

MEDICAL SCIENCES

SPECIFICS OF HYGIENE DURING ORTHODONTIC TREATMENT OF PATIENTS WITH PERIODONTAL PATHOLOGY

Mehmani I.

Doctor of Philosophy in Medical assistant

Department of Orthodontics

Feyzullayev E.

Department of Orthopedic Dentistry Assistant

Kalbiyeva N.

Department of Pediatry Dentistry Assistant

Azerbaijan Medical University

Baku, Azerbaijan

<https://doi.org/10.5281/zenodo.13863095>

Abstract

Numerous studies conducted in our country and abroad indicate that oral hygiene is of great importance in the prevention of dental caries and periodontal disease, especially in patients with periodontal disease undergoing orthodontic treatment. It is known that orthodontic equipment prevents complete teeth cleaning, as it creates additional retention points to retain dental plaque [2, 3].

Keywords: oral hygiene, periodontal diseases, retention points, dental plaque.

Inadequate oral hygiene leads to deterioration of periodontal health, which leads to loss of gingival attachment at the tooth site. In addition, regular supportive personal oral hygiene is the best guarantee of healthy teeth and periodontal tissues [1]. The presence of orthodontic structures in the oral cavity significantly increases the prevalence and intensity of periodontal diseases and dental caries [2]. After fixation of the orthodontic apparatus, the hygienic condition of the oral cavity deteriorates due to the retention features of orthodontic structures. The accumulation of dental plaque leads to a powerful bacterial effect in the oral cavity, which leads to functional and morphological changes in the dental system and a decrease in the factors of nonspecific antibacterial defense of the body [4]. Orthodontic treatment is a long process that lasts from several months to several years, and the patient has to return to the doctor quite often. It is important in the process of orthodontic treatment to effectively remove plaque, as well as control its growth in order to prevent caries and periodontal disease. The key point when planning orthodontic treatment is to eliminate or significantly reduce the accumulation of plaque and inflammation in periodontal tissues before, during and after orthodontic treatment. Oral hygiene products for patients with dentoalveolar anomalies and deformities during orthodontic treatment include: 1 toothbrushes, including orthodontic and mono-beam (mono-brush); 1 interdental products (brushes, flosses, flossets, tooth-picks); 1 tongue scrapers and brushes; 1 toothpastes, gels; 1 dental elixirs, mouth rinses, deodorants for the oral cavity; 1 oral irrigators; 1 powders or tablets for the treatment of removable orthodontic appliances and dentures; 1 dyes for identifying dental plaque (tablets, solutions); 1 orthodontic wax; 1 whiteners for teeth and orthodontic equipment. The effectiveness of plaque removal during brushing depends on three main factors: the design of the toothbrush, the skill of the person using

the toothbrush, the use of additional hygiene products, the frequency and duration of their use. A correctly selected toothbrush, paste, interdental agents and others, individually for the patient and the method of their use, makes it possible to effectively control the growth of plaque. Therefore, the best toothbrush is one that is individually selected, and the ideal method of brushing teeth is one that allows you to remove dental plaque in a short time, without damaging tooth tissue and periodontal tissue. Nowadays, the use of a toothbrush and fluoride toothpaste is almost universal. The use of interdental products and rinses is less common among the population.

However, for patients with orthodontic appliances, the use of additional hygiene products, in addition to basic products, is mandatory and necessary. During orthodontic treatment, teeth should be brushed for 10 minutes after each meal. You should brush your teeth as you would normally brush your teeth using the standard method of brushing your teeth without braces. Next, teeth, braces, rings, arches, ligatures, springs and other elements of orthodontic equipment are cleaned with special-purpose hygiene products: orthodontic, mono-beam, brushes, floss, interdental brushes (Fig. 1). Regular toothbrushes treat all accessible dental surfaces, but orthodontic equipment must be cleaned with special orthodontic brushes. The design features of orthodontic brushes determine the specifics of their use. Some of them have a longitudinal V-shaped depression on the entire surface of the bristle field for the size of braces (Oral-B Orthodontic). In this case, horizontal movements of the brush on the braces should prevail. Using longer marginal tufts of bristles, plaque is removed in the direction from the gum to the arch, and from under the arch it is removed with long marginal bristles on the opposite side of the head. At the same time, shorter internal bristles allow you to clean the braces and orthodontic archwire. Other orthodontic brushes have a narrow brush head for sweeping vertical

movements when brushing over brackets and wires (TePe) (Figure 2). Mono-beam and small-beam brushes are used as aids and can complement orthodontic brushes. The self-cut Sulcus toothbrush has two rows of bristles, which are left on a regular brush, and are designed to clean the gingival groove, the narrow interdental spaces of the teeth. These brushes are recommended for hygiene measures in the presence of orthodontic structures, orthopedic structures and for crowded teeth. It is preferable to use single-tuft brushes in the form of a truncated cone with rounded bristle tips. They are indicated for cleaning fixed orthodontic and orthopedic structures, involving the furcation of multi-rooted teeth, the distal surface of the extreme tooth (usually a molar), implanted implants, and the oral and lingual surfaces of teeth with an atypical gingival margin (Fig. 3). New generation electric toothbrushes have shown greater efficiency in removing plaque on contact surfaces compared to conventional toothbrushes, as they use a combination of not only horizontal and vertical movements, but also rotational and vibration movements. Electric toothbrushes remove plaque from the surface of teeth per unit of time faster and more efficiently than manual ones. Moreover, the motivational impulse and interest of most people after purchasing an electric toothbrush encourages them to improve their oral hygiene. However, the popularity effect diminishes over time and the patient may return to using traditional manual toothbrushes. For patients with fixed orthodontic appliances in the oral cavity, it is necessary to use two-speed electric toothbrushes with vibrating torque. In this case, you should clean the braces at low speed to prevent the elements of orthodontic equipment from coming off.

Thus, electric toothbrushes may be particularly useful in persons undergoing orthodontic treatment, in poorly motivated patients, patients with periodontal disease, disabled or mentally retarded people, children over 6 years of age, hospitalized patients, nursing which are monitored by medical personnel. Electric toothbrushes can also be recommended in cases where the doctor considers it necessary for the patient to adjust the method of brushing the teeth; improve the motivationally-conscious effect. Contraindications for using an electric brush include peeling off of an orthodontic element, grade 3 tooth mobility, hyperplastic gingivitis, gum recession, stomatitis, condition after surgery on periodontal tissues, condition after surgery, including for oncological diseases of the oral cavity, abrasion and abrasion of teeth and dentin sensitivity. Interdental brushes (interdental or interproximal brushes) are intended for cleaning wide interdental spaces, fixed orthodontic elements and enamel around braces, rinsing parts of bridges, spaces between implanted implants, diastemas and threes, as well as exposed bifurcations and trifurcations of teeth and after periodontal surgery (Fig. 4). In the presence of these situations in the oral cavity, brushes are a mandatory means of hygiene. They are made of nylon bristles fixed to a thin wire base. The shape of the working part of the brush can be conical or cylindrical. Brush brushes vary in size and stiffness of the bristles. The most convenient for cleaning bracket systems are

“strong” brushes with a larger working part and a more durable rod. Special probes have been developed to determine the required size of the brush in each specific case. The brushes can be mounted in a special holder, or mounted in a special lockable case. Cleaning the interdental spaces of plaque with dental floss is important for the prevention of caries and gingivitis in these areas, as well as for improving the overall level of oral hygiene (Fig. 5). Normally, the interdental spaces are small and located in the area of the contact point and directly below it. After tooth extraction for orthodontic reasons, when teeth are moved during orthodontic treatment and in patients with periodontal disease, the interdental spaces can increase, and the accumulation of plaque in these spaces increases, so the use of manual and electric toothbrushes is not enough. Flossing is the most universal method that removes up to 80% of plaque on contact surfaces. Even subgingival dental plaque can be removed by placing dental floss or tape 2.5 to 3 mm below the apex of the interdental papilla. There are disposable holders with a small piece of thread fixed on them - flossers (light flossing). However, no differences in their effectiveness were identified. The main condition for the effectiveness of dental floss is its daily use. It should be noted that flossing is difficult for people for whom brushing is not easy. This requires a certain skill and takes a lot of time, and there is also a danger of gum injury and abrasive damage to hard dental tissues due to the wrong choice or violation of the technique of using interdental hygiene products. To clean fixed elements of orthodontic devices (bracket systems), superfloss is specially used, consisting of three parts of different diameters, turning into one another. The first part is a solid fiber for passing the thread through the gingival part of the interdental space, the second part is thicker and looser. This section of the thread effectively cleans wide interdental spaces, spaces around fixed orthodontic elements and under orthodontic arches, as well as splinting structures, rinsing parts of bridges, between implanted implants, in the presence of intraoral traction, in addition, it is able to absorb exudate from the periodontal pocket in diseases periodontal The third part is regular floss. To clean the inner surface of the orthodontic arch, superfloss is inserted under the arch, and to clean the bracket along the perimeter and the adjacent part of the tooth enamel, which is especially susceptible to demineralization, superfloss is placed around the bracket and forward movements are made. Most therapeutic and prophylactic toothpastes presented on the Belarusian market contain strong antiseptics as active ingredients: chlorhexidine bigluconate and triclosan. These pastes have high antimicrobial activity and their use leads to the suppression of not only pathogenic, but also saprophytic microflora, which leads to dysbiosis and resistance of pathogenic strains to existing antimicrobial drugs, reducing the effectiveness of treatment. Long-term use of toothpastes with antiseptics can exacerbate the inflammatory process in the periodontium. Therefore, recently much attention has been paid to pastes based on herbal and plant extracts. Among their variety, Parodontax-F paste deserves special attention. Parodontax-F paste contains extracts of medicinal

herbs: chamomile - promotes epithelization, stimulates the removal of decay products and toxic substances, has an anti-inflammatory, antiseptic effect; myrrh - strengthens tissues and stops bleeding; ratania - prevents bleeding, has an anti-inflammatory effect, gives the gums firmness and elasticity; sage - has bactericidal, bacteriostatic and antiseptic activity, helps remove toxins from cells; Echinacea - has anti-inflammatory, immunocorrective and healing effects. In addition, it contains Na bicarbonate and Na fluoride, which enhances anti-inflammatory and cleansing properties. Increased sensitivity of hard dental tissues is one of the most pressing problems of modern dentistry. According to various authors, this condition causes discomfort in 45–60% of the entire adult population and in more than 85% of patients with periodontal pathology. One of the most modern developments of the Glaxo SmithKline company is Sensodyne Total Care toothpaste, recommended by dentists for symptoms of dentin hypersensitivity and periodontal disease. Along with the active ingredients "Sensodyne-F" (potassium chloride, sodium fluoride, zinc citrate), this toothpaste contains vitamins E and B5, which have an antioxidant, keratoplasty and strengthening effect on periodontal tissue, which is especially necessary to maintain oral health during orthodontic treatment. Mouth rinses or dental elixirs are additional hygiene products. Based on their main function, rinses are divided into deodorizing; reducing the formation of dental plaque and the degree of inflammation due to the antibacterial effect; and rinses containing various concentrations of fluoride compounds and can affect the mineralization of hard dental tissues. These rinses should not be used continuously, but are applied at certain intervals in courses depending on the concentration of fluoride ions and active antibacterial components. Corsodyl mouthwash contains 0.2% chlorhexidine bigluconate, hydrogenated castor oil, triclosan, sanguinarine and other components of plant origin (peppermint oil, tea tree oil, echinacea extract, wheat germ extract), vitamins (tocopherone, panthenol), allantoin, xylitol, zinc and potassium compounds. Sensodyne Mouthwash does not contain alcohol, sugar or dyes. This product contains potassium chloride, which is very effective as a way to quickly get rid of hypersensitivity. Other active ingredients are sodium fluoride, sorbitol, which is active against oral microbes, and glycerin and castor oil, which create an additional protective film and retain the active substances on the tooth surface. To carry out the most effective oral hygiene during orthodontic treatment, there is a need to use an irrigator - a device for removing plaque from interdental spaces, to improve blood circulation in periodontal tissues due to a constant or pulsating jet of liquid under pressure and the effect of hydromassage of the gums. Liquid medications (chlorhexidine, ethacridine lactate, romazulone, decoctions of calendula, chamomile, sage, corsodil, stomatophyte, etc.) can be added to the water supplied for irrigation. The procedure for irrigating the teeth and gums of one jaw for 3 minutes greatly helps prevent focal demineralization of enamel, gingivitis in the process of orthodontic treatment of fixed orthodontic equipment. Removing plaque from the back of the tongue with a tongue scraper and brush

is also an important hygienic procedure that reduces the contamination of oral microflora and eliminates bad breath (Fig. 6). Currently, two types of tongue cleaning products are proposed: scrapers of various shapes and brushes, mainly round or crescent-shaped. To clean the back of the tongue, regular brushes or brushes with additional devices for cleaning the tongue can be used, as well as electric brushes with special attachments for these purposes. It is recommended to use tongue cleaners twice a day in conjunction with an antiseptic rinse or antiseptic gel applied to the surface of the tongue after cleaning it. Orthodontic wax is used to protect the mucous membranes of the lips and cheeks from irritation and rubbing of braces, rings, arches and other orthodontic elements of a multibonding system. For erosion and ulceration of the mucous membranes of the lips and cheeks, the combined use of transparent orthodontic wax on the surface of the traumatic fixed orthodontic element and an epithelializing ointment or gel (solcoseryl, Actovegin, methyluracil, Reparef-2) applied to the wound surface of the mucous membrane is recommended. Dyes for detecting dental plaque (tablets, solutions) make it possible to detect the presence of dental plaque and the places where they accumulate when rinsing a solution or chewing a tablet. These substances are used both for individual control by the patient himself and to determine the level of oral hygiene by the doctor. Purpose and objectives of the study. The purpose of the study is to increase the effectiveness of treatment of patients with periodontal diseases and dentofacial anomalies and deformities by developing the scientific and methodological foundations of pathogenetically oriented hygienic measures before the installation of orthodontic equipment, during the process of orthodontic treatment, as well as during the period of maintenance therapy. The objectives of the study are to evaluate the impact of various hygienic measures on the course of periodontal diseases in patients with dentofacial deformities and periodontal pathology, as well as to prevent the development of periodontal diseases during orthodontic treatment in patients with dentofacial anomalies. Materials and methods of research. To solve the set tasks, a comprehensive treatment was carried out for 80 patients with periodontal pathology and dentofacial deformities and 30 patients with dentofacial anomalies, including various hygiene products at the stages of treatment. The preparatory (periodontal) stage of complex treatment consisted of hygienic measures with the elimination of iatrogenic factors in the oral cavity (low-quality fillings of classes II, V, IV, dentures with long crowns and a traumatic intermediate part of the prosthesis). Next, before orthodontic treatment, the patient was motivated, taught how to care for the oral cavity, and, if necessary, administered anti-inflammatory therapy. Orthodontic treatment began after the formation of a stable skill in caring for the oral cavity, as well as after eliminating inflammation in the periodontal tissues. During the orthodontic treatment, the level of oral hygiene was monitored every 3 months and, if necessary, professional teeth cleaning was carried out in conjunction with other therapeutic and preventive measures. After removal of the equipment, oral care

was adjusted in order to prevent habitual excessive efforts when brushing teeth with the inclusion of hygiene products that were recommended before the installation of orthodontic equipment. All patients were informed about the rational use of fluoride and reducing the frequency of carbohydrate intake. Before orthodontic treatment, all patients used individually selected hygiene products (therapeutic and prophylactic toothpastes, toothbrushes, rinses, mono-beam brushes, if necessary, floss, interdental brushes, tongue scrapers and dyes to identify plaque). After fixing the orthodontic equipment, patients in two groups were prescribed to use basic and auxiliary hygiene products (therapeutic toothpastes, basic toothbrushes, electric, orthodontic and mono-beam brushes, superflosses, interdental brushes, rinses, irrigators, tongue scrapers and dyes to identify plaque). An important role in reducing the accumulation of plaque in patients with periodontal disease was played by the correct choice of orthodontic equipment. In this regard, orthodontic equipment was chosen that was indifferent to periodontal tissues and at the same time aesthetic. Orthodontic technique was used without hooks, elastic ligatures and excess fixation material around the base of the bracket. Orthodontic treatment was carried out using self-ligating (ligature-free) passive type bracket systems (Damon System 2, 3 MX). The work used two protocols for dynamic observation of patients with periodontal pathology and dentofacial deformities. The first protocol consisted of using an optimal set of objective research methods with control calls every 2 weeks after the installation of orthodontic equipment in the first 3 months of orthodontic treatment and then every 3 months in order to prevent inflammation and develop a stable skill in caring for the oral cavity using basic and auxiliary means hygiene. If necessary, professional teeth cleaning was carried out together with other therapeutic and preventive measures at each visit. After removal of the orthodontic equipment, depending on the condition of the periodontal tissues, patients were divided into groups "A", "B" or "C" for dispensary observation. Group A for dynamic observation included patients with good hygiene skills and a compensated condition of periodontal tissues with a frequency of control visits 2 times a year (every 6 months). Group "B" of dynamic observation with a frequency of control examinations 3 times a year (every 4 months) included patients with minor deviations from the norm in the condition of periodontal tissues. Group "C" of dynamic observation included patients with significant deviations from the norm in the condition of periodontal tissues with a frequency of control visits 4 times a year (every 3 months). The second protocol included traditional research methods and traditional hygiene products. After removal of the orthodontic equipment, the patients were transferred to the usual routine follow-up (every 6 months). Based on the results obtained, the condition of periodontal tissues was assessed, as well as the effectiveness of the treatment. The results were considered as good, satisfactory and unsatisfactory. Thus, the effectiveness of the treatment was considered good if the patient had no complaints, and clinical data and objective tests were within

normal limits. Satisfactory treatment results were considered to be those in which the patients had no complaints, clinical data and objective test indicators had a slight deviation from the norm. The effectiveness of treatment was considered unsatisfactory in cases where patients continued to have complaints and the indicators of objective tests had significant deviations from the norm. The effectiveness of orthodontic treatment was assessed using 6 Andrews keys of normal occlusion [135]. To solve these problems, a comprehensive treatment was carried out for 60 patients with periodontal pathology and dentoalveolar deformities, including basic and additional hygiene products at the stages of treatment. All patients were divided into 2 groups. The first group consisted of 30 patients who underwent orthodontic treatment of dentoalveolar deformities with fixed orthodontic appliances using individually selected basic and additional hygiene products with dynamic observation according to the first protocol. The second group included 30 patients who underwent hygienic control and treatment and preventive measures according to the generally accepted method with dynamic observation according to the second protocol. Results and discussion. Based on the objective data obtained, the condition of the periodontal tissues of patients in two groups, as well as the effectiveness of the treatment, was assessed. In patients of the first group with periodontal diseases and dentoalveolar deformities, using individually selected basic and additional hygiene products with dynamic observation according to the first protocol throughout the entire period of orthodontic treatment, as well as after removal of the equipment, the condition of the periodontal tissues was similar to the indicators before orthodontic treatment. In the first group, 24 (80.0%) people had a good condition of periodontal tissues in the second week after fixation of the equipment, and 6 (20.0%) patients had a satisfactory condition of periodontal tissues. After 1 month in the first group, good condition of periodontal tissues was detected in 25 (83.33%) patients, and satisfactory – in 5 (16.67%). After removal of the equipment in patients of the first group, in 93.33% of cases, a good condition of periodontal tissues was revealed, which was also noted from 6 weeks and throughout the entire period of orthodontic treatment (GI - 0.15 ± 0.05 ; PMA - 2.62 ± 0.13 ; IPC - 85.71 ± 1.74 ; 03 ± 0.01), and only 2 (6.67%) patients had a satisfactory condition (GI - 1.05 ± 0.05 ; RMA - 11.31 ± 1.79 ; IPC - 50 ± 0 ; GZDB - 1.21 ± 0.86 ; ICH - 1.3 ± 0.02 ; PI - 0.22 ± 0.11 ; IR - 0.13 ± 0.01), which indicates the therapeutic and prophylactic effect of the optimal complex. individually selected hygiene products and other therapeutic and preventive measures with dynamic observation according to the first protocol throughout the entire period of orthodontic treatment. In the second group of patients who followed the second protocol, only 11 (36.67%) patients had a good condition of periodontal tissues at the 3rd month of orthodontic treatment, and 19 (63.33%) patients had a satisfactory condition. After 6 months, good condition of periodontal tissues was found in 10 (33.33%) patients, and satisfactory – in 20 (66.66%). From 9 months until the end of complex treatment, the results on average corresponded to the

assessment after 6 months. After removal of the equipment, only 12 (40%) patients showed good condition of periodontal tissues, confirmed by gingival coefficients (GI - 0.15 ± 0.05 ; PMA - $2.62 \pm 0.13\%$; IPC - $85.71 \pm 1.74\%$; GZDB - 0.62 ± 0.05 ; ICH - 0.46 ± 0.05 ; PI - 0.07 ± 0.01 ;) patients had a satisfactory condition (GI - 1.05 ± 0.05 ; RMA - $11.31 \pm 1.79\%$; IPC - $50 \pm 0\%$; GZDB - 1.21 ± 0.86 ; HPI - 1.3 ± 0.02 ; PI - 0.22 ± 0.11 ; IR - 0.13 ± 0.01). The results of orthodontic treatment of patients in two groups showed that all patients, after removal of fixed orthodontic equipment, had a harmonious smile, profile, normal symmetrical shape, size, ratio of the dentition of the upper and lower jaws and multiple fissure-tubercle contacts between antagonist teeth. For stability of the result, after removal of the fixed equipment, fixed retainers made of a .0175" Tripleflex orthodontic arch and composite material were fixed to the upper and lower jaws.

Conclusion.

Thus, orthodontic treatment with modern orthodontic devices worsens the hygienic condition of the organs and tissues of the oral cavity and requires patients to undergo an optimal set of individually selected

hygiene products and other therapeutic and preventive measures with dynamic monitoring every 2 weeks after installation of orthodontic equipment in the first 3 months of orthodontic treatment and beyond. every 3 months using basic and auxiliary hygiene products. The effectiveness of hygienic measures in the oral cavity during orthodontic treatment of patients with periodontal pathology depends on the "doctor-patient match" and the doctor's responsibility in achieving the goal.

References:

1. Dedova L.N. Diagnostika boleznej periodonta: Ucheb.-metod. posobie / Bel. gos. med. univ.; Sost. L.N.Dedova — Minsk, 2004. — 70 s.
2. Terehova T.N. // Sovrem. stomatologija. — 2000. — №1. — S. 48–49.
3. Tokarevich I.V. // Zdravoohranenie. — 2000. — №4. — S. 25–26.
4. Fedorov Ju.A. Ocenka ochishhajushhego dejstva zubnyh gigienicheskikh sredstv i kachestva uhoda za polost'ju rta / Ju.A.Fedorov, V.V. Volodkina // Terapevticheskaja i ortopedicheskaja stomatologija: Resp. mezhved. sb. — Kiev, 1971. — S. 31