RELATIONSHIP BETWEEN ESTROGEN DEFICIENCY AND PERIODONTAL DISEASE IN POSTMENOPAUSAL WOMEN

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This article is a review and presents the results of research by foreign scientists on the effects of estrogen deficiency on the oral cavity and their impact on the development of periodontal diseases in women during natural and surgical menopause. The dental status of women aged 35 to 70 years was studied; scientists noted the negative impact of estrogen deficiency on the state of the whole organism, and in particular on the state of soft and hard tissues of the oral cavity.

Key words: dental status, periodontium, mineral density of jaw bones, dentition system, menopause, estrogen deficiency.

According to WHO, at the beginning of the 21st century, approximately half of the world's female population will be in menopause. In this regard, the structure of dental care for this category of patients will change significantly. The state and

functioning of various organs and systems of the human body largely depends on the hormonal status. Hypoestrogenism resulting from surgical menopause is a trigger in the development of a complex of various metabolic disorders, including in the dental system. Considering the role of estrogens in immunogenesis, their participation in anabolic, inflammatory and mitotic processes in the oral mucosa, we can fully explain the growth of dental pathology among older people, especially in women.

The explanation for this fact can be found not only in a change in estrogen production, but also in a smaller estrogen receptor field in women in general and a lower amount of receptor protein in them, as well as in a decrease in the sensitivity of receptors of the oral mucosa to sex hormones. In connection with the foregoing, it is natural to assume the presence of features of both the frequency and clinical course of chronic periodontitis in women with hypoestrogenemia and a possible difference in their treatment efficiency.

Thus, studies of scientists studying the dental status in 577 women aged 35 to 65 years revealed the presence of chronic periodontitis of varying severity in 85.09% of cases. With hypoestrogenemia, chronic periodontitis is more common than with normoestregenemia. They also revealed a direct dependence of the severity of CGP and the frequency of exacerbations on the level of estradiol in blood plasma. Of the clinical manifestations in patients with hypoestrogenia, soreness and bleeding of the gums, bad breath, the presence of dental deposits, purulent discharge from the PC, more pronounced gum retraction; pathological tooth mobility and higher Kulazhenko test scores were more often noted. Of the index indicators, the most pronounced differences were found in tooth retraction, the Schiller-Pisarev test, the Green-Vermillion index, tooth mobility and bleeding, i.e. in indices reflecting the spread of the inflammatory process and the hygienic condition of the oral cavity. Indices such as UKT, PI and KPI, reflecting dystrophic and inflammatory-dystrophic processes, changed to the same extent. Thus, the study of the dental status in women with different levels of estradiol concentration in blood plasma showed that the extinction of the function of reproductive hormones is accompanied by a deterioration of the

dental status, an increase in the occurrence of chronic periodontitis and its exacerbations, as well as a significant decrease in the effectiveness of treatment.

Menopause - the last menstruation (PM) reflects the final cessation of menstrual cycles due to the loss of follicular activity of the ovaries. The menopause period is characterized by a gradual decrease, and then by the "shutdown" of ovarian function (in the first 1-3 years of postmenopause, only single follicles are found in the ovaries, subsequently they completely disappear). The resulting state of hypergonadotropic hypogonadism is characterized by a change in the function of the limbic system, impaired secretion of neurohormones, and the development of involute and atrophic processes in reproductive and non-reproductive target organs. Despite the physiology of endocrine shifts during reproductive aging, in different women, individual stages of this process may differ in their duration and be accompanied by various specific symptoms (vasomotor, psych emotional, vaginal, sexual, etc.) and signs: bone loss, the formation of an unfavorable cardiovascular risk profile due to the development of abdominal/ visceral obesity, dyslipidemia, endothelial dysfunction, glucose tolerance disorders, etc.

Postmenopausal women have a rapid decrease in bone mineral density (BMD) due to hormone (estrogen) deficiency. Meanwhile, osteoporosis and periodontal diseases indicate excessive bone resorption, since both diseases have multifactorial causes, depending on the host, and are regulated by local and systemic cytokines, such as IL-1 and six, and various hormones. When the periodontal status of menopausal women was with osteoporosis investigated, a more severe depth of the periodontal pocket and loss of attachment were found compared to those in the same age group who did not have osteoporosis. In particular, it is known that hormonal changes associated with menopause affect the condition of the oral cavity due to changes in sex hormones such as estrogen, progesterone and testosterone, which affect the secretion of pro-inflammatory cytokines that are involved in bone resorption. Moreover, estrogen receptors in the oral mucosa react sensitively to changes in hormone levels, which leads to increased inflammation in periodontal tissues. There is a large number of works devoted to research on the effect of hormone replacement therapy on the

condition of the female body as a whole and in the complex therapy of hypoestrogenic conditions in women with periodontal diseases. The need for hormone replacement therapy (HRT) has been presented as a means to alleviate the symptoms of menopause, in order to improve the quality of life of a woman during menopause. Another mechanism of HRT action in preventing the development of osteoporosis is a reduction in postmenopausal weight loss. Women who received estrogen therapy showed significantly higher density in the lumbar spine and hip compared to the control group; at the same time, similar results were found in the alveolar bone. Since periodontal diseases also depend on the state of the alveolar bone, various scientists have tried to demonstrate the relationship between HRT and periodontal diseases. Studies have shown various effects of HRT, which depended on the age of menopause and the postmenopausal period. Other researchers have demonstrated contradictory results depending on the degree of progression of periodontal disease. In other words, HRT can have a positive effect on the density of alveolar bone tissue, but it does not affect the degree of attachment of periodontal tissues and the depth of the periodontal pocket.

Yun hee Lee and co-authors conducted a study on the relationship between HRT and the risk of periodontal disease in menopausal women. An analysis of menopausal women aged 45 to 74 years showed that in the HRT group the probability of developing periodontal diseases was less than in the group of women who did not take HRT, which confirmed the results of previous studies. In a case-control study conducted by Haas et al. when examining Brazilian women aged 40-69 years, the probability of periodontal disease in the group that did not undergo HRT during menopause was 2.10 times higher than in women before menopause; while the probability that the group took HRT during menopause was 1.11 times higher than in premenopausal women.

Case-control studies conducted by López-Marcos and co-authors in 210 Spanish menopausal women aged 40-58 years showed that a decrease in the depth of the periodontal pocket was observed in the group with estrogen patches, however, since

it was not possible to find a connection with gum recession, scientists decided to continue studying this problem.

Shweta Vinayak Kumbhojkar and co-authors conducted equally interesting studies on the study of calcium content in saliva for screening osteoporosis in postmenopausal women. The authors concluded that there is a definite relationship between serum estrogen, BMD and calcium in saliva, and that the level of calcium in saliva can be used as a risk marker for the development of osteoporosis in postmenopausal women. This is a relatively simple, safe, reliable, inexpensive and non-invasive method compared to its modern analogues, such as serum or urine calcium analysis and X-ray tools used in the diagnosis of osteoporosis.

According to Mann-Whitney because estrogen is believed to directly affect the physiological absorption of calcium from the intestine. Deficiency or a sharp drop in estrogen levels observed in the postmenopausal phase causes the release of parathyroid hormone, which, in turn, actively induces calcium resorption from the skeletal system, increasing serum calcium levels, which, in turn, is reflected in increased levels of calcium in the body, saliva.

Leimola-Virtanen and co-authors made a similar observation in their study that salivary calcium depends on estrogen. Ben Arye et al. both Nagler and Gershkovich also observed that calcium levels in saliva were significantly higher in the elderly age group compared to the young.

Agha-Hosseinii et al. also demonstrated that the average concentration of calcium in saliva in all stimulated saliva was significantly higher in people with a feeling of dry mouth compared to the control group. Therefore, it can be definitively assumed that there is a definite inverse correlation between the levels of calcium in saliva and the amount of saliva secretion, which, in turn, depends on age and estrogen.

Puskulian et al. observed that the calcium concentration in submandibular saliva was low during ovulation. They also noted that calcium levels in saliva were lower during pregnancy than during childbirth, which directly correlated with high estrogen levels. However, they could not estimate any difference in saliva calcium levels between the control and pregnant groups.

Sewón and co-authors reported that the concentration of calcium in saliva was significantly lower in healthy postmenopausal women taking HRT. And in their other work, Sewón and co-authors noted that the levels of calcium in saliva were significantly increased in women with low BMD compared to the control group.

Bone loss associated with estrogen deficiency in postmenopausal women is accompanied by increased bone resorption. This may partly be due to a decrease in the effect of estrogen on osteoclasts and their precursors, as well as on the levels of chemical mediators such as interleukin (IL) -1. IL-6 and tumor necrosis factor-α, which in turn enhance osteoclastic activity, which can be suppressed by the introduction of physiological doses of estrogen.

The menopause period increases and is associated with important systemic manifestations and changes in the oral cavity. During menopause, the gum epithelium becomes thinner, atrophic and more prone to inflammatory changes, on the other hand, the rate of salivation decreases, and the composition of saliva may change, contributing to the development of certain conditions of the oral cavity.

The sudden decrease in estrogen production that occurs during menopause is considered the main cause of primary osteoporosis, which also affects the jawbones. It is assumed that this decrease in bone mineral density may contribute to the progression of periodontal diseases.

In addition to their effect on bones, estrogens also affect other periodontal tissues (gum and periodontal ligament) and affect immune inflammatory responses of the host. A number of studies have linked menopause with some periodontal conditions, although various methods used to determine and evaluate osteoporosis, alveolar bone loss and periodontitis make it difficult to compare the results.

Several studies have reported improved periodontal parameters, and tooth preservation in women undergoing hormone replacement therapy; however, contradictory results have also been published. In addition, drugs that alter bone metabolism, such as estrogen and bisphosphonates, have been proposed in several case-control studies as a new approach to the treatment of periodontitis in postmenopausal patients.

O. V. Oreshaka and co-authors presented the results of a study of the dental status in women with surgical menopause before surgical treatment 3, 6 and 12 months after it. The study showed that a sharp deficiency of estrogens leads to significant changes in the main indicators of dental status. The study showed that in the patients of the examined groups, there were no significant differences in the outcome of the indicators characterizing the condition of the hard tissues of the teeth. However, after the surgical treatment, against the background of absolute hypoestrogenism, there was a deterioration in the indicators of the hygienic condition of the oral cavity, the cariesogenicity of plaque, and the TER test. It should be noted that the changes in these indicators after 3 and 6 months were less pronounced than at the annual stage, when they reached their maximum values. When studying the functional parameters of salivation in patients after surgical treatment, there was a significant decrease in the rate of secretion of oral fluid, against the background of an increase in its viscosity. The authors noted that the severity of dental disorders significantly correlated with the level of estrogens. Thus, as a result of surgical menopause, absolute hypoestrogenism occurs, contributes to the maladaptation of the woman's body and leads to a deterioration of a number of clinical and laboratory indicators characterizing the state of organs and tissues of the oral cavity. Moreover, the reaction from the periodontal tissues and salivary glands is pronounced already three months after surgical treatment, while changes from the hard tissues of the teeth are recorded later. Summarizing the above, it should be noted that estrogen deficiency negatively affects both the condition of the hard tissues of the teeth, and especially the condition of periodontal tissues. The effect of estrogen levels on the dental status of patients is confirmed by positive changes on the part of oral tissues that occur against the background of the use of local hormone replacement therapy. However, to date, the question of the timing of the occurrence, as well as the severity of dental changes in women that occur in the early stages of surgical menopause, against the background of pronounced hypoestrogenism compared to the initial state (before surgical treatment) remains insufficiently studied.

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