

## Prediction and Prevention of the Development of Partial and Complete Defects of the Dentition in Women in Early Menopause

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### Relevance

*Dentistry is one of the priority areas, which is due to its decisive role in maintaining the homeostasis of the oral cavity, high sensitivity to various influences and non-invasiveness of the method. A number of studies have proven that salivary glands change their structure and function with various fluctuations of sex steroids, which leads to qualitative changes in the composition of their secret. This is due to the presence of estrogen receptors in the exocrinocytes of the terminal sections and cells of the excretory ducts of the salivary glands. It is known that changes in the properties of saliva affect the condition of the hard tissues of the teeth, periodontal tissues, oral mucosa and the microbial landscape of the oral cavity. However, to date, no studies have been conducted to determine the nature and severity of changes in the functional parameters of the salivary glands and the parameters of dental status in the early period of surgical menopause, when the female body finds itself in conditions of a sharp absolute estrogen deficiency without an adaptation phase to a new condition.*

**KEYWORDS:** *Early Menopause, Prediction and Prevention.*

**The purpose of the study** – features of quantitative and qualitative indicators of mixed saliva, the main clinical and laboratory indicators of dental status in women with surgical menopause.

**Material and methods** the main objectives of the study included 46 patients, of whom the observation group included 23 women with surgical menopause without hormone replacement therapy aged 45-56 years; the comparison group included 23 relatively healthy women of premenopausal age (45-53 years). The patients were monitored before surgical treatment (bilateral ovariectomy), 3, 6 and 12 months after it. In the study of hormonal status, the state of the hypothalamic-pituitary-ovarian system was assessed by the level of follicle-stimulating (FSH), luteinizing (LH) hormones, as well as estradiol (E2) and progesterone (P) in blood plasma.

**Research results.** When analyzing the state of the hormonal background, a significant decrease in the level of estrogens was determined already at the three-month observation stage both in blood plasma (twice) and in mixed saliva (five times) compared to the initial preoperative state. In response to the shutdown of the endocrine activity of the ovaries in the pituitary gland, the release of gonadotropins FSH and LH increased. Progesterone concentration remained stable throughout the study period. Significant changes in quantitative and qualitative indicators of mixed saliva were observed against the background of a sharp estrogen deficiency. Thus, a significant decrease in the rate of saliva secretion was noted against the background of an increase in its viscosity. Fluctuations in the pH of mixed saliva in women of both compared groups at stages up to six months were insignificant and were within the normal range, however, by the twelfth month of observation, an increase in the acidity of the oral fluid was noted in patients with surgical menopause. Analysis of the dynamics of the composition of the inorganic components of mixed saliva revealed a gradual decrease in the concentration of Na and total Ca, an increase in the concentration of K, while the P

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content significantly decreased only 12 months after surgical treatment. Changes in the values of the buffer capacity for acid and alkali in the examined patients did not have significant differences over the entire observation period. Changes in the properties of mixed saliva and the volume of its secretion affected the dental status of women with surgical menopause [1.3.5.7.9].

Thus, with the constant intensity of carious lesions of the hard tissues of the teeth ( $CPU = 12.3 \pm 0.4$ ,  $CPU = 15.3 \pm 0.52$ ), a gradual deterioration in the hygienic condition of the mouth, estimated by the Green–Vermillion index, was noted in the women of the observation group, from  $0.93 \pm 0.09$  points in the outcome to  $1.43 \pm 0.1$  points a year after surgery. An increase in the cariesogenicity of plaque was recorded from  $1.68 \pm 0.15$  points at the first stage of the study to  $2.44 \pm 0.14$  points at the last and the indicators of the enamel resistance test (TER test) from  $5.79 \pm 0.46$  points to  $7.65 \pm 0.43$  points, respectively. Moreover, the above indicators significantly changed only at the annual stage of the study. However, periodontal tissues underwent significant negative changes by the third month of observation. Thus, when studying the prevalence of gum inflammation, there was a progressive increase in the values of the papillary-marginal-alveolar index, which in the outcome was  $16.22 \pm 1.52\%$ , after 3 months  $19.49 \pm 1.63\%$ , after 6 months

Fluctuations in the pH of mixed saliva in women of both compared groups at the stages up to six months were insignificant and were within the normal range, however, by the twelfth month of observation, an increase in the acidity of the oral fluid from  $7.06 \pm 0.07$  to  $6.6 \pm 0.08$  was noted in patients without hormonal correction. Analysis of the dynamics of the composition of inorganic components of mixed saliva of women without hormone replacement therapy revealed a gradual decrease in the concentration of Na and total Ca, an increase in the concentration of K, while the content of P significantly decreased only twelve months after surgical treatment. In patients with HRT, the concentrations of the studied components at all stages of the study remained at the initial level. Changes in the values of the buffer capacity for acid and alkali in the examined patients did not have significant differences over the entire observation period. A decrease in the rate of salivation, an increase in its viscosity and a change in composition contributed to the appearance of complaints of dry mouth in the examined patients with surgical menopause without hormonal correction. After three months, an increase in the amount of points on the questionnaire for a comprehensive assessment of xerostomia "The Summarized Xerostomia Inventory – XI" was recorded, followed by progression from mild to moderate xerostomia by the year of observation [2.4.6.8].

Subjective complaints of dry mouth were confirmed by the presence of objective signs identified using the scale of clinical diagnosis of xerostomia "The Challacombe Scale of Clinical Oral Dryness", the values of which also increased as the indicators of mixed saliva changed. In patients receiving HRT, there was no significant increase in subjective or objective manifestations of xerostomia, which may be due to the positive effect of estrogens on the tissues of the salivary glands and the walls of blood vessels. Changes in the properties of mixed saliva and the volume of its secretion were also reflected in other indicators of the dental status of women with surgical menopause without hormonal correction. Thus, with the constant intensity of carious lesions of the hard tissues of the teeth ( $CPU = 12.3 \pm 0.4$ ,  $CPU = 15.3 \pm 0.52$ ), there was a gradual deterioration in the hygienic condition of the mouth, estimated by the Green—Vermillion index, from  $0.93 \pm 0.09$  in the outcome to  $1.43 \pm 0.1$  points a year after surgery. There was an increase in the cariesogenicity of plaque from  $1.68 \pm 0.15$  at the first stage of the study to  $2.44 \pm 0.14$  points at the last and the indicators of the enamel resistance test (TER test) from  $5.79 \pm 0.46$  to  $7.65 \pm 0.43$  points, respectively [9.10.11.13.15.17.19.21].

Moreover, the above indicators significantly changed in women only one year after the surgical intervention. There were no significant negative changes in the hygienic state of the mouth, dental plaque caries and enamel resistance to the action of acids in women from group 2. Periodontal tissues in women from group 1 underwent significant negative changes by the third month of observation.

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Thus, when studying the prevalence of gum inflammation, a progressive increase in the values of the papillary-marginal—alveolar index was noted, which at the end was  $16.22 \pm 1.52\%$ , after 3 months —  $19.49 \pm 1.63$ , after 6 months -  $22.3 \pm 1.73$ , and by the year after surgery reached  $25.12 \pm 1.84$ . When studying gum bleeding according to Mulleman — Cowell, a significant increase in the index values was revealed from  $0.65 \pm 0.03$  in the outcome to  $1.22 \pm 0.04$  points after 3 months. Dynamics of complaints of dry mouth according to the questionnaire for the comprehensive assessment of xerostomia in women in the early period of surgical menopause. Dynamics of objective signs of dry mouth on the scale of clinical diagnosis of xerostomia "The Challacombe Scale of Clinical Oral from  $1.52 \pm 0.03$  in six months and up to  $1.83 \pm 0.03$  points a year after surgery. This indicated a marked increase in the permeability of the vascular wall of the mucous membrane against the background of progressive hypoestrogenism. HRT performed in group 2 women prevented the development of such pronounced pathological processes in the periodontium, which was confirmed by the absence of significant changes in clinical indices. It is known that epithelial cells play one of the central roles in the induction of a specific immune response at the level of the mucous barrier of the oral cavity, for this reason, the results of cytological research are interesting [12.14.16.18.20.22].

Already at the early stage of observations in women without HRT, there was a significant decrease in the values of the epithelial cell differentiation index, which continues at subsequent stages. In particular, if the initial values of the studied index in the area of transverse palatine folds were  $427 \pm 3.7$  points, then after 3 months after surgery they decreased to  $397 \pm 3.4$ , after 6 — to  $391 \pm 3.6$ , and after 12 — to  $382 \pm 3.6$ .

Output. Analysis of the keratinization index values in the same group of patients also indicated a significant decrease in it. So, if in the initial state in the area of transverse palatine folds the index was  $79.9 \pm 1.94\%$ , then by 3 months its values decreased to  $68.6 \pm 2.22$ , by 6 — to  $63.3 \pm 2.11$ , and by 12 — to  $57.4 \pm 2.39$ . In addition to negative changes in the level of differentiation and keratinization of epithelial cells, it worsened and their ability to adsorb microorganisms, which significantly decreased already at the first stage, reaching a minimum by the end of observations. It is logical that the revealed decrease in the amount of saliva, changes in its properties and composition, along with a weakening of the ability of epithelial cells to neutralize bacteria, could have a negative impact on the microbial landscape of the oral cavity in patients with severe hypoestrogenia.

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