



## Immunological Changes in the Organs of the Oral Cavity When Prosthetics with Bridging Prosthesis Made of Zirconium and Metalloceramics

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**Relevance.** The degree of exposure of dental prostheses to tissues in the oral cavity depends on the quality of their preparation, the physical and chemical properties of the structural materials. In recent times, it has been observed that the number of patients who are in the oral cavity (removable and non-removable dental prostheses) who suffer from the inability to take metal supplements is growing. Subjective signs include: metallic taste in the mouth, aching and itching of the tongue, changes in the sense of taste sensation, bitter, sour taste, abundant salivation or, on the contrary, dry mouth, itchy throat, tooth confinement, redness and swelling of the soft tissues of the face. Most often, headaches, dizziness, weakness, rapid fatigue, nausea, vomiting, sleep disorders, pain in the heart are detected.

Objective signs can be varied: in the oral cavity – haylitis, glossitis, red flat iron, as well as in the gastrointestinal tract, changes in liver function, neurological disorders are observed [K.A. Lebedev, 2010; Yu.N. Maybara, 2011; A.I. Mein, 2011; S.S.Tower, 2010]. One of the ways to increase the indifference of metal additives in the oral cavity is their galvanic electrolyte goldening [20.22.24.25]. This method of increasing the biological inertness of non-removable dental prostheses has not been sufficiently studied. In Parodont pathology, there is no data on the justification of instructions for the use of modern methods of electrolyte gilding of carcasses of metalloceramic dental prostheses.

The obtained data of the group with zirconium prostheses significantly differed from the data of the group with metal-ceramic prostheses.

The content of immunoglobulins of the main classes in groups with zirconium prostheses tended to increase and reached its peak on the 7th day after implantation.

It was found that concentrations of sIgA (up to  $825 \pm 8.80$  ml/ml, after 7 days  $885 \pm 16.73$ ), IgM (up to  $82 \pm 2.71$  mg/ml, after 7 days  $94 \pm 3.15$  mg/ml) in rye and IgG content (before treatment  $56 \pm 1.11$  mg/ml after a week  $63 \pm 2.61$  mg/ml) in the group significantly reached high values after a week.

It should be assumed that the stimulation of sIgA after prosthetics, in particular on the 7th day, indicates the tension of the resistance mechanism in the oral cavity at the maximum level, as well as an increase in the levels of IgG and IgM RV is evidence of high activity of inflammatory processes in the oral cavity formed on the day of prosthetics and the strength of antigenic load.

In the studies of Viha G.V. (2008), it was found that the magnitude of changes in sIgA levels in secretions depends on the duration of adverse effects on the body, genetic characteristics and reserve capabilities of the body. Passive adaptation takes place with reduced reserves of self-regulation. Active adaptation is possible with sufficient reserves of self-regulation [21.23.24.25].

Accordingly, 30 days after prosthetics, due to one of the leading qualities of zirconium – hypoallergenic, as well as the treatment of inflammatory changes in the mucous membrane 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)" during repeated examinations of the oral cavity, the patients did not complain about the dental prosthesis, no inflammatory changes were found on the oral mucosa.

Analysis of the obtained data on the assessment of the content of sIgA in the RV revealed a significant decrease on the 30th day after prosthetics, which was lower than the initial and approached the control values (day 30  $-811\pm 9.17$  mg/ml, baseline -  $825\pm 8.80$  mg/ml, control -  $780\pm 8.59$  mg/ml) ( $P<0.001$ ). Such indicators indicate an improvement in the condition of the prosthetic bed and the oral mucosa as a whole.

In a number of works, as mentioned above, the authors point to the fact that Mi G immunoglobulins, which are classified as non-secret, enter the oral cavity with blood flow, but they can also be synthesized directly in it by plasmocytes after specific stimulation [1.3.5.7.9.11.13.15.17.18.19]. Compared to sIgA, they are less effective, but they have an important immunostimulating effect on the local lymphatic system.

1 month after prosthetics, the concentration of IdM significantly decreased by 13% of the initial values and approached the data of the control group and averaged  $72\pm 2.37$  mg/ml (baseline -  $82\pm 2.71$  mg/ml, control -  $68\pm 1.31$  mg/ml) ( $P<0.001$ ).

The squamous epithelium lining the mucous membrane of the mouth acts as a "molecular sieve", particularly conducive to the penetration of IgG. Normally, this route of admission is limited to. IgG-class antibodies have pro-inflammatory properties and can acquire an immunopathological role when antigen elimination is impossible.

In our study, in a group of patients with zirconium prosthetics, the synthesis of this immunoglobulin in the RV due to a decrease in inflammation of the prosthetic bed and adaptation to dentures by day 30 significantly decreased and the average level was  $49\pm 0.87$  mg/ml, which is less than the baseline values and approached the control values (baseline -  $56\pm 1.11$  mg/ml, control -  $37\pm 1.13$  mg/ml) ( $P<0.001$ ).

Thus, when examining the oral cavity of patients with zirconium prosthetics after 7 days, the tightness of the zirconium prostheses to the tissues of the oral cavity excluded gum subsidence, exposure of the dental root, inflammation of the soft tissues of the oral cavity, thereby the indicators of local humoral immunity indicate satisfactory dynamics of sIgA, IdM and IgG in the oral fluid.

Numerous studies have proven an important role in protecting the body from TNF- $\alpha$  infections. In its absence, anti-infective resistance is violated. In our work, the concentration of TNF- $\alpha$  significantly peaked after 7 days and decreased on day 30, but did not reach the initial values (baseline  $-12.3\pm 0.32$  pg/ml, day 7  $-28.5\pm 1.04$  pg/ml, after 1 month  $-14.8\pm 0.36$  pg/ml). According to the literature data, the obtained indicators indicate the activation of TLR receptors of innate immunity and their recognition of endogenous molecules, which leads to enhanced synthesis of the above-mentioned mediator in tissue damage and inflammation, which were observed after prosthetics ( $P<0.001$ )

Analysis of the content of IL-6, which has a dual function: pro-inflammatory and anti-inflammatory, revealed a significantly maximum level a week after prosthetics, which explains its ability to transfer inflammation from the acute phase to the chronic one. The content assessment after 1 month revealed a slight decrease in IL-6 expression (baseline  $-14.7\pm 0.46$  pg/ml, after 7 days  $-34.2\pm 0.62$  pg/ml, after 1 month -  $24.5\pm 0.45$  pg/ml) ( $P<0.001$ ).

It should be noted that despite the switching of non-specific protective reactions to specific ones, while inhibiting the synthesis of IL-1, TNF- $\alpha$ , attracting neutrophil granulocytes, increases the migration of monocytes and lymphocytes [2.4.6.8.10.12.14.16.18.20], the inflammatory process probably continued for a long time.

The key regulator of the immune response is IL-10. It inhibits the synthesis of pro-inflammatory cytokines by macrophages and cytokines produced by Th1 to a much greater extent than Th2. IL-10, as a rule, is not detected either in the blood or in the fluid of the dental sulcus of healthy people.

**Conclusion.** In patients after the establishment of the orthodontic design, the level of IL-10 increased to an average of  $16.7\pm 0.57$  pg/ml after 7 days ( $P<0.001$ ), and a slight decrease was

observed after 1 month –  $12.3 \pm 0.68$  pg/ml ( $P < 0.01$ ), which indicates a decrease in the inflammatory response of the oral cavity and although slow, but normalization of the local immune mood of the oral cavity (Fig.5.2).

Thus, a comparative analysis revealed a positive dynamics of indicators of local immunity links in the RV in patients after zirconium prosthetics. During the examination, no foci of inflammation caused by dentures were observed, which indicates satisfactory regeneration of the tissues of the prosthetic bed, and according to the patients, they fully adapted to the denture.

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