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**CLINICAL AND MORPHOLOGICAL ASSESSMENT OF THE EFFECTIVENESS OF THE
APPLICATION INNOVATIVE THERAPEUTIC AND PROPHYLACTIC TOOTHPASTE IN THE
COMPLEX TREATMENT OF PATIENTS WITH MAJOR DENTAL DISEASES*****Xaydarov Ulug'bek****Samarkand State Medical University, Uzbekistan****Axmedov Alisher Astanovich****Samarkand State Medical University, Uzbekistan***ABOUT ARTICLE****Key words:** Therapeutic and prophylactic dentifrice, clinical study, cytomorphological study.**Received:** 20.06.2024**Accepted:** 25.06.2024**Published:** 30.06.2024**Abstract:** The social and economic development of a society is largely determined by the level of health of its young population. The objective of this study was to increase the effectiveness of preventive and comprehensive treatment of young patients with major dental diseases using an innovative therapeutic and preventive toothpaste based on organic gel. A group of 32 volunteers participated in the study. All patients underwent a complex dental examination that included basic and additional methods (determination of indices of caries intensity, indicators of oral hygiene (simple hygiene index OHI-S, Silnes-Low index), evaluation of periodontal tissue status (papillary-limbal alveolar abscess index PMA, gingival bleeding in inflammatory periodontal disease index BI Müllmann), evaluation of pain (hypersensitivity) to stimuli using a visual analog scale (VAS), measurement of the electrical conductivity of tooth enamel using the Dentest electrodiagnostic device (ZAO Geosoftident), clinical evaluation of enamel remineralization rate, spectrophotometer "VITA (Easy Shade) (VITA) to evaluate tooth discoloration, oral fluid immunoassay, and cytomorphometric studies of the buccal epithelium. The results of the clinical trials showed that the therapeutic and prophylactic toothpaste has excellent consumer

characteristics, has no allergic or local irritant effects on the oral mucosa, improves the natural protection of the oral cavity, effectively cleans up to 100% of the oral cavity, provides anti-inflammatory effects, eliminates gum swelling and bleeding from the first use, reduces tooth sensitivity, reduces tooth enamel structure, and was shown to have no toxic effect on the cells of the buccal epithelium. The results of the clinical trial suggest that the innovative therapeutic and prophylactic dentifrice can be recommended for daily use in a wide range of individuals, as well as in patients with low tooth enamel resistance, various periodontal diseases, and oral mucosa.

INTRODUCTION

Oral diseases occupy the third place among the general morbidity of the Russian population (the incidence is 20-25%), are the cause of deterioration in general health and reduce the quality of life of the population. According to WHO, the prevalence of pathology of hard tissues of teeth and oral mucosa currently reaches 95-97%. [1-5]. The most affordable way to prevent dental diseases is to use oral hygiene products. Despite the wide variety, modern personal hygiene products have many disadvantages. These include a drying effect on the mucous membrane of the oral cavity, the need for long-term use for the development of a therapeutic and preventive effect, high abrasiveness, the development of intolerance due to individual characteristics, high cost [6, 8]. Therefore, the development of innovative therapeutic and prophylactic agents with new compositions and properties is an urgent and interesting task for chemists and doctors various specialties (dentists, dermatologists, immunologists, endocrinologists). During the implementation of this study, innovative therapeutic and preventive dentifrices based on organogels, non-toxic and with high transdermal activity, were developed. The permit for clinical use was issued by the Ethics Committee of the Federal Service for Supervision of Medical and Social Development (Protocol No. 72 dated 06/23/2010). An important difference between an innovative therapeutic and prophylactic toothbrush from conventional toothbrushes is that the base used in its manufacture is an active conductor, which allows for more efficient, fast and complete delivery of the active substance to the site of exposure. The biocompatibility of the base, the absence of flavors and preservatives, anti-inflammatory and wound healing properties are the main advantages of the developed pastes, which can be used for the treatment and prevention of teeth in all categories of patients. The aim of the study is to increase the effectiveness of innovative therapeutic and preventive dental paste based on organogels for the prevention and comprehensive treatment of major dental diseases.

Materials and methods of research: A clinical study of innovative therapeutic and prophylactic toothpaste was conducted on the basis of the UMMU dental clinic from April to May 2017 (the attending physician is associate professor, Candidate of Medical Sciences Stati T.N.) on a group of 32 physically fit volunteers aged 18 to 20 years. The study was conducted as follows. All the subjects were divided into three groups in accordance with the classification of caries resistance levels according to V.B. Nedoseko, according to B. Nedoseko, where the level of resistance was defined as the highest level of caries resistance, the lowest level of caries resistance and the highest level of caries resistance, according to B. Nedoseko. The group of people with an average level of resistance consisted of 12 people, the group of people with a low level of resistance consisted of 11 people, and the group of people with a very low level of resistance consisted of 9 people. 7-14 days before the start of the study, the participants were trained in oral hygiene and personal hygiene rules by a specialist. To clean the surface of the teeth, a toothbrush with medium hardness of bristles from the same manufacturer as in the Leonard method was recommended. Other types of hygienic oral care were prohibited during the study period. They also had to brush their teeth at home with organic gel toothpaste for two to three minutes at least twice a day in accordance with the manufacturer's recommendations. The examination included the collection of anamnesis (identification of complaints, anamnesis of life and past illnesses), visual examination, intraoral examination, pathological examination of hard tissues of teeth and detection of occlusive anomalies. The following indices and tests were performed during the examination: caries intensity index (CPI index (h)), oral hygiene (simplified hygiene index, OHI-S; Silness-Lowe index), assessment of the condition of periodontal tissues (papillary-marginal-alveolar index, PMA; the Mulleman gum bleeding index in inflammatory periodontal diseases (MI)), assessment of pain perception (hypersensitivity) to stimuli using a visual analog scale (VAS), measurement of electrical conductivity of tooth enamel using an electrodiagnostic device "Dentest" (CJSC Geosoftdent). Measurement. The COSRE test was used to evaluate the remineralizing ability of therapeutic and prophylactic toothpastes. The bleaching efficiency was evaluated using a high-precision VITA Easy Shade (VITA) spectrophotometer. Dental examinations were performed before the start of the study, after the first application, 12 hours after application (to determine the rate of plaque formation), 7 and 14 days after application. The analysis of the organic properties of pastes was carried out by interviewing participants (on a 5-point scale) after the first application and after 14 days. The patients' subjective assessment of the paste quality, its appearance, color, smell, effect on taste sensitivity and the presence of irritation of the oral mucosa was taken into account. Oral fluid was spontaneously collected from all subjects and samples of buccal epithelium scraping were taken before and 14 days after the application of toothpaste. Immunological studies of oral fluid included measuring the level of

secretory immunoglobulin A (sIgA), cytomorphological studies of cytogenetic disorders in the buccal epithelium, and a comparative assessment of the frequency of proliferation and destruction of nuclei. Statistical processing of the results of all studies was carried out in the Vortex 7.0 program by the method of variational analysis with the determination of the arithmetic mean standard deviations and confidence intervals according to the Student's t-criterion. By default, the confidence interval of the Vortex 7.0 application program is set to ≤ 0.01 , which guarantees with a 95% probability that the percentage values are within the range of the packet in the general population.

RESULTS AND DISCUSSION

During the survey, patients complained of carious teeth (75%), bleeding gums (45%), dental deposits (23%), bad breath (20%) and tooth sensitivity (21%). During dental examination, the average CPI index (h) was 7.8 ± 0.9 , which was defined as the average level of caries intensity according to WHO criteria, the Green Vermilion oral hygiene index was 1.82 ± 0.31 , the Silnes-Lowe hygiene index (HI) was 1.82 ± 0.18 , inflammatory periodontal diseases according to the gum bleeding index (IP) Mülleman - 1.57 ± 0.27 , gingivitis index RMA - $34.87 \pm 2.46\%$. Occlusive anomalies were detected in 55% of cases. At the first application of the innovative therapeutic and prophylactic toothpaste and during its use, none of the patients had any symptoms of individual intolerance (itching, burning). The organic properties of the toothpaste were positively evaluated by all participants. According to the survey, the toothpaste had a uniform consistency, neutral taste and smell (Fig. 1). A week after the first procedure, the oral hygiene of all patients using innovative organic gel-based therapeutic and prophylactic toothpaste improved, and the index values decreased significantly: The Green-Vermilion oral hygiene index was $1.05 \pm 0.13\%$, the Silnes-Lowe hygiene index (HI) was 1.02 ± 0.05 , the Mülleman gum bleeding index (IP) for inflammatory periodontal diseases was 0.85 ± 0.15 , and the PMA gingivitis index was 25.51 ± 1.64 . Two weeks after the start of the toothpaste application, the patient had no complaints and there was a decrease in bleeding gums. An examination of the oral cavity showed good hygiene, absence of edema or hyperemia of the oral mucosa. An objective assessment showed that the Green-Vermilion oral hygiene index decreased by $0.43 \pm 0.12\%$, the Silnes-Lowe hygiene index (HI) was 0.53 ± 0.07 , the Mülleman gum bleeding index (IP) for inflammatory periodontal diseases was 0.55 ± 0.13 , and the PMA gingivitis index was 15.48 ± 1.6 (Fig. 2). When assessing the perception of pain to stimuli in patients at the beginning of the study, the most pronounced pain response was observed when exposed to cold air - 60%. After the use of therapeutic and prophylactic toothpaste based on organic gel, pain symptoms disappeared in 21% of patients within 7 days and in 37% - within 14 days. This indicates the remineralizing properties of therapeutic and prophylactic toothpaste based on organic gel (Fig. 3). The

KOSRE test indicator confirmed the change in the resistance of tooth enamel after the use of therapeutic and prophylactic toothpaste based on organic gel. The rate of remineralization (COSRE) of tooth enamel when using the paste decreased to 32 ± 2.24 hours (Fig. 4). According to a subjective assessment, 37.5% of the subjects noted the shine of teeth after using the therapeutic and prophylactic paste. The color of the teeth became brighter after using this paste. This indicates that therapeutic toothpaste has the ability to restore the protective properties of saliva. When using a therapeutic and prophylactic toothpaste based on organogel, the frequency of occurrence of buccal epithelial cells with micronuclei decreased by 50%, and the number of cells with protrusions remained. The evaluation of proliferation indices indicates a decrease in the number of binucleated cells in the buccal epithelium by 25%. Among the indicators of nuclear decay, a decrease in the number of cells with nuclear vacuoles and condensed chromatin by 62.5 and 70%, respectively, should be noted, which indicates a decrease in destructive changes in the nuclear membrane and the preservation of the barrier and transport functions of the nuclear membrane. The natural form of apoptosis in buccal epithelial cells is considered to be nuclear division. This indicator decreased by 59%, which indicates a mechanical change in the natural destructive process of buccal epithelial cells. Conclusions: 1. The studied therapeutic and prophylactic toothpastes have good consumer properties: they are neutral in taste and color, do not cause unpleasant sensations (burning) in the oral cavity during and after use; 2. Therapeutic and prophylactic toothpastes based on organic gels do not cause allergies and local irritation of the oral mucosa; 3. Clinical studies of therapeutic and prophylactic toothpastes based on organic gels have shown an improvement in oral hygiene in patients, a decrease in the value of the Green-Vermillion index by 40%, the PMA index by 50% and a decrease in tooth sensitivity by 37.5%. There was a decrease. The restoration of the natural whiteness of the enamel and the strengthening of its structure were observed. 4 Cell-morphological studies of innovative therapeutic and prophylactic toothpastes have shown the absence of toxic effects and a decrease in destructive changes in buccal epithelial cells.

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