

STRUCTURAL AND FUNCTIONAL CHANGES IN PERIODONTAL TISSUES DURING PROSTHETICS WITH METAL-CERAMIC AND ZIRCONIUM DENTURES

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Abstract:

Factors of local immunity of the oral cavity in the oral fluid before and after prosthetics with the use of fixed structures made of cermet and zirconium materials was studied in 180 people aged 20 - 70 years and 30 practically healthy people in the comparison group of the same age. The oral fluid determined and referring levels of pro inflammatory cytokines IL-1 β , IL-6, FN O- α and anti-inflammatory cytokine IL-10. To increase the efficiency of prosthetics, the use of metal, metal-ceramic and zircon dentures was determined. The issues of modern methods of dental prosthetics are highlighted. The analysis of the most common errors and complications in prosthetics with the use of fixed structures has been carried out. The assessment of the physical and technical properties of cermet structures remains poorly studied. To exclude ceramic chips, antagonizing dentures are not brought to contact, which can lead to deformation. Thus, the question of the influence of fixed prostheses on the clinical and morphological state in the absence of periodontal tissues remains unstudied.

Introduction

The structural changes in the oral cavity organs with partial loss of teeth were studied. Changes in saprophytic and pathogenic microflora have been fairly well studied. In case of prosthetics with a non-removable design of dentures, special importance is attached to the abutment teeth. They carry out a large functional load, in connection with which the periodontal tissue undergoes morpho-functional changes. Considering the side effects of artificial crowns, these changes become obvious. Initial structural changes are observed in the pulp tissue during the preparation of dental hard tissues.

In orthopedic dentistry, dentures from precious and base metal alloys are widely used to restore defects in crowns and dentition. The latter are composed of cobalt-chrome and nickel-chrome alloys. The problem of the influence of base metals on the organs of the oral cavity and on the body as a

whole is urgent. Among them, oral galvanosis is more common. Being in the oral cavity for a long time, a denture, as a foreign body made of a material not characteristic of the human body, causes structural changes in the marginal periodontium. Therefore, modern orthopedic dentistry faces the question of the compatibility of metal dental alloys and the human body [1.3.5.7.9.11].

The available research in this direction is not numerous and is of a fragmentary nature. Therefore, the identification of the cause-and-effect circumstances that contribute to the occurrence and cause of diseases of oral mucosa when using various types of prostheses (metal crowns, ceramics, zirconium) with the use of histological, electron microscopic and histochemical research methods, will allow developing more effective methods of their treatment and prevention.

Aim of the study

Is comparative assessment of morphological and functional changes in periodontal tissues when using metal, metal-ceramic and zircon dentures to improve the efficiency of prosthetics.

Materials and methods

The studies were carried out in 100 people, who were divided into 2 groups: the main observation group - 90 ($80.7 \pm 3.7\%$) patients and the comparison group (control group) - 30 ($19.3 \pm 3.7\%$) patients. Among the patients of the main group, there are 30 patients with chromium-cobalt, 30 patients with metal-ceramics and 30 patients with zircon crowns. There were examined 144 teeth, which are and will be the abutment teeth of bridges. In the comparison group, studies of 24 teeth with intact periodontium on the upper and lower jaws were carried out in patients aged 30 to 60 years. When examining all patients in both observation groups, the Green-Vermillion hygienic index, Russell periodontal index were determined, and the Kulazhenko test was performed. The Schiller-Pisarev test refers to the method of intravital staining of gingival 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 lubrication of the gums indicates inflammation. Oral cavity sanitation, dental plaque removal, and oral hygiene training were carried out. Diagnostic observations of the periodontal condition were carried out in the area of abutment teeth before and after fixation of bridges and crowns, as well as within 1, 3, 6, 12 months after prosthetics. Clinical methods included questioning, casual examination, and armed eye examination (stomatoscopy) of the oral cavity. Stomatoscopy was performed using an ophthalmic operating microscope at a magnification of 30 times.

The used bridges (cermets, zirconium, metal crowns) create conditions for the development of increased functional load on the periodontal tissues of the supporting teeth. When prosthetics of included dentition defects with bridges, it is necessary to determine possible functional changes in the periodontal tissues, which can largely determine the terms of their use. The change in blood circulation in the periodontal tissues directly depends on the degree of deformation of the dentition, the length of the edentulous and the involvement of bridges in the chewing load. Particular attention during prosthetics (cermets, zirconium) should be paid to changes in the state of the marginal periodontium at the level of microcirculation, which was one of the objectives of this study. To determine the marginal periodontium of the abutment teeth of the first group, we selected 64 patients, the second group - 10 people [2.4.6.8.10.12.14].

The study groups consisted of 5 groups: 10 patients ($16.0 \pm 4.2\%$) - with intact periodontal disease, 16 patients ($24.0 \pm 4.9\%$) - gingivitis, 22 patients ($36.0 \pm 5.5\%$) - mild periodontitis, 10 patients (13.3

$\pm 3.9\%$) - periodontitis of moderate severity, 6 patients ($10.7 \pm 3.5\%$) - periodontitis at the stage of abscess formation. The state of the periodontal tissues, in particular the marginal gums, was assessed according to the data of clinical and paraclinical research methods in the field of abutment 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 the variation statistics of the computer programs "MS Excell" and "MS Access" in a standard volume for biomedical research. Before using the technique of electrodontometry, dental deposits were removed. During the second prosthetics, after removing the bridges, the remains of the fixed cement were carefully removed. EOM, intraoral image.

Immunological studies were carried out in the laboratory of immunoregulation of the institute of the Immunology and Human Genomics of Academy of Sciences of the Republic of Uzbekistan. The study involved 180 patients (115 women and 65 men), aged 20 to 70 years old. The average age of women was 38 years old, men - 49 years old. The patients were conditionally divided into two groups:

1st group - 180 patients (115 women and 65 men) who underwent metal-ceramic prosthetics;

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

The control was the data of a survey of 30 apparently healthy volunteers, comparable in age and sex.

Measurement of concentration of IL-1 β , IL-6, IL-10, TNF α in oral liquid (GC), was conducted by enzyme immunoassay (ELISA) using commercial kits AO "Vector-Best". Gastrointestinal tract sampling was performed before complex treatment in patients with defects in dentition and hard dental tissues and after prosthetics, not earlier than after 30 days, as well as in healthy individuals. To do this, at the dental appointment, the patient was asked to rinse the oral cavity with 3 small volumes of plain water and think about lemon to stimulate salivation. Sterile penicillin vials with a volume of 10 ml were used as test tubes, which patients filled with their gastric cancer up to 1 / 3-1 / 2 of the total volume. Then glass vials with the test material were frozen in a freezer and stored at minus 20 ° C for no more than one month. Thereafter, undiluted samples were thawed very quickly by heat treatment in a water bath at 37 ° C to prevent fibrinogen precipitation.

The data were statistically processed using the Statistics 6.0 computer program. The reliability of differences in the mean values of the compared indicators was assessed by the Student's test (t).

Clinical researches

In accordance with the tasks, 100 patients were included in the study, who were divided into two groups: the main observation group - 90 patients (80.7 ± 3.7) and the comparison group - 10 patients. Design features and type of material from which bridges were made. In the comparison group (control group), studies of 24 teeth with intact periodontium in the upper and lower jaws were carried out on the basis of basic and paraclinical research methods (percussion, the state of the gingival margin using a bulbous probe), X-ray - overview and sighting images, electrodontometry - to determine condition of the pulp and periodontal. In the main observation group of patients, in addition to determining the type of design features of bridges, all abutment teeth were examined in the same sequence as in the comparison group. The collection of clinical material was carried out with the obligatory opening of an outpatient card, entering into it the dental status and the general condition of the body and the diseases transferred. All design features and type of material from which bridges were made, age indicators are given in the section "Material and research methods". In the comparison group (control

group), studies of 24 teeth with intact periodontium in the upper and lower jaws were carried out on the basis of basic and paraclinical research methods (percussion, the state of the gingival margin using a bulbous probe), X-ray - overview and sighting images, electrodontometry - to determine condition of the pulp and periodontal. In the main observation group of patients, in addition to determining the type of design features of bridges, all abutment teeth were examined in the same sequence as in the comparison group [13.15.17.19].

The clinical condition of the marginal periodontium was assessed visually and using an operating microscope, the Schiller-Pisarev test and the papillary-marginal alveolar index (PMA) indexes, where hyperemia, edema, bleeding and vascular pattern were determined.

The clinical picture with partial adentia largely depends on the number of lost teeth, dystopia, type of bite, functional usefulness, the state of hard tissues not only of abutment teeth, but also of the complex of tissues surrounding the tooth. The appearance of a defect after tooth extraction disrupts its continuity, morphological and functional disorders occur. Shortened periods of wearing fixed bridges resulted in supercontact, while in others the teeth were turned off from the act of chewing. The marginal gum, where the connection with the tooth occurs, is often interpreted as a gingival pocket, a gingival gap, a physiological pocket, a gingival groove. When measuring the gingival gap, the groove depth reached 2-3 mm on average. With bridge prosthetics, when odontopreparation was performed and the gums were injured (periodontal pathology), the depth of the gingival groove in 50% of cases reached 3 mm. These data related to the indicators of the marginal gingiva of the abutment teeth around the defect during repeated prosthetics of patients. The condition of the periodontal gap served as a basis for assessing the marginal periodontium in persons wearing fixed prostheses, both during re-prosthetics and in future orthopedic interventions. We studied the magnitude of the electrochemical potentials in connection with the finding in the oral cavity of prostheses of various design features, as well as the materials from which they were made: solid, cermets, zircon [12.14.16.18].

It is known that dentures made of various materials lead to disruption of oral homeostasis and have adverse effects on the body as a whole. In particular, there are violations in the triggering mechanisms in the development of allergies, hyperergic conditions, ulcerative and trophic processes. In this regard, the determination and understanding of causal factors in the conditions of the galvanic environment of the oral cavity is based on the use of para-clinical methods, in particular, on the study of electrochemical potentials. Our data on electrochemical potentials (ECP) are consonant with the indicators of numerous studies and are normally up to 50 mV. Analyzing the identified ECP frequencies, it is obvious that wearing metal structures is directly related to an increase in the level of galvanic currents. Thus, when studying ECP in patients using structures made of dissimilar materials, the average measurement values tended to higher values of the potential difference and reached the level of 100-150 mV. Poor, inadequate endodontic treatment leads to changes in the periodontal complex, ultimately leading to side effects and premature removal of bridges.

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 the supports of bridges and 24 teeth on the upper and lower jaw with healthy intact periodontium in patients of the control group. The dynamics of observations began with planning and coordinating with the patients the design features of bridges and the upcoming therapeutic measures in the dynamics of treatment up to 1 year. Selectively, in terms of up to 3 years and more, after prosthetics,

some patients were called for a follow-up examination, where, if necessary, a clinical and X-ray examination was carried out. In patients using for many years (more than 7 years) a fixed construction of dentures made of 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. Bleed easily and painful on probing. In some patients (more in men), the titanium coating has worn off on the chewing surfaces of the teeth. Patients with such (metal) dental constructions complained of the appearance of a metallic taste in the mouth and the sensation of unpleasant micro-currents when using aluminum spoons. In the dynamics of observations in terms of up to 1 year and more with repeated prosthetics, we paid special attention to the state of the periodontal edge, the mucous membrane of the entire oral cavity, modeling in accordance with the anatomy of the group of teeth, supercontacts, the state of the intermediate part of the bridge, as well as functional and aesthetic indicators.

The aim of this study is the histological and histochemical assessment of the oral mucosa with various types of prostheses: cermets, zirconium, metal crowns. The control group consisted of marginal gum tissue after tooth extraction. The keratinization process is especially pronounced in the epithelium of the anterior third of the hard palate. The structure of the epithelium of the hard palate is very similar to the leaves that have fallen to the ground in the autumn period of the year. Some of them slough off in the form of completely keratinized scales, while others do not show any signs of keratinization and have a structure typical of squamous epithelium. Regeneration of epithelial cells occurs due to cell division of the basal layers. The pattern of mitosis, as a rule, is observed in the cells of the basal layer, as well as in the adjacent lower rows of cells of the spinous layer. (Irsaliev Kh.I. 1993). The electron diffraction pattern of a transmission microscope shows detachment of cells of the granular layer with penetration of microorganisms into the intercellular space. Destructive changes are also observed in the deep zones of the spinous layers of the epithelium. It should be noted a slowdown in the differentiation of epithelial cells and a sharp decrease in the mitotic activity of the combined zone. In the prickly layers, there is a rupture of desmosomic connections between epithelial cells [14.16.18].

With the introduction of metals (mainly stainless steel) into the practice of orthopedic treatment, the reactions to these materials were explained by the appearance of galvanic phenomena in the oral cavity. As a rule, the diagnosis was formulated as "galvanosis", "electrogalvanosis". Since there were no sufficiently sensitive research methods to prove the presence of metal corrosion in an aggressive environment. Significant disorders with partial edentulousness occur in the tissues of the periodontal complex, since it is the integrity of the dentition of the jaws that ensures the usefulness of chewing as one of the most important functions of the body. The wide spread of secondary adentia among the adult population makes this problem relevant all over the world Gozhiy A.G. 1998, Volynets V.I. 1996). In the manufacture of a fixed structure of dentures, most of the bridges have to be prepared with abutment teeth for artificial crowns. Dissection of hard dental tissues without observing the established rules leads to morpho-functional changes in dental pulp tissues. In the monograph of Professor Irsaliev Kh.I. (2001) widely described and illustrated electronograms of the surface of prepared teeth.

Results and discussion

Thus, the restoration of dentition defects with various fixed structures of dentures is an orthopedic dental treatment. The loss of teeth and the appearance of various defects in the dentition contribute to the further development of the pathological process in the dento-jaw system and in the body as a

whole. The choice of the design of dentures and the materials from which they will be made is of paramount importance in the medical and social sphere of the patient. In our Republic of Uzbekistan and a number of other foreign countries, metal crowns and bridges made of base metals are currently used, sometimes they are coated with titanium nitrate, which further aggravates the protective mechanisms of the oral cavity.

Such materials used for 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 built into 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 cermets and zirconium are largely indifferent for the organs and tissues of the oral cavity. However, there are also negative influences 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 fixed bridges, cermets, zirconium and chromium-cobalt alloy).

As recommendations for practical health care of the most appropriate 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 a cobalt-chromium alloy, edematous with cyanosis of the mucous membrane of the alveolar ridge was observed. As we mentioned above, such a mucous membrane quickly bleeds when touched with a probe and when brushing teeth with a toothbrush [15.17.19].

A different clinical picture was observed in patients using metal-ceramic bridges. Among the examined, 7 patients 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. We observed a completely different clinical picture in the group of patients using zircon bridges. Among the examined patients, gingivitis was observed in 3 patients. Regardless of the terms of using dentures, periodontitis was not observed in this group of patients. The data on indicators of the state of microcirculation of the marginal gingiva included abutment teeth under bridges (main group of observations), as well as intact periodontium of the symmetrical side (comparison group). The analysis of the results showed that the level of capillary blood flow in the healthy periodontium and marginal gingiva (the results obtained were averaged and taken as the norm) was 20% and 30% higher, respectively, compared with the periodontium of abutment teeth. The coefficient of variation (KV), indicating the state of microvascular activity, was lower in the supporting vessels by 18% in patients with repeated prosthetics. The vasomotor activity of the microvessels of the abutment teeth is slightly reduced (by 4.2%) compared to the indices in the intact dentition, which is possibly due to the high functional load on the healthy side. The data obtained show that in the area of the gum tissue of the marginal periodontium of the supporting teeth, which limits the dentition defect, there was a decrease in the intensity of tissue blood flow and vasomotor activity of microvessels, compared with those of the marginal gingiva of the intact dentition.

It should be noted that at present there is no multifactorial approach to the diagnosis, treatment and prevention of diseases caused by the materials of dentures, which significantly complicates the practical work of a dentist. Therefore, the histological diagnosis of the mucous membrane of the marginal periodontium will certainly contribute to the differential diagnosis of diseases caused by the materials of dentures. The development of inflammatory diseases is determined by the state of cytokine regulation. Most of both pro- and anti-inflammatory cytokines are present not only in the peripheral blood, but also in other biological fluids

of the body [9]. The sources of their production are both lymphocytes and macrophages built into the epithelium of the mucous membranes, and the epithelial cells of the mucous membranes and the salivary glands themselves. Another source of cytokines in gastric cancer (saliva) may be their extravasation from blood serum. However, many researchers have noted that the content of cytokines in gastric cancer (saliva) does not correlate with their level in the blood, which indirectly indicates their local synthesis [11].

Analysis of the data set that the content of IL-1 β to treat patients was about in the middle $7.5 \pm 0.20 \text{ pg / ml}$, then like the comparison group, its concentration was $4.2 \pm 0.26 \text{ pg / ml}$ ($P < 0.001$). 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 ($14.7 \pm 0.46 \text{ pg / ml}$ versus $11.8 \pm 0.55 \text{ pg / ml}$, $P < 0.001$), 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, synthesis FN O- α in patients with the group to prosthetic averaged $12.3 \pm 0.32 \text{ pg / ml}$, and these values were in the control group $9.4 \pm 0.39 \text{ pg / ml}$, which is 1.3 times more ($P < 0.001$). It was also found that a significant increase in the level of IL-10 in the main observation group before orthodontic treatment was 1.2 times ($10.6 \pm 0.32 \text{ pg / ml}$ versus $8.5 \pm 0.38 \text{ pg / ml}$) ($P < 0.001$).

The obtained data with cytokine status of the oral cavity before the prosthetics point to the weakening of the local immune defense GPRS, connectivity with the need for the orthopedic intervention.

After the imposition of dentures, the 1st dental examination was carried out the next day, at the stage of denture correction. Treatment of inflammatory changes in the mucous membrane was carried out both at the reception and at home using preparations containing antiseptic, anesthetic, regenerating components in accordance with the "Protocol for the management of patients with partial absence of teeth (partial secondary adentia)".

Comparative analysis of the content revealed that in group I with metal-ceramic prosthetics, the level of IL-1 β increased by 3 times after a week with an average value of $22.7 \pm 0.35 \text{ pg / ml}$ (before treatment, $7.5 \pm 0.20 \text{ pg / ml}$) ($P < 0.001$), the concentration of IL-6 increased to $42.9 \pm 1.07 \text{ pg / ml}$ (before treatment $14.7 \pm 0.46 \text{ pg / ml}$) ($P < 0.001$), TNF- α - $37.2 \pm 0.76 \text{ pg / ml}$ (before treatment $12.3 \pm 0.32 \text{ pg / ml}$) ($P < 0.001$), IL-10 - $21.5 \pm 0.55 \text{ pg / ml}$ (before treatment $10.6 \pm 0.32 \text{ pg / ml}$) ($P < 0.001$).

The cytokine profile of oral mucosa after a week in patients of group II with zirconium prostheses significantly differed from the group with metal-ceramic prosthetics. When examining the oral cavity in 91% (84) of patients with zirconium prosthetics already after 7 days, the tight fit of the zirconium prostheses to the tissues of the oral cavity excluded subsidence of the gums, exposure of the dental root, and inflammation of the soft tissues of the oral cavity (Fig. 2).

So the content of IL-1 β after a week in group II averaged about $19.4 \pm 0.61 \text{ pg / ml}$ ($P < 0.001$), the concentration of FN O- α significantly reached a peak after 7 days $28.5 \pm 1.04 \text{ pg / ml}$ ($P < 0.001$), the content after 7 days was $34.2 \pm 0.62 \text{ pg / ml}$ ($P < 0.001$), in patients after the installation of an orthopedic construction, the level of IL-10 increased on average to $16.7 \pm 0.57 \text{ pg / ml}$ after 7 days ($P < 0.001$) (Fig. 2).

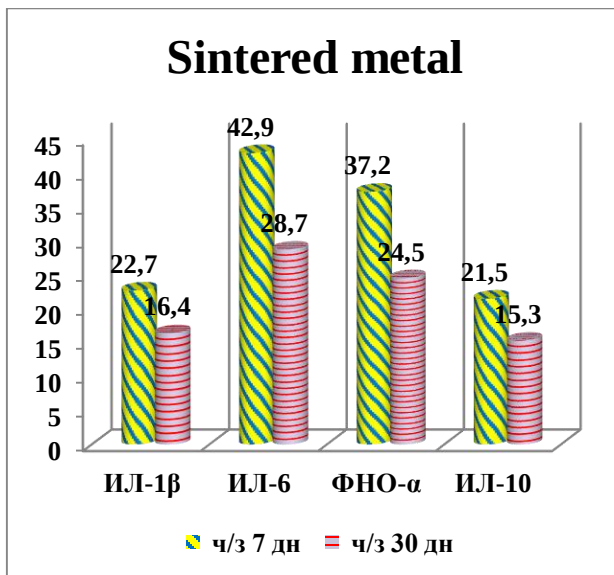


Fig. 1 The content of cytokines in the gastric cancer after prosthetics after 7 and 30 days in patients with metal-ceramic prostheses

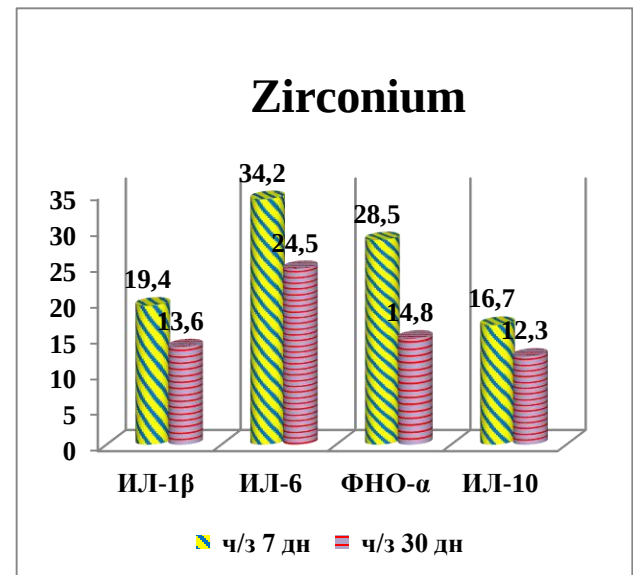


Fig. 2. Content of cytokines in gastric cancer after prosthetics after 7 and 30 days in patients with zircon prostheses

The study of the dynamics of the above mentioned mediators of inflammation recorded a decrease in the expression with 30 days after fixation of the fixed bridge, but these data did not reach the values before the start of treatment and did not undergo significant fluctuations in the future, that is, remained within the specified concentrations.

Thus, in group I of patients with metal-ceramic prosthetics after 1 month, the level of IL-1 β decreased to 16.4 ± 0.74 pg / ml ($P < 0.001$), IL-6 to 28.7 ± 0.72 pg / ml ($P < 0.001$), TNF- α - 24.5 ± 1.03 pg / ml ($P < 0.001$), IL-10 - 15.3 ± 0.65 pg / ml ($P < 0.001$) (Fig . 1).

It is important to note that in the II group of patients with zirconium prosthetics, the level of IL-1 β after a month of prosthetic implantation retained a tendency to decrease by 30% compared to the values after 7 days. Thus, the content of IL-1 β after 30 days is 13.6 ± 0.46 pg / ml ($P < 0.001$). (Fig. 2.)

Concentration of FN O- α was significantly decreased on Day 30 to 14.8 ± 0.36 pg / ml, but did not reach the initial values (starting - $12.3 \pm 0,32$ pg / ml ($P < 0.05$). The rating of content via 1 month established a slight decrease in the expression of IL-6 to 24.5 ± 1.03 pg / ml ($P < 0.001$). A decline after 1 month was observed in the level of IL-10, which averaged 12.5 ± 0.68 pg / ml ($P < 0.001$) (Fig. 2.)

These indicators indicate a decrease in the inflammatory response of the oral cavity, albeit slow, but stabilization of the local immune mood of the oral cavity.

The revealed significant increase in the concentration of pro-inflammatory cytokines IL-6 and TNF- α after 7 days and 1 month in both groups indicates a significant decrease in anti-infectious resistance in the oral cavity, which is a consequence of an imbalance between the normal flora and the body's immune response at the local level.

Thus, on the basis of the studies carried out, it can be stated that the established cytokine imbalance in gastric cancer in group I with metal-ceramic prosthetics indicates

an increase in the antigenic load and an increase in the permeability of the oral mucosa as a result of a traumatic genesoprosthesis and, as a consequence of the developed inflammatory process, which also causes discomfort.

Comparative analysis of the obtained data of group II with zirconium prosthetics revealed a positive dynamics of indices of local immunity links in gastric cancer in patients of this group. On examination, no foci of inflammation caused by the prostheses were observed, which indicates a satisfactory regeneration of the tissues of the prosthetic bed, and according to the patients, they were completely adapted to the denture.

The obtained data of the comparative analysis make it possible to develop an algorithm for the treatment of the consequences of metal-ceramic and zirconium prostheses, in the use of orthopedic structures made of various materials.

Conclusions

Dental prosthetics in patients using chromium - cobalt pure metal bridges with a coating of titanium dioxide) have a negative effect on the marginal periodontium and the oral mucosa, manifested by high values of electrochemical potentials, unsatisfactory hygienic state, profound changes in the morphological structures of the marginal periodontal complex in the dentoparodontium. Laser Doppler flowmetry at the stages of orthopedic treatment showed that the functional state of the microcirculation system in the tissues of the marginal gums of the periodontal tissues is relevant for predicting the results of prosthetics of partial dentition defects.

The structural and functional characteristics of the mucous membrane of the marginal gingiva indicated the negative effect of metal dentures in comparison with the weakly expressed inflammation of the epithelium in the surface layers during prosthetics made of metal-ceramics and zirconium. Diagnostics and treatment of an increased level of galvanic currents should involve the removal of metal structures of various inclusions and the conduct of pathogenetic therapy of periodontal tissues before re-prosthetics, with the replacement of basic dental materials with ceramics or zirconium.

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