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**ТИББИЁТДА ЯНГИ КУН
НОВЫЙ ДЕНЬ В МЕДИЦИНЕ
NEW DAY IN MEDICINE**

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CRITERIA FOR ASSESSING THE CONDITION OF THE ORAL CAVITY IN PATIENTS WITH PROSTHETIC CERMET AND ZIRCONIUM PROSTHESES

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✓ *Resume*

The assessment of the physical and technical properties of metal-ceramic structures remains poorly understood. To eliminate ceramic chips, antagonistic dentures do not touch, which can lead to deformation. Thus, the question of the effect of non-removable prostheses on the clinical and morphological condition in the absence of periodontal tissues remains unexplored.

Keywords: homeostasis, oral fluid, interleukins, cermet's, fixed prostheses, periodontal, prosthetics.

КРИТЕРИИ ОЦЕНКИ СОСТОЯНИЯ ПОЛОСТИ РТА У ПАЦИЕНТОВ, ПРОТЕЗИРОВАННЫХ МЕТАЛЛОКЕРАМИЧЕСКИМИ И ЦИРКОНИЕВЫМИ ПРОТЕЗАМИ

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✓ *Резюме*

Оценка физико-технических свойств металлокерамических конструкций остается малоизученной. Чтобы исключить керамическую крошку, антагонистические зубные протезы не соприкасаются, что может привести к деформации. Таким образом, вопрос о влиянии несъемных протезов на клинко-морфологическое состояние при отсутствии тканей пародонта остается неизученным.

Ключевые слова: гомеостаз, ротовая жидкость, интерлейкины, металлокерамика, несъемные протезы, пародонт, протезирование.

МЕТАЛЛ-КЕРАМИКА ВА ЦИРКОНИЙ ПРОТЕЗЛАР БИЛАН ПРОТЕЗЛАНГАН БЕМОРЛАРДА ОҒИЗ БЎШЛИҒИ ҲОЛАТИНИ БАҲОЛАШ МЕЗОНЛАРИ

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✓ *Резюме*

Металл-керамика конструкцияларининг физик-техник хусусиятларини баҳолаш жуда яхши тушунилмаган. Керамика чипларини йўқ қилиш учун антагонистик протезлар тезмайди, бу деформацияга олиб келиши мумкин. Шундай қилиб, periodontal тўқималар йўқлигида олинмайдиган протезларнинг клиник ва морфологик ҳолатга таъсири ҳақидаги савол ўрганилмаган бўлиб қолмоқда.

Калит сўзлар: гомеостаз, оғиз суюқлиги, интерлейкинлар, серметлар, собит протезлар, пародонт, протезлар.

Relevance

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 orthopedic dentistry, dentures made of precious and base metal alloys are widely used to repair defects in crowns and dentitions. The latter consist of cobalt-chromium and nickel-chromium alloys. The problem of the influence of base metals on the organs of the oral cavity and on the body as a whole is relevant. Among them, galvanosis of the oral cavity is more common. Being in the oral cavity for a long time, a denture, as a foreign body made of a material not peculiar to the human body, causes structural changes in the marginal periodontium. Therefore, modern orthopedic dentistry is faced with the issue of compatibility of metal dental alloys and the human body [1.3.5.7.9.11.13].

The phenomenon of "intolerance", galvanosyndrome, galvanosis, described in the literature, can be explained by the body's reaction to the presence of metal inclusions in the oral cavity, which is expressed not only by intolerance to dentures, but also by the manifestation of a burning sensation of the tongue, hypo- and increased salivation, changes in taste, etc., etc.. In this regard, the study of the state of galvanosis of the oral cavity with non-removable dentures made of various metals becomes relevant and requires further research in this direction, which will improve the quality of dental care and prevent premature removal of orthopedic structures. The available research in this area is few and fragmentary. Therefore, the identification of causal circumstances contributing to the occurrence and causing diseases of the oral mucosa when using various types of prostheses (metal crowns, ceramics, zirconium) using histological, electron microscopic and histochemical research methods will allow us to develop more effective methods of their treatment and prevention.

The purpose of the study. Improvement of criteria for assessing the condition of the oral cavity in patients with prosthetic cermet and zirconium prostheses.

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.

The Schiller-Pisarev test refers to the method of in vivo staining of gum glycogen, the content of which increases with chronic inflammation (composition - crystalline iodine 1 g, potassium iodide 2 g, distilled water 40 ml). Intense discoloration after gum lubrication indicates inflammation. Oral sanitation, plaque removal and oral hygiene training were carried out. Diagnostic observations of the periodontal condition were carried out in the area of the supporting teeth before and after fixation of bridges and crowns, as well as during 1, 3, 6, 12 months after prosthetics. Clinical methods included a questionnaire, a random examination and an examination of the oral cavity with an armed gaze (stomatocopy). The stomatocopy was performed using an ophthalmic surgical microscope at a magnification of 30 times.

For morphological examination, 1 × 1.5 mm pieces of tissue were taken for transmission electron microscopy. Pieces of bioplast were fixed during glutaraldehydes. Electron microscopic studies were conducted under the supervision of Professor I.M. Baibekov. The bone tissue around the supporting tooth was examined using X-ray machines. The pictures were taken according to Yusupov. Computed tomography was performed to assess the bone structure of the upper and lower jaw. To determine the endurance of periodontal tissues to vertical load, gnathodynamometry was performed using electronic gnathodynamometers. Electrodontometry was performed selectively, and only those teeth that were included in the supporting teeth for bridges and according to indications. The bridges used (cermets,

zirconium, metal crowns) create conditions for the development of increased functional load on the periodontal tissues of the supporting teeth.

When prosthetics of the included defects of the dentition with bridges, it is necessary to determine possible functional changes in periodontal tissues, which can largely determine the timing of their use. The change in blood circulation in periodontal tissues directly depends on the degree of deformation of the dentition, the length of toothless teeth and the involvement of bridges in the chewing load. Special attention in prosthetics (cermet, zirconium) should be paid to changes in the state of the marginal periodontium at the level of microcirculation, which was one of the goals of this study. To determine the marginal periodontal of the supporting teeth of the first group, we selected 64 patients, the second group - 10 people.

The study groups consisted of 5 groups: 10 patients ($16.0 \pm 4.2\%$) with intact periodontal diseases, 16 patients ($24.0 \pm 4.9\%$) with gingivitis, 22 patients ($36.0 \pm 5.5\%$) with mild periodontitis, 10 patients ($13.3 \pm 3.9\%$) with moderate periodontitis severity, 6 in patients ($10.7 \pm 3.5\%$) - periodontitis at the stage of abscess formation. The condition of periodontal tissues, in particular the marginal gums, was assessed according to clinical and paraclinical research methods in the field of supporting teeth in the dynamics of observations up to 1 year in patients of the main observation group and the comparison group. Statistical processing of the obtained data was carried out using variational statistics of the computer programs "MS Excell" and "MS Access" in a standard volume for biomedical research. Dental deposits were removed before using the electroodontometry method. During the second prosthetics, after the removal of the bridges, the remains of the fixed cement were carefully removed. EOM, intraoral image. An examination of the EOM of teeth with a filling in the neck of the tooth was not carried out in order to avoid the release of current from soft tissues. The existing amalgam fillings were removed and measurements were made from the bottom of the carious cavity. Patients with contact fillings on their teeth were pre-insulated with a celluloid plate lubricated with vaseline, after which the indicators were measured [2.4.6.8.10.12.14].

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. Taking into account the radiological, functional parameters and the state of the periodontal complex, electroodontometry (EOM) was used: the supporting teeth were subjected to depulcation or root canal transplantation with poor-quality obturation. During prosthetics, the supporting teeth were subjected to odontopreparation for cermet or zirconium according to a generally accepted technique: the design of the protrusion, retraction of the periodontal edge using appropriate filaments. The impression was obtained using silicone sandwich technology. Laboratory and clinical stages: installation of frames, prosthetics, fixation were carried out in accordance with the rules of orthopedic dentistry. When removing bridges from metal soldered-stamped structures, it turned out that in 95% of cases, dark-colored corrosion covered with nutrient masses was observed at the joints of the prosthesis body with supporting crowns, and there were bedsores of the mucous membrane of light red color, hypertrophy, bleeding under the prosthesis body. The errors we observed in the work of the dentist and technician at the stages of manufacturing non-removable dentures were evaluated according to the following parameters: modeling the manufacture of crowns and the intermediate part of the prosthesis body; supercontacts, which, if performed incorrectly, lead to the erasure of the teeth of the antagonists and abrasion of the lining material.

The above data from clinical and paraclinical known techniques of non-removable bridge prosthesis indicate the presence of pathological conditions that entail premature removal of bridges. We studied the condition of the marginal periodontal of the supporting 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

Such materials used for the manufacture of dentures do not meet either the aesthetic or functional requirements of modern dentistry. This state of the problem dictated the search for the most adequate structures embedded in the oral cavity, devoid of the above disadvantages. Currently, the most satisfying clinical and functional requirements and aesthetic parameters are dentures made of cermet, zirconium. Undoubtedly, the positive results of orthopedic structures made of cermet and zirconium are largely indifferent to the organs and tissues of the oral cavity. However, there are also negative effects on the marginal periodontium associated with the advancement of the edges of the crowns into the periodontal pocket, causing morphological changes. The present study is devoted to the study of the marginal periodontium when using non-removable bridges, cermets, zirconium and chromium-kobolt alloy). As recommendations for practical healthcare on the most suitable optimal designs, it is necessary to use cermet, 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.

In the dynamics of observations before the fixation of the bridge prosthesis with the LDF of the supporting teeth, a positive dynamics of microcirculation indicators was determined. The level of capillary blood flow (M) increased by 28% and approached the baseline level before treatment, vasomotor vascular activity (CV) increased by 32%. After fixation of the bridge prosthesis, in the dynamics of observations of the marginal gum of the supporting teeth, the level of capillary blood flow tended to increase further: vasomotor activity of microvessels (CV) decreased by 10%, which is lower than the initial level. 1 month after the bridge was fixed, the level of capillary blood flow tended to progress and corresponded to normal values. The obtained indicators were maintained in the dynamics of observations up to 6 months and in more distant observation periods. According to the results of our research, orthopedic treatment of a partial defect of the dentition with metal-ceramic structures is important for determining the state of microcirculation of the supporting tissues of the teeth. The data obtained during the study of laser Doppler flowmetry (LDF) at the stages of orthopedic treatment up to the fixation of a non-removable bridge prosthesis and in the long-term follow-up period show that this objective assessment of the functional state of the microcirculation system in periodontal tissues of the marginal gum of the abutment of teeth is important for predicting the immediate and long-term results of prosthetics of partial defects of the dentition.

Data analysis showed that the content of IL-1 β in patients receiving treatment was approximately 7.5 ± 0.20 pg/ml on average, whereas, as in the comparison group, its concentration was 4.2 ± 0.26 pg/ml ($P < 0.001$). The concentration of IL-6 in the general group of patients before the start of orthopedic treatment exceeded the values of the control group by more than 1.3 times (14.7 ± 0.46 pg/ml versus 11.8 ± 0.55 pg/ml, $P < 0.001$), which indicates an already formed inflammatory focus in the oral cavity. As a rule, the content of FN O- α is not determined or is at a low level in the blood serum of healthy people, whereas with the development of a pathological process, its amount increases several times. Thus, the synthesis of FN O- α in patients of the group before prosthetics averaged 12.3 ± 0.32 pg/ml, and in the control group these values were 9.4 ± 0.39 pg/ml, which is 1.3 times more ($P < 0.001$). It was also found that a significant increase in IL-10 levels in the main follow-up group before orthodontic treatment was 1.2 times (10.6 ± 0.32 pg/ml versus 8.5 ± 0.38 pg/ml) ($P < 0.001$). Thus, in ceramic prostheses of group I, after 7 days, 83% (72) of patients complained of pain in the oral mucosa during interdental contact and during the application of the prosthesis. The examination revealed inflammatory changes in the mucous membrane of the prosthetic bed, which were represented by hyperemia and erosion localized in the area of the border of the denture, as well as in areas of increased pressure of the base on the mucous membrane. At the repeated stages of denture correction, patients did not complain, and no inflammatory changes were found on the oral mucosa.

A study of the cytokine content showed that in patients with mucosal redness, the area of which coincided with the shape of the edge of a metal-ceramic denture, an imbalance of cytokines was noted in the oral fluid on the 7th day, characterized by a significant increase in the content of IL-1 β , IL-6, IL-10 and FN O- α . A comparative analysis of the content showed that in group I with cermet prosthetics, the level of IL-1 β increased 3-fold after a week with an average value of 22.7 ± 0.35 pg/ml (before treatment 7.5 ± 0.20 pg/ml) ($P < 0.001$), the concentration of IL-6 increased to 42.9 ± 1.07 pg/ml (before treatment 14.7 ± 0.46 pg/ml) (

$P < 0.01$), TNF- α - 37.2 ± 0.76 pg/ml (before treatment 12.3 ± 0.32 pg/ml) ($P < 0.001$), IL-10 - 21.5 ± 0.55 pg/ml (before treatment 10.6 ± 0.32 pg/ml) ($P < 0.001$). The cytokine profile of the oral mucosa after a week in patients of group II with zirconium prostheses significantly differed from the group with cermet prostheses. Upon examination of the oral cavity in 91% (84) patients with zirconium prosthetics, after 7 days, the tight fit of zirconium prostheses to the tissues of the oral cavity excluded gum subsidence, tooth root exposure and inflammation of the soft tissues of the oral cavity.

Conclusions

Dental prosthetics in patients using bridges made of pure chrome-kobolt metal coated with titanium dioxide) have a negative effect on the marginal periodontium and the mucous membrane of the oral cavity, manifested by high values of electrochemical potentials, unsatisfactory hygienic condition, profound changes in the morphological structures of the marginal periodontal complex in the dental periodontium. Laser Doppler flowmetry at the stages of orthopedic treatment has shown that the functional state of the microcirculation system in the tissues of the marginal gums of periodontal tissues is important for predicting the results of prosthetics of partial dentition defects. 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.

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