Expression of MMP-14 and MMP-13 occurred in all investigated cases of both fast-progressive and chronic complex periodontitis. The MMP-14 enzyme was characterized by the staining of membrane cells of type I collagen during periods of disease progression indicating by the destruction of connective tissue. It is known that the family of MMPs forms a "cascade" of reactions that cause changes in connective tissue with collagenase activity and activates collagenase MMP-8 and MMP-13. It is of interest that MMP-13 is capable to activate osteoblasts and thus is involved in many osteodestructive diseases. MMP-13 (collagenase-3) is an enzyme which presents in the healing tissue of the gum, pulp, odontoblast. It is known as a potential key molecule that plays a role in the pathogenesis and prognosis of the disease. MMP-13 enzyme that possesses collagenase activity and activates collagenase MMP-8 and MMP-13. It is of interest that MMP-13 is capable to activate osteoblasts and thus is involved in many osteodestructive diseases. Previously, an increase of MMP-13 immunohistochemical expression and its concentration in the gingival fluid was observed. Moreover, the MMP-13 enzyme is known to play a role in the degradation of bone and other ECM components.

Destruction of tissues of the supporting apparatus of the tooth goes due to the degradation of the components of the extracellular matrix (ECM) and leads to irreversible loss of connective tissue of the periodontium and alveolar bone resorption. Important role in this pathological process is played by matrix metalloproteinasises (MMPs) -Zn-dependent endopeptidases, which are activated in inflammatory and tumor processes and participate in the destruction of all types of ECM proteins. MMP-14 is a membrane-bound enzyme that possesses collagenase activity and activates collagenase MMP-8 and MMP-13. It is of interest that MMP-13 is capable to activate osteoblasts and thus is involved in many osteodestructive diseases. Previously, an increase of MMP-13 immunohistochemical expression and its concentration in the gingival fluid was observed. Moreover, the MMP-13 enzyme is known to play a role in the degradation of bone and other ECM components.

Results. In our study has been shown the absence of significant difference in the interleukin’s production in women of the first and second groups. In the patient of the third group the serum level of IL-1B was in 17,9 times higher, moreover level of TNF-a was in 3,6 times higher than in the first group. In addition, the level of IL-1B in the fourth group was in 1,4 times higher and level of TNF-a was in 1,5 times higher than in the third group. The high concentration of serum interleukins has important impact on loss of alveolar bone’s density. An increase of interleukins concentration is associated with decrease of alveolar bone’s density. Also, there is in fact increasing in 1,6 times of IL-6 serum level in women of the first group. And number of IL-1B in the patients of fourth group declined in 1,4 times compared with third group. We can conclude that the numerical density of alveolar bone goes down and it correlates with serum interleukins concentration in six-eight months term after prosthodontic treatment in postmenopausal women.

Prospects for the further research. To study the level of interleukins and the degree of alveolar bone resorption in patients with reduced alveolar bone density depending on the type of prosthodontics constructions and the material from which it is made. Furthermore, there is need to develop and implement prosthodontic characteristics guidance and indications for remodeling therapy in clinics.

References:

Key words: osteoporosis markers, interleukins, postmenopausal women, prosthetics.

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MATRIX METALLOPROTEINASE -14 AND MATRIX METALLOPROTEINASE -13 ARE THE POTENTIAL MARKERS OF THE CHRONIC PERIODONTITIS

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Destruction of tissues of the supporting apparatus of the tooth goes due to the degradation of the components of the extracellular matrix (ECM) and leads to irreversible loss of connective tissue of the periodontium and alveolar bone resorption. Important role in this pathological process is played by matrix metalloproteinasises (MMPs) -Zn-dependent endopeptidases, which are activated in inflammatory and tumor processes and participate in the destruction of all types of ECM proteins. MMP-14 is a membrane-bound enzyme that possesses collagenase activity and activates collagenase MMP-8 and MMP-13. It is of interest that MMP-13 is capable to activate osteoblasts and thus is involved in many osteodestructive diseases. Previously, an increase of MMP-13 immunohistochemical expression and its concentration in the gingival fluid was observed. Moreover, the MMP-13 enzyme is known to play a role in the degradation of bone and other ECM components. It is known that the family of MMPs forms a “cascade” of reactions that cause changes in connective tissue with active and chronic inflammation. The purpose of our study was to determine the prognostic significance of immunohistochemical determination of MMP-14 and MMP-13 expression in periodontal tissues of the patients with fast-progressive and chronic periodontitis.

Material and Methods. To assess the MMP-14 and MMP-13 expression a histological study of 75 gingival biopsies of the patients with a clinical diagnosis fast-progressive periodontitis (28 patients, 15 men (53,6%), 13 women (46,4%), average age 31.1 years old) and chronic complex periodontitis (47 patients, 23 men (48,9%), 24 women (51.1%), average age 43.7 years old) was performed. All patients were undergoing with professional hygiene of the oral cavity and closed curettage procedures. A periodontal soft tissue biopsy while indicated procedures was performed. Expression was assessed on immunohistochemical slides stained with antibodies to MMP-14 and MMP-13. Statistical analysis was performed using Statistica 12 software. The comparison of the groups was carried out with the help of the criterion χ² with the Yates correction.

Results. Expression of MMP-14 and MMP-13 occurred in all investigated cases of both fast-progressive and chronic complex periodontitis. The MMP-14 enzyme was characterized by the staining of membrane cells of the basal layer of the epithelium. In stromal cells positive staining was found both in the membrane and cytoplasm of cells. It was found that the expression of MMP-14 was mild and moderate in the fast-progressive...
periodontitis, while in the group with chronic periodontitis, the expression of MMP-14 was significantly higher ($p = 0.0027$). MMP-13 expression was characterized with MMP-13 absence in the epithelium of the gums but localization in the cells of the stroma, presumably in the macrophages and fibroblasts cells. When comparing groups with fast-progressive and chronic complex periodontitis no any statistically significant differences in MMP-13 expression in the gingival stroma were detected.

Prospects of the further researches. Despite the fact the level of MMP-13 did not change significantly in the tissues of patients with different forms of periodontitis in our study there is undoubtedly an increasing of the MMP-13 expression while inflammation of the periodontium is determined and MMP-13 enzyme participation in the activation cascade of metalloproteinases since it is known that expression of that enzyme is absent in the normal gingival tissue. Nevertheless, rapidly progressive periodontitis is characterized by a lower expression of MMP-14 in comparison with the chronic form of the periodontal disease. Thus, immunohistochemical staining with antibodies to MMP-14 can be used in dental practice as an additional method for diagnosing and predicting the course of periodontitis in the early stages of the disease. Further researcher of the MMP-7, -8, and -9 enzymes expression in the periodontal tissues as a potential marker of the course of the periodontal diseases might be very interesting for the diagnostic criteria of the different forms of periodontitis evaluation.

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PROGNOSIS OF PERI-IMPLANTITIS IN PATIENTS BASED ON BIOCHEMICAL PARAMETERS OF SALIVA

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Study of objective measures of bone metabolism, bone regeneration reflecting the course when it is damaged, and the possibility of using them to control healing process, the timely detection of complications remain an actual problem of modern medicine [4]. At the moment, the study of oral fluid, the development of diagnostic and prognostic tests based on the study of its qualitative and quantitative indicators are one of the promising areas in medicine, in dentistry and maxillofacial surgery [1,2,3]. The aim of the study was to determine the most informative indicators of the development of peri-implantitis and the reversibility of the inflammatory process in dental implantation on the basis of saliva enzymes.

**Material and Methods.** In the early postoperative period (3-30 days) at the stage of clinical observation there were 37 patients who had inflammatory processes in the area of dental implants after surgery. Patients were divided into groups to assess the severity of peri-implantitis, the presence of implant mobility and the severity of the inflammatory process in the tissues surrounding the implant. The first group included 12 patients with stable implants, clinically determined minor soreness, mucosal hyperemia in the area of the implant, preserved the integrity of the gingival sulcus, the value of the peri-implantitis index was reliably 1.1 (0-1,4) points. Treatment of patients of the 1st group included oral hygiene control, correction of antibacterial therapy. The second group included 12 patients who clinically determined hyperemia and bleeding of the mucous membrane in the area of the implant, when probing there was a pathological pocket, the implants were stable, the values of the peri-implantitis index were reliably 8.0 (6.0-9.0) points. Treatment of patients of the second group, with the stability of the implant, but with severe inflammation in the tissues surrounding the implant, pathological pocket, included oral hygiene control, correction of antibiotic therapy with genetic resistance. Surgical treatment was carried out, including curettage of granulation tissue and filling of bone defect in the implant area with bone graft material. In 13 patients of the third group, where there was mobility of the implant, clinically determined hyperemia and bleeding of the mucous membrane in the implant area, when probing there was a pathological pocket with purulent discharge, the value of the peri-implantitis index was reliably 10.0 (9.1-10.0) points. Treatment of patients of the third group, with the mobility of the implant and with severe inflammation in the tissues surrounding the implant, the presence of a pathological pocket, was to control oral hygiene, curettage using bone graft materials. However, despite the treatment and ongoing antibiotic therapy, after 30 days the inflammatory process was not stopped, the implants remained mobile and were removed.

**Results.** In the first group of patients, where all the implants were osseointegrated, the level of acid phosphatase prior to treatment had a value 29.0 (27.9–29.7) U/l after treatment for 30 days significantly declined and accounted for 19.1 (18.6–19.9) U/l, the level of alkaline phosphatase before treatment had a value of 19.8 (19.4 to 20.7 per) U/l after treatment for 30 days significantly increased and amounted to 28.2 (25.1-29.7) U/l. In the second group, implants were disintegrated in 3 patients (25%), the level of acid phosphatase of before treatment was 33.3 (32.3–34.6) U/l, after treatment on day 30 significantly decreased and amounted to 25.1 (22.7-27.4) U/l, the level before treatment was 21.6 (20.4-22.7) U/l, after treatment on day 30 significantly increased and amounted to 29.3 (28.1-30.7) U/l. In the third group the implants were disintegrated, the level of acid phosphatase prior to treatment had a value 39.08 (34.8-38.7) U/l. The level of alkaline phosphatase before treatment had a value of 24.0 (23.8-24.7) U/l after treatment for 30 days had no significant differences with the figure to conduct anti-inflammatory treatment 24.2 (24.1-24.7) U/l.