

## Dental Studies of the Chewing Height in Patients Using Metal-Ceramic and Zirconium Prostheses

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**Relevance.** Restoration of defects in hard tissues of teeth and dentition is an urgent task not only for orthopedic dentistry, but also for general medicine in general. Pathology of hard tissues of teeth, both carious and non-carious, contributes to a decrease in the quality of chewing food and digestive disorders, as well as cosmetic defects and speech disorders. The physiological parameters of the dentition function are disrupted by tooth loss. Structural changes in the organs of the oral cavity with partial tooth loss were studied. Changes in saprophytic and pathogenic microflora have been well studied. In the case of prosthetics with a non-removable denture design, special importance is attached to the supporting teeth. They carry out a large functional load, and therefore the periodontal tissue undergoes morphofunctional changes. Given the side effects of artificial crowns, these changes become obvious. Initial structural changes are observed in the pulp tissue during the preparation of hard tooth tissues. In the case of prosthetics with various removable and non-removable structures with secondary adentia, the periodontal condition depends on the magnitude of the load, the extent of the defect and the choice of technique for processing hard dental tissues. At the same time, the choice of design features primarily depends on the condition and degree of changes in periodontal tissues [1.3.5.7.9.11.13.15]. According to some data, with an increase in functional loads, pronounced morphofunctional changes are observed in periodontal microvessels. It should be borne in mind that problems associated with obtaining reliable information about the condition of the tissues surrounding the tooth (periodontal disease, periodontal disease, marginal gum) arise already at the initial stage. The diagnostic methods used are quite approximate and in many cases do not reflect the actual picture of the condition of periodontal tissues.

**The purpose of the study.** A comparative assessment of morphological and functional changes in periodontal tissues is carried out when using metal, cermet and zirconium dentures to increase the effectiveness of prosthetics.

**Materials and methods.** The studies were conducted in 100 people who were divided into 2 groups: the main observation group - 90 (80.7±3.7%) patients and the comparison group (control group) - 30 (19.3±3.7%) patients. Among the patients of the main group there are 30 patients with chromocobalt, 30 patients with cermet and 30 patients with zircon crowns. A total of 144 teeth were examined, which are and will be the supporting teeth of bridges. In the comparison group, studies were conducted on 24 teeth with intact periodontitis on the upper and lower jaws in patients aged 30 to 60 years. During the examination of all patients in both observation groups, the Green-Vermillion hygienic index and the Russell periodontal index were determined and the Kulazhenko test was performed. Immunological studies were conducted in the laboratory of immunoregulation of the Institute of Human Immunology and Genomics of the Academy of Sciences of the Republic of Uzbekistan. The study involved 180 patients (115 women and 65 men) aged 20 to 70 years. The average age of women was 38 years, men - 49 years. The patients were conditionally divided into two groups:

Group 1 consisted of 180 patients (115 women and 65 men) who underwent metal-ceramic prosthetics;

Group 2 consisted of 30 healthy patients (17 women and 13 men) who underwent zirconium prosthetics.

All design features and the type of material from which the bridges were made, age indicators are given in the section "Materials and research methods". In the comparison group (control group),

studies of 24 teeth with intact periodontium on the upper and lower jaws were carried out on the basis of basic and paraclinical research methods (percussion, the condition of the gingival margin using a bulbous probe), X-ray and sighting images, electroodontometry - to determine the condition of the pulp and periodontium. In the main patient observation group, in addition to determining the type of structural features of bridges, all supporting teeth were examined in the same sequence as in the comparison group. All patients were familiarized with the treatment plan and manipulations (removal of bridges, if necessary, upcoming stages of treatment, replacement of structures, exclusion of possible side effects and pathological conditions), written consent and financial costs signed by the patients [2.4.6.8.10.12.14.16].

The errors that we identified were most often associated with the wrong choice of supporting teeth for bridges, the choice of the prosthesis design not according to indications (irrational prosthetics), violation of the regime during the preparation of hard dental tissues, traumatization of the periodontal edge due to non-compliance with the immersion of dentures. crowns in the periodontal furrow. The criteria for the quality of crowns were assessed by the discrepancy of anatomical shapes, taking into account the group of teeth, excessive or insufficient insertion of crowns into the gingival groove, causing retraction of the neck of the tooth or leading to hypertrophic gingivitis, supercontacts - to changes in the periodontal complex. We evaluated the periodontal complex in 90 patients who received orthopedic treatment. Of these, 38 patients underwent primary and 20 patients underwent repeated orthopedic treatment with fixed bridges with the complete exclusion of acrylic, plastic veneers. We examined 114 teeth under bridge supports and 24 teeth on the upper and lower jaw with healthy intact periodontitis in patients of the control group. The dynamics of observations began with the planning and coordination with patients of the design features of bridges and upcoming therapeutic measures in the dynamics of treatment up to 1 year. Selectively, for up to 3 years or more, after prosthetics, some patients were called for a second examination, where, if necessary, a clinical and X-ray examination was performed. In patients who have been using for many years (more than 7 years) a non-removable denture structure made of a cobalt alloy coated with titanium sodium, an unpleasant odor from the oral cavity was noted. The mucous membrane of the gums is hyperemic, sometimes bluish in color, repeats the shape of the neck of artificial crowns [15.17.19.21.22]. It bleeds easily and is painful when probed. In some patients (more often in men), the titanium coating has been erased from the chewing surfaces of the teeth. Patients with such (metallic) dental structures complained of a metallic taste in the mouth and a feeling of unpleasant microcurrents when using aluminum spoons. In the dynamics of observations for up to 1 year or more during repeated prosthetics, we paid special attention to the condition of the periodontal margin, the mucous membrane of the entire oral cavity, modeling in accordance with the anatomy of a group of teeth, supercontacts, the condition of the intermediate part of the bridge, as well as functional and aesthetic indicators. We studied the condition of the marginal periodontal support teeth in 70 people aged 20 to 60 years, who underwent laser Doppler flowmetry as part of the study. Dissection of teeth (depulped and with live pulp) was carried out in a strict sequence: creating a protrusion, reducing the length of the tooth crown taking into account the layer of ceramics and metal, removing hard tooth tissues from the vestibular and oral surfaces and forming a round protrusion at the level of the marginal gum. Diamond drills were used in the work in a certain sequence, taking into account the formation of the protrusion. After removing the impressions from the antagonists with a silicone mass, the teeth were covered with temporary crowns, which were previously made by removing the impression and making them from plastic. Subsequently, prosthetics were performed according to a generally accepted method: installation of a durable frame, color selection, elimination of supercontacts, fixation of the bridge prosthesis with glass ionomer cement.

**Results and discussion.** As recommendations for practical healthcare on the most suitable optimal designs, it is necessary to use cermets, zirconium in order to improve the quality of dental care. In patients using bridges and crowns made of kobolt-chromium alloy, edema with cyanosis of the mucous membrane of the alveolar process was observed. As we mentioned above, such a mucous membrane bleeds quickly when touched with a probe and when brushing teeth with a toothbrush. We also described structural changes in the epithelial integument at the level of light and electron microscopy.

We attribute all these changes to the appearance of galvanic currents in the mouth of patients. The determination of electrochemical potentials in the mouth in these patients showed maximum values and was equal to 120-150 mV. The high level of galvanic currents in the oral cavity, exceeding the physiological norm, dictates the implementation of preventive measures to prevent the occurrence of galvanism in the oral cavity, which should include the selection of design features tolerant to the physiological homeostasis of the oral cavity, compliance with the complete uniformity of the metal structure and their replacement in the presence of heterogeneity of inclusions. In this regard, the study of the functional state of microcirculation in the tissues of the marginal gums and the entire periodontal complex is relevant for obtaining further positive results of prosthetics of dentition defects. In this regard, when choosing an orthopedic treatment plan, an assessment of the functional state of the dental support and retention apparatus comes to the fore [16.18.20.22]. However, problems arise in the first approximation and are associated with an objective assessment of the true picture of the condition of the tissues surrounding the tooth. The diagnostic methods currently used are quite subjective: there are no standard measurement techniques, developed protocols, and the available data are contradictory.

Thus, the existing methods for assessing the condition of the marginal gum of periodontal abutment teeth do not give a true picture of its functional changes in microcirculation at the stages of prosthetics with secondary adentia.

In our opinion, special attention should be paid to determining the state of the marginal periodontal of the supporting teeth in modern types of prosthetics (cermet, zirconium), adaptation processes at the level of microcirculation, which was the topic of the study. We examined the tissues of the marginal periodontal of the supporting teeth by clinical, functional and morphological methods in patients using metal-ceramic and zircon bridges. A different clinical picture was observed in patients using metal-ceramic bridges. Among the examined patients, 7 had gingivitis. These patients have been using metal-ceramic bridges for more than 5 years. Moderate periodontitis was observed in 6 patients. We did not observe severe periodontitis in the acute stage. Gingivitis was observed in 3 patients among the examined patients. Regardless of the timing of the use of dentures, periodontitis was not observed in this group of patients. Data on the microcirculation state of the marginal gum included supporting teeth under bridges (the main group of observations), as well as intact periodontal symmetrical side (comparison group). The analysis of the results showed that the level of capillary blood flow in a healthy periodontium and marginal gum (the results were averaged and accepted as normal) was 20% and 30% higher, respectively, compared with the periodontium of the supporting teeth. The coefficient of variation (KV), indicating the state of microvascular activity, was 18% lower in the supporting vessels in patients with repeated prosthetics. Vasomotor activity of the microvessels of the supporting teeth was slightly reduced (by 4.2%) compared with the indicators in the intact dentition, which may be due to a high functional load on the healthy side. The data obtained show that in the area of gum tissue of the marginal periodontium of the supporting teeth, which limits the defect of the dentition, there was a decrease in the intensity of tissue blood flow and vasomotor activity of microvessels compared with those in the marginal gum of the intact dentition. After the dentures were applied, the 1st dental examination was performed the next day, at the stage of denture correction. Treatment of inflammatory changes in the mucous membrane was carried out both at reception and at home using drugs containing antiseptic, anesthetic, regenerating components in accordance with the "Protocol for the management of patients with partial absence of teeth (partial secondary adentia)".

**Conclusions.** The structural and functional characteristics of the mucous membrane of the marginal gum indicated a negative effect of metal dentures compared with mild inflammation of the epithelium in the surface layers during prosthetics made of cermet and zirconium. Diagnosis and treatment of elevated levels of galvanic currents should include the removal of metal structures with various inclusions and pathogenetic therapy of periodontal tissues before repeated prosthetics with the replacement of basic dental materials with ceramics or zirconium. Activation of the inflammatory process in periodontal tissues has been established, manifested by an increase in the concentration of pro- and anti-inflammatory cytokines already on the 7th day after fixation of the prosthetic structure. It was revealed that with zirconium prosthetics, there is a positive dynamics of local immunity in gastric

cancer in patients of this group. During the examination, there were no foci of inflammation caused by dentures, which indicates satisfactory regeneration of the tissues of the prosthetic bed, and, according to the patients, they were fully adapted to the denture.

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