class II division 1 malocclusion with retrognathic mandible. Pre-treatment (T1) and post-treatment (T2) lateral cephalograms of 30 patients treated with Twin Block appliance (mean age = 10.8 ± 1.2 years) for the correction of class II division 1 malocclusion were compared with the 30 untreated class II control patients (mean age 11.2 ± 0.8 years) who did not undergo any treatment during this period. Both the groups were evaluated for the dentoskeletal changes using 24 angular and linear cephalometric measurements. The differences between the pre and post-treatment were calculated using a paired t-test. The cephalometric analysis revealed that the Twin Block appliance stimulated mandibular growth and statistically significant differences were found between the two groups. Twin Block patients showed a statistically very high significant ($p < 0.001$) increase in mandibular length (6.02 mm) compared with the control group (0.3 mm). "Headgear effect" on the maxilla, increase in lower anterior facial height, significant reduction of overjet, overbite and Class I molar relationship were achieved in the Twin Block group. However, no significant changes appeared in the control group. The results of the present study concluded that the Twin Block appliance is effective in the treatment of Class II malocclusion and this is

due to a combination of skeletal and dentoalveolar changes in both the arches.

Youssefi MA et al¹⁷ assessed the prevalence and associated factors of dental caries in primary schoolchildren in Yasuj township, Iran. In this cross-sectional study, a total of 460 children aged 7–12 years were investigated. Dental examination was performed at school according to the World Health Organization criteria. Sociodemographic data were collected using a structured questionnaire, and caries statuses of children's teeth were recorded through a dental chart. Data were analyzed using summary statistics, chi-square test, and logistic regression model with odds ratio. The prevalence of dental caries in primary, permanent, and whole dentition among children was 75.3%, 41.1%, and 89.8%, respectively. Among all considered factors, the caries presence in primary teeth was inversely ($p < 0.001$) and in permanent teeth was positively ($p < 0.001$) associated with the children's age. Moreover, the odds of decaying permanent teeth were significantly higher in girls, in rural children, and in children whose fathers were not an employee compared to their counterparts ($p=0.04$, $p < 0.001$, and $p=0.02$, respectively). The prevalence of dental caries among the studied primary schoolchildren in mixed dentition was high and associated with their sociodemographic factors. Providing and implementing preventive, therapeutic, and informative programs for controlling dental caries at individual, family, and school levels are necessary for local health policymakers.

AlGhamdi A et al¹⁸ determined the prevalence of periodontitis in high school children in Saudi Arabia. Periodontal examinations were conducted on a randomized sample of high school children between the ages 15 to 19 in Saudi Arabia. The study spanned from September 2012 to January 2016. Clinical examinations included measurements of the probing depth (PD) percentage of PD ≥ 4 mm per patient. The prevalence of periodontitis (PD ≥ 4 mm and CAL ≥ 1 mm), the mean percentage PD ≥ 4 mm, the mean percentage CAL ≥ 1 mm, plaque index (PI) and gingival index (GI). Of 2435 high school children in the sample, 209 students (8.6%) had periodontitis. The mean (standard deviation) for the PD was 0.59 (0.17) mm. Differences in percentage PD ≥ 4 mm and CAL ≥ 1 mm were greater in students with periodontitis ($P < 0.001$). The prevalence of periodontitis was higher among non-Saudis, students who did not brush their teeth and did not visit their dentist regularly. In the bivariate analysis, periodontitis was positively associated with GI, PI, number of teeth extracted, mean percentage PD ≥ 4 mm, and mean PD. However, in the multivariate analysis, tooth brushing was the main factor protective against periodontitis (odds ratio: 0.62, 95% CI 0.42-0.92, $P=0.017$). Periodontitis prevalence was high compared with Western countries in a nationally representative sample of high school students in Saudi Arabia.

Conclusion

In the present study, dental caries was the most prevalent among the children followed by periodontitis, partial edentulism and class 2 malocclusion, respectively. Root canal treatment was performed to treat dental caries followed by composite filling and crown placement. Scaling and root planning was done in subjects having periodontitis. FPDs were planned for those having missing teeth. Twin block appliance and Jasper Jumper appliances were used in children to treat class 2 malocclusion.

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