

COMPARATIVE ANALYSIS OF ORAL HYGIENE IN CHILDREN WITH FIXED ORTHODONTIC TECHNIQUE AND HEALTHY CONTROLS

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ABSTRACT

Introduction: Numerous studies show that, in addition to individual hygiene habits, children's oral hygiene depends on several other factors over which they have no effect, such as treatment with fixed orthodontic technique.

Aim: The aim of the present study is to make a comparative analysis of oral hygiene in children aged 12 to 18 years treated with fixed orthodontic technique and healthy controls.

Materials and Methods: A total of 82 children were included. Of them, 41 were treated with fixed orthodontic technique (braces)—clinical group, and 41 were healthy controls, who have passed through the dental office in University Medical Dental Center—Varna. The oral hygiene of children in the clinical group was measured by the OPI index, and that of healthy controls by OHI. The results were statistically processed with SPSS v.20.0 using variance, variation, comparative and correlation analyses. For significance level we assumed $p < 0.05$.

Results: According to the indices for assessment of oral hygiene in the clinical and control groups, it was found that there was a significant difference between the values of the two indices ($p < 0.01$), as children from the clinical group were characterized by poorer oral hygiene. Poor oral hygiene correlated with male gender and earlier age, as well as lack of co-operation during treatment.

Conclusion: From the obtained results it can be concluded that regardless of the treatment with fixed orthodontic technique, good oral hygiene can be maintained with the cooperation of the patient. Male gender and earlier age, when children do not yet have the necessary skills for plaque control, can be considered risk factors. Moreover, one of the tasks of orthodontists is to raise the awareness of patients and their parents about the methods of maintaining good oral hygiene during fixed orthodontic treatment to prevent the appearance of white carious lesions.

Keywords: oral hygiene, fixed orthodontic technique, comparative analysis, cooperation

INTRODUCTION

Orthodontic treatment has many recognized benefits for improving the aesthetics, function and self-esteem of patients. Treatment with a fixed orthodontic technique can cause unwanted complications such as enamel demineralization, dental caries, and gingivitis. Some studies have found that orthodontic treatment can lead to increased demineralization or white carious lesions on the vestibular surfaces of the teeth (3). Excessive plaque retention during fixed orthodontic treatment is the main reason for the appearance and progression of white lesions (2). The lack of pre-treatment of the dentition and poor oral

hygiene during orthodontic treatment are associated with the higher frequency and severity of white carious lesions (4). On the other hand, plaque retention can lead to increased development of hyperplastic gingivitis and periodontal lysis (13). Oral hygiene can vary in children within the same age group and depends on many factors, the most important of which are hygiene habits (11,12).

The most common areas for the development of dental caries are those in which it is difficult to maintain hygiene. Such sites include areas where food debris and dental plaque can easily accumulate, even when the patient has proper occlusion. Proper oral hygiene is hampered by pathological changes occur-

ring in the mucosa, hypertrophy of the interdental papilla, the appearance of periodontal pockets, dental caries, poorly formed obturations and improper occlusion, as well as wearing orthodontic appliances (9,11).

AIM

The aim of the present study is to make a comparative analysis of oral hygiene in children aged 12 to 18 years treated with fixed orthodontic technique and healthy controls.

MATERIALS AND METHODS

A total of 82 children were included. Of them, 41 were treated with fixed orthodontic technique (braces)—clinical group, and 41 were healthy controls, who have passed through the dental office in the University Medical Dental Center—Varna. The oral hygiene of children in the clinical group was measured by the OPI index, and that of healthy controls by OHI. The results were statistically processed with SPSS v.20.0 using variance, variation, comparative and correlation analyses. For significance level we assumed $p < 0.05$.

RESULTS

The mean age of the included children was 14.7 years ± 2.0 years, with a minimum of 12 years and a maximum of 18 years, with a gender distribution of 54 (65.9%) girls and 28 (34.1%) boys, who are evenly distributed in the two study groups.

The mean value of the OPI index in children of the clinical group was 1.91 ± 1.35 (0–4). The analysis of oral hygiene in children with fixed orthodontic technique did not reveal a significant difference between boys and girls, but such was found in the maintenance of oral hygiene in girls in different age groups ($p < 0.01$) and found a strong inverse relationship ($r = -0.519$; $p = 0.006$), which shows that oral hygiene improves with age.

In healthy controls, the mean value of OHI was 1.22 ± 0.75 (0–3), and no significant difference was found in the maintenance of oral hygiene by gen-

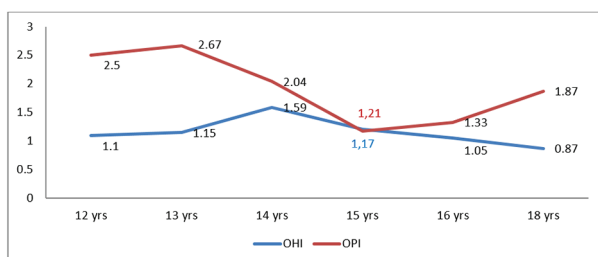


Fig. 1. OHI and OPI by age group

der. An interesting point is that there is an increase in OHI to a peak value (1.59) at 14 years, after which the value of the index decreases to 0.87 at 18 years (Fig. 1).

According to the indices for assessment of oral hygiene in the clinical and control groups, it was found that there was a significant difference between the values of the two indices ($p < 0.01$), as children from the clinical group were characterized by poorer oral hygiene.

Although no significant difference in oral hygiene was found between the clinical and control groups, it could be said that in 36.6% of the children in the clinical group the oral hygiene was good, while in 41.5% of the children in the control group satisfactory oral hygiene was observed.

The better results in the children of the clinical group were mainly due to their cooperation during orthodontic treatment ($p = 0.035$), and a moderate relationship was found between cooperation during treatment and oral hygiene ($r = 0.319$; $p = 0.042$) (Fig. 2).



Fig. 2. Relationship between cooperation during treatment and oral hygiene

On the other hand, this dependence was most evident in boys with orthodontic treatment, where in all those who did not cooperate during the treatment process, the oral hygiene was poor (100%), while in 36.4% of those who cooperated it was good and in 45.5% it was satisfactory. In boys, cooperation strongly correlated with oral hygiene ($r = 0.618$; $p = 0.019$) (Fig. 3).

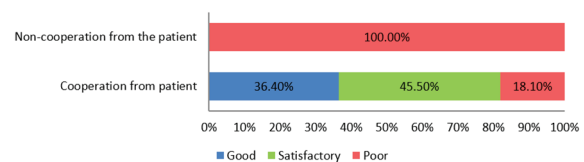


Fig. 3. Relationship between cooperation during treatment by boys and oral hygiene

DISCUSSION

The main goal of orthodontic treatment is to improve the occlusion and alignment of the teeth, which ultimately leads to good functioning of the dentition (6,7). Orthodontic treatment helps patients to im-

prove the aesthetics of their teeth and face (8), which also leads to increased self-esteem (5).

Although orthodontic treatment with a fixed technique offers many different benefits to the patient, fixed orthodontic appliances can easily retain food, which contributes to plaque formation. If plaque is not carefully removed from teeth and braces, patients are at risk of developing gingivitis, dental caries, and oral discomfort (10). There is a direct relationship between oral health and the incidence of caries in orthodontic patients (1). Therefore, an active prevention program should be part of orthodontic treatment to counteract adverse factors. This study was conducted to analyze and compare the oral hygiene of children with fixed orthodontic appliances and healthy controls. The results of the present study showed that healthy controls had better oral hygiene compared to the clinical group. This was primarily due to the lack of iatrogenic plaque-retentive factors—braces, arches, ligatures, and others. From the point of view of maintaining oral hygiene, it could be said that girls had better results, while in boys there was correlation between gender and poor oral hygiene.

In patients treated with a fixed orthodontic technique, the patient's cooperation during treatment is essential for maintaining good oral hygiene and preventing the development of white carious lesions. The results show that the lack of cooperation is associated with poor oral hygiene, but the creation of appropriate hygiene habits and cooperation of the patient lead to good oral hygiene, regardless of the predisposing factors for plaque retention.

Compared to healthy controls, children who are cooperative during their treatment have better results in oral hygiene.

CONCLUSION

From the obtained results it can be said that regardless of the treatment with fixed orthodontic technique, good oral hygiene can be maintained with the cooperation of the patient. Male gender and earlier age, when children do not yet have the necessary skills for plaque control, can be considered risk factors. Moreover, one of the tasks of orthodontists is to raise the awareness of patients and their parents about the methods of maintaining good oral hygiene during fixed orthodontic treatment to prevent the appearance of white carious lesions.

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