

**ASSESSMENT OF ORAL HYGIENE STATUS AND RISK OF CARIES
DEVELOPMENT IN ORTHODONTIC PATIENTS**

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Abstract. *Orthodontic treatment plays an important role in the correction of dental and jaw abnormalities, improvement of occlusion, and restoration of functional and aesthetic characteristics of the dentofacial system. However, the presence of orthodontic appliances creates additional conditions for the accumulation of dental plaque and changes in the oral environment, which may increase the risk of caries development. This scientific thesis evaluates the relationship between oral hygiene status and the probability of caries formation among orthodontic patients. The study emphasizes the importance of regular monitoring of oral hygiene indicators, individual preventive strategies, and professional dental care during orthodontic treatment. Fixed orthodontic appliances, especially brackets and arch wires, create retention areas that complicate mechanical tooth cleaning. As a result, microbial biofilm accumulation increases around orthodontic components, leading to enamel demineralization and the appearance of initial carious lesions. The assessment of oral hygiene status using clinical indicators allows early identification of patients with increased risk and contributes to effective preventive measures. The analysis of scientific literature demonstrates that oral hygiene education, professional cleaning procedures, dietary recommendations, and continuous motivation of patients significantly reduce the occurrence of caries complications during orthodontic therapy. Therefore, maintaining optimal oral hygiene should be considered an essential component of successful orthodontic treatment.*

Keywords: *orthodontic treatment, oral hygiene, dental plaque, caries risk, enamel demineralization, preventive dentistry, fixed appliances*

INTRODUCTION

Orthodontic treatment is widely used in modern dentistry for correcting malocclusion, improving facial harmony, and restoring normal function of the masticatory system. The increasing demand for orthodontic therapy has resulted in a growing number of patients wearing fixed and removable orthodontic appliances. Although orthodontic procedures provide significant clinical benefits, they may also influence the ecological balance of the oral cavity.



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One of the main complications associated with orthodontic appliances is the deterioration of oral hygiene. Brackets, ligatures, and orthodontic wires create complex surfaces where food particles and microorganisms can accumulate. These areas are difficult to access during routine brushing, which increases the amount of dental plaque and promotes the development of caries lesions. Dental plaque contains cariogenic microorganisms that produce acids capable of damaging tooth enamel. According to Fejerskov and Nyvad, the development of caries is a multifactorial process influenced by microbial activity, dietary factors, and the resistance of dental tissues [Fejerskov, 2015, p. 24].

During orthodontic treatment, patients often experience changes in saliva composition, oral microbial balance, and enamel mineralization processes. These changes may accelerate the progression from early enamel alterations to clinically visible carious lesions. Therefore, evaluating the oral hygiene condition of orthodontic patients is necessary for preventing unwanted complications.

Main Part

The oral hygiene condition of orthodontic patients depends on several factors, including the type of orthodontic appliance, duration of treatment, individual cleaning habits, dietary behavior, and motivation level. Fixed appliances are considered one of the main risk factors because they increase the number of plaque retention areas on tooth surfaces. The accumulation of plaque around brackets and cervical regions of teeth contributes to the formation of white spot lesions, which represent the earliest visible manifestation of enamel demineralization.

Assessment of oral hygiene status is usually based on clinical examination of dental plaque accumulation and gingival condition. Regular evaluation allows orthodontists to identify patients who require additional preventive interventions. Patients with insufficient hygiene frequently demonstrate increased plaque accumulation around orthodontic structures, accompanied by inflammatory changes in gingival tissues.

The development of caries during orthodontic treatment is closely associated with bacterial metabolism. Cariogenic microorganisms located in dental plaque utilize fermentable carbohydrates and produce organic acids. Continuous acid exposure decreases the mineral content of enamel and creates a favorable environment for lesion formation. According to Pitts and colleagues, early detection of caries risk is essential because preventive interventions are more effective before irreversible tissue destruction occurs [Pitts, 2017, p. 52].

Orthodontic patients require special oral hygiene techniques because conventional brushing methods may not effectively remove plaque around brackets. The use of specialized orthodontic toothbrushes, interdental cleaning devices, and fluoride-containing products improves plaque control. Fluoride plays an important role in strengthening enamel resistance and reducing mineral loss during orthodontic therapy.

Patient education is another critical factor influencing treatment outcomes. Many orthodontic patients, especially adolescents, have insufficient awareness of the relationship between hygiene practices and caries development. Regular instructions

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from dental professionals improve patient cooperation and encourage long-term preventive behavior. Oral hygiene motivation should be provided throughout the entire orthodontic treatment period rather than only at the initial appointment.

Dietary habits also contribute significantly to caries risk. Frequent consumption of sugary foods and beverages increases the availability of carbohydrates for cariogenic bacteria. Therefore, orthodontic patients should receive recommendations regarding balanced nutrition and limitation of cariogenic dietary factors.

Professional dental cleaning procedures are recommended for orthodontic patients with increased plaque accumulation. These procedures help remove deposits that cannot be eliminated through daily hygiene practices. Professional prevention combined with home care provides better control of the oral environment.

Modern orthodontic practice requires an integrated approach that combines tooth movement correction with prevention of dental diseases. According to Proffit and colleagues, successful orthodontic treatment depends not only on mechanical correction but also on maintaining the health of dental and periodontal tissues throughout therapy [Proffit, 2019, p. 286].

The risk of caries development is influenced by the duration of appliance wearing. Longer treatment periods increase the time during which teeth are exposed to plaque accumulation around orthodontic components. Therefore, continuous monitoring of hygiene indicators is necessary during all stages of orthodontic treatment.

Preventive programs for orthodontic patients should include assessment of individual caries risk, professional consultations, hygiene instruction, and periodic clinical examinations. Such strategies reduce the possibility of enamel damage and improve the long-term stability of orthodontic results.

The relationship between oral hygiene and orthodontic success is especially important because caries lesions developed during treatment can negatively affect aesthetic outcomes and patient satisfaction. Therefore, maintaining proper hygiene is not only a preventive measure but also an important component of comprehensive orthodontic care.

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