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DEVELOPMENT AND IMPLEMENTATION OF "PREVENTIVE DENTISTRY
KITS" FOR PARODONTOLOGY PATIENTS AT THE POST-SURGERY STAGE

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TABLE OF CONTENTS

INTRODUCTION	4
CHAPTER 1. LITERATURE REVIEW	13
1.1. The prevalence of inflammatory periodontal disease	13
1.2. The role of individual oral hygiene in the development of inflammatory periodontal diseases	18
1.3. The correlation between the assessment of the hygienic mouth condition and the prevention of inflammatory periodontal diseases at the post-surgery stage.....	23
CHAPTER 2. MATERIALS AND RESEARCH METHODS	31
2.1. General characteristics of the research group and design project of the research	31
2.2. Methods of inflammatory periodontal disease prevalence estimation	35
2.3. Methods of laboratory research	39
2.4. Study of the periodontal status dependence on the level of dental hygienic knowledge in the surveyed population	55
2.5. Clinical Research Methods	64
2.6. The content of "Preventive dentistry kits" and hygiene programs.	69
2.7. Statistical processing of obtained results	75
CHAPTER 3. RESULTS OF OWN RESEARCH	76
3.1. The results of the inflammatory periodontal diseases prevalence research	76
3.2. Study of the oral hygiene product and item anti-inflammatory efficiency	79
3.3. Assessment of dental status in periodontal patients.....	89
3.4. Assessment of dental hygiene knowledge among the surveyed patients	96
3.5. The study of the motivation strategy and a periodontal patient supervision ...	98
CHAPTER 4. RESULTS OF "PREVENTIVE DENTISTRY KITS "THE IMPLEMENTATION IN PARODONTOLOGICAL PATIENTS IN THE POST-SURGERY PERIOD.....	100
4.1. Cleansing effect of "Preventive dentistry kits" at a post-surgery rehabilitation period.....	100

4.2. Anti-inflammatory "Preventive dentistry kits" efficiency in the rehabilitation period after surgery.....	102
4.3. Impact of "Preventive dentistry kits" on the acid-base the oral fluid.....	103
4.4. Monitoring dental hygiene knowledge maintenance efficiency in periodontal patients.....	104
4.5. Preventive Knowledge Survival Efficiency in Periodontal Patients.....	104
DISCUSSION	106
CONCLUSIONS	108
PRACTICAL RECOMMENDATIONS	110
LIST OF ABBREVIATIONS	111
LITERATURE	112

INTRODUCTION

Relevance of the research subject

The key factor setting the trend of dental diseases prevention is a regular growth of inflammatory periodontal diseases among the people. The high incidence of periodontal diseases arouses the interest of researchers in that issue (Averyanov S.V. et al., 2017; Garyga V. et al., 2019; Kwon T. et al., 2021).

Currently, in clinical practice, after periodontal surgery, anti-inflammatory agents for individual oral hygiene are used, aimed at improving hygiene in the rehabilitation period to maintain dental health of the population (Voloshina A.A. et al., 2011; Mamedov R.M. et al., 2019; Worthington H.V. et al., 2019). To optimize and improve the preventive efficiency in various surgical interventions on the periodontium is an urgent dental issue (Lutskaya I.K. et al., 2016; Vogel M. et al., 2014).

Poor oral hygiene underlies the growth of plaque in the oral cavity resulting in the growth of microorganism colony-forming units (Javadova L.M. et al., 2022; Medvedeva L.S. et al., 2018; Tomar S.L. et al., 2015). Subsequently, plaque mineralization destroys the ligamentous apparatus, an additional retention factor is formed causing a local irritating effect on periodontal tissues, determining the course of inflammatory periodontal diseases (Kiselnikova L.P. et al., 2022; Lenartova M. et al. , 2021; Soldani F.A. et al., 2018). The evolution of inflammatory-destructive processes requires an integrated approach in the treatment of inflammatory periodontal diseases, the intensity of which underlies the choice the surgical treatment method (Sabirova A.I. et al., 2021; Sitdikova O.F. et al., 2021; Zietek M. et al., 2008). The low level of dental hygiene knowledge affects the inflammatory periodontal disease course intensity (Isaeva E.R. et al., 2016; Maksimovskaya L.N. et al., 2016; Tokmakova S.I. et al., 2021; Van Der Weijden F. et al., 2011). An essential condition for successful dental treatment in periodontal patients is compliance with the rules of individual oral hygiene (Zhurbenko V.A. et al., 2021; Zoyirov T.E. et al., 2016; Kuzmina E.M. et al., 2021; Goyal C.R. et al., 2016; Ribeiro D.G. et al., 2009). After surgery, the patient is responsible for

maintaining satisfactory oral hygiene. There is an obvious need to select hygiene items and means for various surgical interventions, as well as to monitor and educate periodontal patients in maintaining individual oral hygiene (Kopecky I.S. et al., 2012; Korbakova S.A. et al., 2017; Oleinik O. I. et al., 2013; Ulitovskiy S. B. et al., 2008, 2021; Cota L. et al., 2021; Jonsson B. et al., 2012)

The relevance of a preliminary anti-inflammatory oral hygiene agent assessment is growing in view of their antimicrobial effect on the mouth microflora in order to boost the preventive anti-inflammatory effect on periodontal tissues after surgical interventions.

Degree of the subject research elaboration

Though the number of studies in the field is considerable, the need to study methods for the prevention of inflammatory periodontal diseases, conducted by domestic and foreign authors, the problem of individual oral hygiene after surgical interventions in periodontal patients remains relevant (Shalashova D.A. et al., 2019; Ostafiychuk, M. A. et al., 2014; Redinova T. L. et al., 2020; Unusyan O. S. 2022; Jonathan M. et al., 2011; Poklepovic T. et al., 2013; Seymour G. J. et al., 2007).

The up-to-date literature contains the detailed aspects of inflammatory periodontal diseases and their prevention in individuals with chronic generalized periodontitis of moderate severity (Mikhalchenko V.F. et al., 2016; Tarasova N.V., 2010; Croffoot C. et al., 2010 ; Madden I.M. et al., 2014). At the same time, there is no data on the rules for the selection of "Preventive dentistry kits" and the elaboration of dental prevention programs after surgical interventions. The need to develop evidence-based approaches aimed at the choice of preventive tactics after various surgical interventions on the periodontium is being identified.

The search for ways to perform personalized selection of oral hygiene items and means used at the post-surgery stage by periodontal patients and their rehabilitation after surgical treatment is an urgent issue.

Goal of research

The study of evidence-based development and formation of prevention kits in periodontal patients at the post-surgery stage, depending on the type of periodontal surgery performed.

Tasks of the research

1. To identify the prevalence and intensity of inflammatory periodontal diseases, in view of the oral fluid acid-base state dynamics in periodontal patients.
2. To investigate the properties and assess the efficiency of oral hygiene products and their correlation with the degree of periodontal health in patients.
3. To develop an index for assessing the efficiency of manual mono-bundle toothbrushes used in periodontal practice.
4. Assess the impact of dental hygiene knowledge in periodontal patients and its correlation with the rehabilitation period after surgery.
5. Develop and implement "Preventive dentistry kits" of oral hygiene products for periodontal patients, depending on the type of surgical intervention.

Scientific innovation significance

For the first time, the correlation between the prevalence and intensity of the course of inflammatory periodontal diseases and the oral fluid acid-base state in periodontal patients has been identified.

For the first time, using objective research methods, the efficiency of oral hygiene anti-inflammatory drugs and their interdependence with the periodontal status of the patient after surgical interventions have been assessed.

For the first time, a manual mono-bundle toothbrushes efficiency assessment index used in periodontal practice has been developed and implemented.

A correlation between the dental hygiene knowledge and the rehabilitation period

after surgery in periodontal patients has been identified.

For the first time, "Preventive dentistry kits" of oral hygiene products with proven anti-inflammatory efficiency for periodontal patients at the post-surgery stage have been designed and implemented.

Theoretical and practical relevance

The conducted researches enabled studying the prevalence and intensity of inflammatory periodontal diseases.

The choice of anti-inflammatory drugs for oral hygiene in periodontal patients at the post-surgery stage has been substantiated.

A method for indexing manual mono-bundle toothbrushes efficiency has been proposed. It enables boosting the efficiency of preventive measures after surgical interventions in patients with inflammatory periodontal diseases and implementing a hygienic kit based on them.

Based on the outcome of clinical, microbiological and statistical studies, "Preventive dentistry kits" of oral hygiene products for periodontal patients at the post-surgery stage have been designed and implemented.

Methodology and research methods

The research was performed in accordance with the evidence-based medicine methodology. The research is based on a comparative analysis of clinical, instrumental, laboratory and sociological methods, reliability assessment of relative risk values, as well as up-to-date statistical methods for processing obtained results. Permission to conduct a thesis research was obtained from Ethics Committee.

Provisions for defense

1. The evolution of the oral fluid acid-base state in periodontal patients is combined with the prevalence of inflammatory periodontal diseases that is clinically comparable in terms of periodontal indices (PMA = $64.98 \pm 7.80\%$, Muhlemann and Cowell = $44.19 \pm 3.09\%$, Schiller-Pisarev test = 7.26 ± 0.80 c.u.) and the state of the oral fluid (6.74 ± 0.20).
2. When using the implemented "Preventive dentistry kits" in periodontal patients after surgery, the indicators of periodontal indices decrease - PMA = $28.05 \pm 3.37\%$, Muhlemann and Cowell = $10.25 \pm 0.72\%$.
3. Index assessment of the manual mono-bundle toothbrushes efficiency provides an assessment of the oral hygiene item quality in the implementation of "Preventive dentistry kits" and allows achieving effective outcomes of the rehabilitation period in periodontal patients.
4. The ongoing monitoring of dental hygiene knowledge in periodontal patients increased the efficiency of preventive hygiene knowledge survival within the rehabilitation period.
5. The use of the implemented "Preventive dentistry kits" promotes the degree of dental health and reduces the period of periodontal tissue rehabilitation that is confirmed by anti-inflammatory efficiency indicators in compliance with the PMA index - $56.83 \pm 4.55\%$ and the Schiller-Pisarev test - $74.10 \pm 5.19\%$.

The reliability degree of the research results

The representativeness and sufficient amount of the material studied provides finding reliability, as well as the use of up-to-date clinical, laboratory and medical and sociological research methods.

The conclusions, provisions and recommendations formulated within the thesis are substantiated and logically follow from a systematic analysis of a significant volume

of samples examined and statistical processing of the obtained results

A sufficient and representative amount of research samples ensures a high reliability of the obtained results within the conducted research employing up-to-date research methods.

Implementation of research results

The materials of the thesis research enabled publication of 16 articles, 4 of them were made in journals from in the list of leading peer-reviewed scientific publications recommended by the Higher Attestation Commission, the Ministry of Education and Science of the Russian Federation. An educational and methodological manual "Strategy of Patient Motivation" was developed for students of medical universities, residents and practicing doctors. 1 publication in a foreign peer-reviewed publication.

An application has been filed for the invention of a method for assessing the quality of a manual mono-bundle toothbrush No. 2023108334 от 03.04.2023.

Peer-reviewed scientific magazines recommended by the Higher Attestation Commission, the Ministry of Education and Science of the Russian Federation:

- 1. Ulitovskiy, S.B. Efficiency assessment of preventive care in adults with odontogenic infection, regarding social and hygienic risk factors / S.B. Ulitovskiy, O.V. Kalinina, A.V. Shevtsov, E.S. Solovieva, N.K. Fock // Pediatric Dentistry and Prevention. - 2021. - V. 21, No. 3. - p. 175-181.**
- 2. Ulitovskiy, S.B. Toothpaste desensitizing property studies / S.B. Ulitovskiy, O.V. Kalinina, A.A. Leontiev, O.V. Khabarova, L.I. Pankratieva, E.S. Solovieva, N.K. Fock // Periodontology. - 2022. - v.27, No. 1. - p. 81-89.**
- 3. Ulitovskiy, S.B. Correraltion of dental hygienic knowledge in the adult population and their hygienic status / S.B. Ulitovskiy, O.V. Kalinina, A.A. Leontiev, O.V. Khabarova, E.S. Solovieva, N.K. Fock // Institute of Dentistry. - 2022. - v.95, No. 2. - p. 61-63.**

Publications in other journals:

4. Ulitovskiy, S.B. Motivation of periodontal patients to perform individual oral

- hygiene before surgical treatment / S.B. Ulitovskiy, A.A. Vasyanina, E.S. Solovieva // Dental scientific and educational journal. - 2020. - No. 1/2. - p.38-44.
5. Ulitovskiy, S.B. Optimization of oral hygiene in patients with inflammatory periodontal diseases before treatment / S.B. Ulitovskiy, E.S. Solovieva // Dentistry of the Slavic states. - 2021. - p.288-290.
 6. Ulitovskiy, S.B. The significance of primary communication between the doctor and the patient with inflammatory periodontal diseases for the entire course of further treatment / S.B. Ulitovskiy, E.S. Solovieva // Theoretical and practical issues of clinical dentistry. - 2021. - p.147-148.
 7. Ulitovskiy, S.B. Motivation details of periodontal patients aimed at performing hygiene-related actions by a dentist in the preoperative period / S.B. Ulitovskiy, O.V. Kalinina, E.S. Solovieva // Educational science and psychology in Russia and abroad: collection of scientific papers based on the materials of the International Scientific and Practical Conference. Educational science of the higher school. - 2021. - No. 2. - p.45-47.
 8. Ulitovskiy, S.B. The role of individual hygienic prevention programs in the complex treatment of patients with inflammatory periodontal diseases and partial adentia in preparation for prosthetics / S.B. Ulitovskiy, E.S. Solovieva // Actual issues of dentistry. - 2022. - S.452-455.
 9. Solovieva E.S. Patient motivation management strategy as an element of inflammatory periodontal disease prevention / E.S. Solovieva // New technologies in dentistry. - 2022. - S.32-33.
 10. Ulitovskiy, S.B. Analysis of previous treatment failures in patients with chronic inflammatory periodontal diseases: motivation component in the doctor's activity / S.B. Ulitovskiy, E.S. Solovieva // Pedagogy and psychology in medicine: problems, innovations, achievements. - 2022. - p. 206-209.
 11. Ulitovskiy, S.B. Modification in hygienic prevention programs in the progress of complex treatment of periodontal diseases at different stages / S.B. Ulitovskiy, E.S. Solovieva // Dental scientific and educational journal. - 2022. - No. 1/2. - p.36-40.

12. Ulitovskiy, S.B. Psychological commitment of patients with inflammatory periodontal diseases to start treatment / S.B. Ulitovskiy, E.S. Solovieva // Dental scientific and educational journal. - 2022. - No. 3/4. - p.61-64.
13. Ulitovskiy, S.B. The role of primary communication between a dentist and a patient in the prevention and treatment of inflammatory periodontal diseases / S.B. Ulitovskiy, E.S. Solovieva // Interdisciplinary aspects of internal diseases. - 2022. - p.185-189.
14. Ulitovskiy, S.B. The correlation of dental prevention knowledge in the adult population and their hygienic status / S.B. Ulitovskiy, O.V. Kalinina, L.I. Pankratieva, E.S. Solovieva, N.K. Fok // Bulletin of St. Petersburg University. Medicine. - 2022. - V. 17, No. 4. - p. 272-280.
15. Solovieva, E.S., Patient motivation strategy: teaching aid / E.S. Solovyova, V.A. Rodionov. - St. Petersburg: Science-intensive technologies. - 2023. - 110 p.
16. Ulitovskiy, S.B. Survival of preventive knowledge as a factor of dental health in the population / S.B. Ulitovskiy, O.V. Kalinina, E.S. Solovieva, L.I. Pankrateva // Materials of the foreign international scientific conference «Science in the era of challenges and global changes». – Venezuela. Caracas, 2023. -p. 38-44.

Approbation of work

The main provisions of the thesis were presented at the meetings of the Department of Preventive Dentistry (2023) of the First St. Petersburg State Medical University named after Academician I.P. Pavlov" of the Ministry of Health of the Russian Federation; at various scientific and practical conferences: at the 15th scientific and practical conference "February meetings in St. Petersburg", St. Petersburg, 2020); at the All-Russian Scientific and Practical Conference "Theoretical and Practical Issues of Clinical Dentistry" (St. Petersburg, 2021); at the 17th scientific and practical conference "February meetings in St. Petersburg" (St. Petersburg, 2022); at the All-Russian Congress with international participation: "Pedagogy and psychology in medicine:

problems, innovations, achievements" (St. Petersburg, 2022); at the eleventh interuniversity scientific and practical conference of students and young professionals of dental faculties of medical universities of the northwestern federal district of the Russian Federation (St. Petersburg, 2022); at the 18th scientific and practical conference "February meetings in St. Petersburg" (St. Petersburg, 2023).

Personal contribution of the author to the research

The author independently substantiates the relevance of the thesis research. The thesis defines the purpose, objectives of the study, provisions submitted for defense. The author actively participated in the discussion of the research findings that have been obtained, processed and analyzed by the author personally.

Implementation of research results into practice

The results of the research have been put into practice and successfully applied in practical classes and lectures for the students of the Dentistry Dept, students at the Medical School of the Nursing Education Institute of the First St. Petersburg State Medical University named after Academician I.P. Pavlov” of the Ministry of Health of Russia, as well as for dental hygienists. They are included in the “Strategy of Patient Motivation” teaching aid.

Thesis structure

The thesis is available on 134 pages of printed text, computer layout, and includes an introduction, 4 chapters, discussion, conclusions, practical recommendations and a list of references. The thesis is illustrated with 31 tables and 18 figures. References, including 183 sources, of which 130 are domestic and 53 are foreign.

CHAPTER 1. LITERATURE REVIEW

1.1. The prevalence of inflammatory periodontal disease

Inflammatory diseases of periodontal tissues take the 2nd place in prevalence rating among all dental diseases. According to the World Health Organization [132], today the leading reason for visiting a dentist is an inflammatory periodontal disease, due to premature loss of teeth and a fall in the quality of life, due to bad breath, bleeding gums and increased sensitivity to hard dental tissues. Therefore, inflammatory periodontal diseases are an urgent problem in dentistry [1-4, 38, 46, 53, 97, 100, 164, 179].

Their high prevalence among the population, exceeding 85 - 98%, significant degenerative transformations in the dentition require optimization and improvement of methods for detecting and preventing this pathology [33, 46, 49]. The prevalence of inflammatory periodontal diseases, according to the second epidemiological survey of the Russian population, differs depending on age and gender [28]. The high intensity of periodontal tissue pathology was revealed in 24% adult population of our country, in 52% - the initial nature of periodontal tissue inflammation was revealed. Only in 10% cases in the adult population a healthy periodontium was revealed. According to G.F. Wolf and T.M. Hassel (2014) the relationship between inflammatory periodontal diseases and general systemic human health [15] was revealed.

The research of S.B. Ulitovskiy and A.V. Shevtsova (2019) has identified the prevalence of inflammatory periodontal diseases in orthodontic patients who were examined to identify the prevalence and intensity of the inflammatory periodontal disease. Data were copied from outpatient charts of patients, form 043/y. A high prevalence of inflammatory periodontal diseases in patients with braces was revealed, the average rate of which amounted to 84.11%. The obtained data revealed a high prevalence of inflammatory periodontal diseases in orthodontic patients that necessitates the improvement of dental health quality in that contingent [109]. S.B. Ulitovskiy et al.

(2011) identified the significance of the of inflammatory periodontal disease development as one of the factors entailing the loss of teeth and the development of odontogenic infection foci [106].

In order to analyze the prevalence and causes of the inflammatory periodontal disease development, S.V. Miklyayev et al. (2018) conducted a research addressing the pathogenesis of chronic generalized periodontitis. To provide the quality of the study, the dental status of each examined patient was taken into account. Persons with orthodontic pathology and concomitant pathology were not included in the work. Data obtained by means of the questionnaire, as well as the index assessment, revealed the majority of patients suffering from chronic generalized periodontitis of mild severity [64].

An assessment of dental health was performed among residents of Penza city (6 - 75 years old), followed by a survey conducted by I.V. Malanin et al. (2010) in various age groups of the population. Of those, the share of the children aged 6 years amounted to 500 (40%); adolescents aged 12 and 15 years to 250 (20%); adults aged 35-44 and 65+ to 500 (40%). Each age group consisted of 50 people. The survey was conducted in elementary and high schools. Examination of adults was performed in the treatment rooms of dental clinics in Penza at the reception by appointment. We have assessed the dental status of 1250 residents of three districts in Penza and two districts of the region. At the same time the prevalence and intensity of inflammatory periodontal diseases and the hygienic state of the mouth were assessed. The assessment of those indicators was performed in five age groups according to WHO. In order to study the prevalence and intensity of inflammatory periodontal diseases, the inflammatory periodontal disease need treatment index - CPITN was used. The hygienic state of the mouth was assessed in children under 5-6 years old using the Fedorov-Volodkina index; in adults - the OHI-S index. A survey of two districts of the region has revealed that compared with the regional center they have a higher prevalence and intensity of inflammatory periodontal diseases. Even in 6-year-old children, the prevalence of symptoms of periodontal inflammation ranged from 38 to 50% [60].

The high prevalence of chronic generalized periodontitis in the age group over the 40 years constitutes a large part of the forms of inflammatory periodontal diseases that derives from the lack of necessary monitoring of young people (19-24 years old), who most often have the initial stages of inflammatory periodontal tissue lesions that do not arouse serious complaints and full understanding of the problem. Most of the periodontal patients aged 35-44 years go to the dentist with complaints of bleeding gums during individual oral hygiene. As a rule, such complaints are also accompanied by an objective assessment; upon examination, the dentist detects hyperemia and edema in the area of the tooth root projection, tooth mobility and destruction of bone tissue. There is a growing need to improve the preventive measure efficiency in patients with inflammatory periodontal diseases [28, 136, 150].

The unified ecological system concept consists in the idea that the human body and the environment are interconnected, where microorganisms that make up the microflora of the mouth play the leading role [4, 38].

Periodontopathogenic bacteria produce endotoxins that stimulate the activity of various immunocompetent cells - macrophages and leukocytes. Proteolytic enzymes of periodontal microorganisms like *Actinobacillus actinomycetecomitans* and *Porphyromonas gingivalis* are considered to be one of the most significant pathogenic factors, possessing a wide range of virulence conditions, in particular, proteolytic and osteoresorbing activities. *Actinobacillus actinomycetecomitans* produce collagenase; *Porphyromonas gingivalis* - metalloproteinases, cysteine proteinases, asparagine proteinases, causing degradation of nonspecific IgA and IgG by splitting them into small peptides that give rise to inflammatory periodontal diseases [77, 130]. Large number of pathogens in the gingival sulcus and periodontal tissues stimulates the counter immune response of the body. The main task of proteolytic enzymes produced by monocytes and polymorphonuclear leukocytes is to suppress the negative impact of microorganisms on periodontal tissues [23].

Solving the problem of inflammatory periodontal diseases is significantly complicated by the constant transformation of etiological factors that result from the

growing proportion of opportunistic agents in the oral microflora, the pathogenetic abilities of which, to date, have not been identified [1, 8, 26].

A high content of gram-positive bacteria such as Actinomycetota stimulates the formation of dental plaque resulting in the development of gingivitis that in turn increases the number of bacteroids and coccal flora. In the chronic course of inflammation in periodontal tissues, gram-negative anaerobic polymorphic microorganisms appear - fusobacteria; gram-negative anaerobic non-spore-bearing coccoid bacteria - veillonella; as well as gram-negative spiral-shaped mobile microaerophilic bacteria - campylobacters [48, 70].

The development of periodontitis generates an inflammatory-dystrophic change in the alveolar processes. The key factor of the inflammatory periodontal disease development is infection, however, neurohumoral processes, lipid metabolism disorders, as well as the immune response to allergen play an important role [62, 74, 81].

Inflammatory periodontal diseases cause improper functions of the connective tissue that surrounds the tooth, connecting it to the inner wall of the alveolar bone. Inflammatory periodontal diseases also develop as a local protective response of the body to injury or infection. A number of biochemical modifications are activated leading to vasodilatation that increases their permeability and enhances blood flow to the site of inflammation, where plasma and blood elements exit into the matrix. The inflammation of periodontal tissues without primary and secondary prevention can affect not only the dental status, but also the state of the body as a whole [16, 27, 69].

It has been proven that gingival inflammation consists of the following stages: reaction of mast cells, activation of the plasma system and the appearance of cellular mediators. Leading modulators of inflammation (cytokines, hormones, mediators, and growth factors) regulate the functioning of the body when disorders occur in periodontal tissues [3, 11].

Periodontal diseases are characterized by two pathogenetic trends: bacterial contamination and immune response. Plaque forms the necessary environment for the

development of microorganisms, their reproduction that generate an immune response. Triggering inflammation process in periodontal tissues conditions the significant role of T-helpers [28, 55].

O. Bernhardt et al. (2019) noted the interrelation between the quality of an individual hygiene procedure during orthodontic treatment and associated gingivitis, and inflammatory periodontal diseases in children and adolescents are combined with dental anomalies in 20–25% cases [136].

V.V. Nikitin et al. (2014) proved that when examining patients with non-removable orthodontic structures, a high prevalence of inflammatory periodontal diseases was revealed amounting to 85.04%. Of those, 53.2% were diagnosed with gingivitis of varying severity and various forms, and 31.8% of the examined patients with developed periodontitis [70].

In the progress of research O.I. Arsenina et al. (2005) have found that 10% of 117 examined patients had signs of periodontal inflammation prior to orthodontic treatment. The authors noted the hyperemia and swelling of the gums, its bleeding during probing,

27% patients were directed for periodontal treatment as a result of the complications development during the period of orthodontic treatment. According to the authors, of all patients sent to prepare periodontal tissues for orthodontic care, 83.3% of individuals were diagnosed with chronic catarrhal gingivitis, and 16.7% with mild generalized periodontitis. Of the 117 examined patients, 27.45% patients had inflammatory changes in the periodontal tissues in the course of orthodontic treatment three to four months after the fixation of the bracket system. The examination revealed hyperemia and swelling of the gums of varying degrees of severity, as well as its bleeding during probing. In the gingival area of the crowns of the teeth, they found an accumulation of plaque, in the interdental spaces - tartar deposition

.Hypertrophy of the interdental papillae was found in 10% those examined resulting from poor oral hygiene [6].

Despite numerous studies, the issue of non-specific protection of periodontal tissues at the molecular level remains open, and the existing information on dental

hygiene requires a personalized approach. The long-term persistence of pathogenic microorganisms is associated with the infectious-allergic source of inflammatory periodontal diseases and implementation through periodontopathogenic microflora of the periodontal complex, therefore, it is necessary to develop preventive measures based on the methods of treating inflammatory periodontal diseases.

1.2. The role of individual oral hygiene in the development of inflammatory periodontal diseases

According to A.M. Kovalevsky et al. (2018), as well as S.B. Ulitovskiy et al. (2022) dental plaque is a leading factor in the manifestation and development of inflammation in periodontal tissues. The efficiency of subgingival plaque removal during self-hygiene of the mouth guarantees the success of periodontal treatment and the maintenance of a healthy state of the mouth soft tissues. The main goal of inflammatory periodontal disease treatment is the elimination of the inflammatory process that begins in the gum and the area of the periodontal junction, spreading deep into, involving all periodontal tissues [40, 116].

A.B. Turaev et al. (2018) found that a high activity of dental diseases comes from many factors, including non-compliance with traditional and professional hygiene programs for the prevention of inflammatory periodontal diseases [97].

A relationship has been revealed between personal characteristics and individual oral hygiene attitudes. Revealed significant differences between personality type and attitude to their dental health and preventive actions. Extrovert patients with low anxiety, emotionally stable, prone to building an authoritarian style of relationships with others, perform oral hygiene most consistently and regularly. Patients with low levels of friendliness, optimism, and lack of leadership qualities are less likely to change their prophylactic toothbrush and seldom visit a dentist [95].

When studying hygiene indices according to Fedorov-Volodkina in preschool children of urban and rural population, oral hygiene is assessed at the same level as

being unsatisfactory. Researchers have identified a high prevalence and intensity of caries in Primorsky Krai due to the low level of hygiene knowledge [87, 124].

The assessment of the hygienic and periodontal status in the examined persons has revealed that with the frequency of brushing teeth on average 2 times a day and the use of anti-inflammatory toothpastes the value of indicators for the OHI-S and PMA indices decline. Among the examined children, a correlation was found between the level of oral hygiene, the prevalence and intensity of the course of major dental diseases, and their level of education [91].

According to G.I. Skripkina et al. in order to promote the efficiency of major dental disease prevention in preschool children, the system of their hygienic education and upbringing was improved. Being instructed in oral hygiene at the initial level, 60% children in Omsk demonstrated a poor level of oral hygiene, 18% - very poor, 19% - unsatisfactory, and only 3% - a satisfactory level of oral hygiene. Comparing the efficiency of different hygienic education schemes and upbringing of preschool children, it was found that the growth of caries was reduced by 9.6% when conducting only sanitary and educational work, and when conducting only oral hygiene education that indicator amounts to 18%. Compliance with the stages of individual oral hygiene is a leading factor in the treatment of inflammatory periodontal diseases. Thus, it is important to use complex preventive toothpastes that can affect various types of pathologies [88].

In today's conditions, preventive oral hygiene products containing active ingredients in their composition play an increasing role in the treatment of dental diseases. Among liquid oral hygiene products, rinses are the most widely used. A control survey was performed after four weeks of daily cleaning interdental spaces with floss, in addition to a toothbrush and paste. It has found no pathogenic microflora of the mouth in the crops in 7 people, 8 species of bacteria have been identified in 81%, including non-pathogenic *Neisseria subflava* found in 3%, and *Staphylococcus epidermidis*, found in 20% of the subjects, and the number of acid-forming *Streptococcus mitis* decreased by 3 times [66, 152].

The use of hygienic flosses, in addition to the mechanical removal of food debris, reduces the number of pathogenic bacteria that affect both the development of dental caries and the condition of periodontal tissues.

During the study, Yu.G. Tarasova et al. (2010) analyzed the time spent on performing the stages of professional oral hygiene when receiving patients with chronic generalized periodontitis in medical institutions of various levels. It has revealed that general practitioners in 70% cases used hand tools and in 30% used the ultrasonic method of professional oral hygiene to remove dental deposits. Dentists-therapists in 61.25% cases used the combined method of professional oral hygiene, in 26.25% - ultrasound, and only in 12.5% cases - the manual method of removing dental plaque. Periodontists preferred the manual method of professional oral hygiene (60.71%) and, to a lesser extent, the ultrasonic method (39.29%) [93].

M. Jonathan et al. (2011) identified groups of patients with low, moderate and high levels of plaque. They found an inversely diametrical relationship between the values of dental pathology in terms of cariesological and periodontal parameters with the intensity of plaque accumulation. Successful treatment and control of periodontal tissue incidence, regardless of the inflammatory process severity, is inextricably linked with the need to remove dental plaque, both soft and hard, located on the tooth surface or under the gum [147].

In this regard, according to T.V. Kulazhenko et al. (2013), the leading task of secondary prevention in the development of inflammatory periodontal diseases is the implementation of individual and professional oral hygiene. Treatment of inflammatory periodontal diseases is performed in combination with professional oral hygiene and monitoring of individual oral hygiene [52].

A.S. Shcherbakov et al. (2012) recommend professional oral hygiene before each treatment by a dentist. Especially, in their opinion, it is relevant in patients with periodontitis suffering from general somatic pathology as well. Professional oral hygiene is an effective preventive measure that reduces the growth of dental caries, improves the patient's hygiene skills, eliminates dental deposits, which are a depot of

microorganisms, the waste products of which cause demineralization of tooth enamel and inflammation of periodontal tissues [129].

In the assessment of anti-inflammatory toothpaste efficiency, the active components of which are chlorhexidine and natural herbal extracts, A.V. Akulovich et al. (2013) received a significant improvement in the hygienic condition of the mouth, and a positive anti-inflammatory effect was noted as well. The most effective toothpaste in terms of cleansing and anti-inflammatory effects was the one based on natural ingredients confirmed by a decrease in the Fedorov-Volodkina index (from 1.91 to 1.52 c.u.), OHI-S (from 1.05 to 0.64 c.u.), CPITN (from 0.97 to 0.73 c.u.), as well as Muhlemann and Saxer bleeding index (from 0.96 to 0.56 c.u.) [4].

G.I. Skripkina et al. (2016) have found that the average initial level of oral hygiene in schoolchildren was unsatisfactory and it was accompanied by mild chronic gingivitis. Teeth brushing by schoolchildren under teacher supervision using children's preventive toothpastes in a 6-month school program was effective in preventing chronic gingivitis [88].

A detailed questioning of workers of locomotive crews on their teeth brushing routine has revealed that 71% of the respondents spend 1-2 minutes on brushing. Only 22.6% respondents brush their teeth for 3-4 minutes, 6.5% of respondents spend 5-6 minutes on this, 87.1% respondents do not know which toothbrush and toothpaste are suitable for them. Analysis of the study performed by L.E. Leonova et al. (2016) showed that most of the interviewed persons needed dental education and the correct selection of oral hygiene items [54].

It has been established that the hygienic mouth condition of military pilots is worse than that of persons from the ground aviation services and significantly worse compared to the indicators of the control group [20]. M.V. Grinin et al. (2012) analyzed the hygiene status of military pilots in higher detail, in view of the intensity of plaque formation and the intensity of tartar formation. At the same time, the examined persons demonstrated an increased formation of dental plaque that was 15.5% higher than that in the control group and 11.4% higher than that of ground aviation workers.

Consequently, the unsatisfactory level of oral hygiene in persons from among the flight personnel of military aviation is largely owing to increased plaque formation [20].

Assessment of the preventive efficiency employing the Vector-therapy method formed the basis of R.T. Bulyakova et al. (2013) They compared the results of treatment with the standard method (professional hygiene by ultrasonic and air-abrasive methods) and the one employing Vector-therapy. Prior to treatment, the hygienic and periodontal status of patients in all groups was approximately the same: the PBI bleeding index averaged 3.60, poor oral hygiene was confirmed by high Silness-Loe and OHI-S oral hygiene indices. The depth of periodontal pockets varied from 3 to 5 mm, the PMA index averaged $58.5 \pm 2.8\%$. Within the implementation of the treatment and prevention program, the hygienic condition of the mouth significantly improved in all patients, as evidenced by the reduction in the OHI-S index by 4.6 times on day 10 and 2.6 times six weeks after treatment that corresponds to satisfactory oral hygiene [eleven].

In disabled children 6 months after the active implementation of individual oral hygiene fundamentals a positive evolution of the studied parameters was revealed [83].

The hygienic literacy was studied in the research works of L.N. Maksimovskaya et al. (2016), that being analysed led to the conclusion that only 44.8% respondents regularly follow the rules of individual oral hygiene and brush their teeth once a day, and, according to 14.1% patients, it is enough to brush their teeth once a day. week. Among the respondents 4.0% do not brush their teeth at all, which, according to the researchers, indicates an insufficient level of dental hygiene routine. The dental status is based on the preventive dental knowledge, as well as motivation for their implementation that underlies the dental health in the adult population [59].

The results of the survey have established an insufficient hygienic knowledge of oral care in pregnant women. 55.8% of the surveyed brushed their teeth once a day before breakfast, 6% brushed irregularly, 86% of pregnant women do not know how to control the quality of individual oral hygiene and have never come across relevant information before [34].

The dental status of a today's person is characterized by poor dental hygiene knowledge and a lack of motivation in the prevention of major dental diseases. The best way to prevent inflammatory periodontal disease is to completely remove dental plaque through professional oral hygiene and regular personal oral hygiene [21].

S.L. Tomar and A.F. Reeves (2015) have found that in 2010 the prevalence of dental caries increased by 18% compared to 1994 data that is determined by social and living conditions, as well as the degree of dental education [169].

To develop a concept of human dental health in the 21st century, it is necessary to consider the level of individual oral hygiene skills in periodontal patients. While growing this level ensures the implementation of the most effective prevention of inflammatory periodontal diseases.

1.3. The correlation between the assessment of the hygienic mouth condition and the prevention of inflammatory periodontal diseases at the post-surgery stage

The prevention of inflammatory periodontal diseases takes one of the leading places in today's dentistry. Inflammatory periodontal diseases adversely affect human health that is a significant factor for the adult population worldwide, due to their high prevalence [18, 31, 105, 108, 144, 148, 165, 174].

A high prevalence of inflammatory periodontal diseases affects the general somatic status, reducing the quality of human life, being not only a medical, but also a socio-psychological issue resulting from the possible loss of teeth leading to an anomaly in the ratio of dental arches and pathology in the work of the temporomandibular joint, influencing the function of chewing and the development of speech [15, 21, 39, 48, 106, 124, 149, 163, 177].

In today's conditions, a practicing dentist uses such methods aimed at the prevention of inflammatory periodontal diseases as systematic professional oral hygiene, adherence to the stages of individual oral hygiene with the selection of means and items to increase the efficiency of preventive measures, recommendations for

normalizing the diet and the appointment of immunomodulatory therapy [22, 36, 40, 101, 106, 125, 142, 164, 173, 181].

The set of the measures aimed at preventing the development of inflammatory periodontal diseases incorporates the following: hygienic knowledge development in the adult population; implementation of optimal nutrition projects; control and preparation of individual oral hygiene; regular visits to the dentist in order to prevent the development of inflammation in the periodontal tissues, to eliminate deposits on the teeth, to provide appropriate orthodontic and orthopedic treatment of the dentoalveolar system; x-ray monitoring of hard tissues once a year detecting the type and intensity of destructive changes in the bone of the alveolar processes; surgical prevention of conditions that ensures the formation of pathology in periodontal tissues (surgical intervention in the vestibule of the mouth, prevention of cicatricial changes in the area of the transitional fold, changes in the attachment of the frenulum of the upper and lower lips) [21, 37, 89, 94, 100, 108, 133, 147, 152, 164, 177, 180].

According to the recommendations of the dentist, periodontal patients perform the stages of individual oral hygiene, such as the use of preventive toothbrushes and toothpastes, interdental and additional hygiene items, liquid hygiene products, as well as “finger” gum massage. Hygienic oral care and teaching the rules of individual oral hygiene are both national and individual activities performed with a dentist involved and independently by the patient. An important task of dental education is to cover the entire population: pupils, students, production workers. To increase the prevention efficiency of periodontal tissue inflammation, it is necessary to monitor individual oral hygiene and provide an appropriate training. Due to the regularity and repeated patterns of brushing techniques, a skill is acquired in performing preventive actions in periodontal patients [30, 55, 68, 148, 151, 154, 167, 170, 179, 183].

There is also a scheme for inflammatory periodontal disease prevention, offered by V.A. Zhurbenko (2021), in view of the person's age periods. During the period of periodontal tissue development and formation as well as permanent occlusion, a rational mode of life and nutrition of the child at school and at home is recommended; total

exclusion of sweets between meals; sufficient intake of calcium (1.5 g / day); phosphorus (2.5 g/day), amino acids and phosphatides; ensuring sufficient load on the chewing apparatus; correction of children's upper skeleton deformation with the help of orthodontic equipment and special gymnastic complexes; a full range of therapeutic measures in children with congenital pathology of teeth and periodontal disease; detection and timely treatment of children with gingivitis and their dispensary observation; regular sanitation of the mouth and ENT organs; widespread use of fluorine varnishes and remineralizing solutions in the prevention of dental caries; the maximum exclusion of antibiotics, steroids and other potent drugs; training of the general vascular system and vessels of periodontal tissues by alternating temperature factors, using massaging procedures in the oral area; elimination of local factors in the development of inflammatory periodontal diseases (grinding of prematurely contacting bumps, with indications of orthopedic and orthodontic interventions, elimination of defects in the structure of the oral mucosa - the condition of the frenulum, the vestibule of the oral cavity); the use of hygiene products and items that prevent the development of pathological changes in the periodontium, such measures as the elimination or neutralization of professional harmful agents on periodontal tissues and a set of steps that prevent the development of sclerotic changes in periodontal vessels are added. For the physiological development of the dentition, it is necessary to observe the necessary degree and intensity of the load on the periodontal tissues, a diet with a high consumption of dairy and seafood, as well as vegetables [10, 29, 36, 39, 44, 47, 66, 71, 77, 90, 102, 142, 155].

To maintain the health of periodontal tissues, it is necessary to pay attention to the diet in accordance with the age group, to prevent the development of somatic pathology and stressful situations, to eliminate hypoxia of the body and periodontal tissues. Medical examination is an integral part of maintaining dental health in periodontal patients. Performing such a set of actions that is aimed at identifying the risk of developing chronic inflammation in periodontal tissues, ensures the functions of

the dentition. Socio-hygienic measures within the dental education program improve dental health in the adult population [23, 30, 41, 69, 75, 104, 135, 149, 158, 162].

Improving methods for the prevention and treatment of inflammatory periodontal diseases that progress with age is one of the most important issues in dentistry [48, 63, 74, 89, 108, 111, 139, 146, 155, 169].

The wide prevalence of periodontal tissue pathology among the population and the lack of a unified view on the restoration of the dentoalveolar system determine not only the medical, but also the social significance of the problem of rehabilitation of those patients. Research points to a role for periodontal pathogenic bacteria in increasing the risk of heart disease, diabetes, and respiratory infections. The need for research to optimize individual hygiene measures in the field of prevention of inflammatory periodontal diseases is confirmed by their wide prevalence [14, 102, 108, 133, 159, 161, 175, 180, 182].

The use of a diode laser in dentistry opens up new opportunities for the quality and timing of treatment [183]. Laser technologies have proven a direct destructive effect on oral microorganisms. In order to restore periodontal tissues, non-surgical periodontal therapy is used that removes dental plaque and their endotoxins from hard dental tissue surface [164]. Treatment of inflammatory periodontal diseases using diode lasers provides a bactericidal effect, reduces inflammation in the soft tissues and facilitates healing in periodontal pockets [62]. Lasers are able to close capillaries and lymphatic vessels, thereby reducing swelling in the treated area, and the level of postoperative discomfort, and also stimulate healing at a cellular level. Laser photobiostimulation activates local blood flow and stimulates the growth of endotheliocytes [74]. The advantages of laser technologies in non-periodontal surgery as well as in treating inflammatory periodontal diseases ensures a wide dental laser application in the complex treatment of gingival inflammation [40-48, 51, 62, 74, 100, 164, 183].

During inflammation in periodontal tissues the initial protective body responses aimed at neutralizing microbial plaque become links in the progress of damage to periodontal tissues: vascular permeability grows, hyperperfusion of the

microvasculature develops, metabolism is disturbed, antioxidant protection and immune response to the microorganisms in the mouth decrease [68, 77].

Teutrophil-initiated damage to periodontal tissues generate acute and chronic generalized gingivitis and periodontitis. Neutrophils, sensitized or stimulated by the periodontopathogenic microflora, promote inflammatory process resulting in tissue destruction [70, 78, 130]. Phytoadaptogens, as immunomodulators, affect this link in pathogenesis [55]. It has been proven that water-alcohol extracts of *Rhodiola rosea* and *Eleutherococcus*, as phytoadaptogens, stimulate T-cell immunity, and *Eleutherococcus senticosus* also manifests itself as an immunomodulator that prevents meteoropic conditions, desynchronosis, increased fatigue, decreased performance in people with severe physical and mental stress, as well as during hypoxia and hyperthermia, while it restores impaired functions of the central nervous system, the autonomic nervous system, the neuromuscular apparatus, the cardiovascular system, improves the attention and accuracy of the work performed [21, 37, 50, 61, 64, 88, 97, 106, 125, 133, 151, 162, 177, 180].

The action of adaptogens is systemic performed by its own metabolites, the body's defense cascades, activating the protein-synthesizing and energy apparatus of the cell, thereby stimulating body's resistance to adverse factors [18, 89]. Phytoadaptogens interact with phospholipase to generate diacylglycerol that stimulates protein biosynthesis, improves plastic processes and induces the synthesis of detoxification enzymes. Under the impact of phytoadaptogens, histohematic barriers are stabilized, since they prevent the accumulation of peroxide compounds [94]. N-tyrosol, rosin and rosidine of *Rhodiola rosea* enhance tissue resistance to damage [9, 33, 64, 72, 83, 89, 94, 108, 124, 163].

During inflammation, periodontal tissues function under hypoxia that enhances lipid peroxidation creating a large amount of highly toxic products: superoxide anion, malondialdehyde that destroy periodontal connective tissue structures that are replaced by granulation tissue infiltrated by macrophages, plasma cells, and lymphocytes [69, 126].

Phytoadaptogens prevent the accumulation of lipid peroxidation products in the body providing an antioxidant effect that has a positive effect on periodontal tissues in a chronic inflammatory process that results in the accumulation of macroergic compounds and intensification of energy metabolism [33, 41].

Licorice (*Glycyrrhiza glabra*) contains up to 24% of the triterpene saponin glycyrrhizin that causes a distinct anti-inflammatory activity inhibiting exudative and proliferative inflammation phases. Licorice flavonoids have an antispasmodic effect [52]. Positive clinical results in the treatment of inflammatory periodontal diseases are obtained by an aqueous solution of *Rhodiola rosea* tincture that helps to reduce gingival edema and reduce its bleeding [10].

Phytoadaptogens are included in the composition of prophylactic oral hygiene products. Complexes of extracts of herbs and plants stimulate an endogenous antioxidant system and decrease the intensity of free radical oxidation [29]. Phytoadaptogens if used on a long-term basis form a "state of non-specifically increased resistance" of the body to the adverse effects of environmental factors, with the restructuring of the body to a more stable level of regulation that explains the systemic nature of their effects. The search for the most effective combinations of phytoadaptogens for the treatment of local and systemic disorders in inflammatory and inflammatory-destructive periodontal diseases will allow finding new methods of long-term active prevention and complex therapy in dentistry [45].

Professional oral hygiene is performed involving antiseptic agents to remove dental deposits. Most often, dentists resort to chlorhexidine with bactericidal properties and providing a distinct antimicrobial effect, to reduce the pathogenicity of dental plaque [31]. A finding has been made that the constant use of this agent can cause a number of side effects [64].

The research performed in the children's age group within the period of orthodontic treatment has revealed a positive trend in periodontal indices during individual oral hygiene. Actual approaches including the choice of targets and means of oral hygiene, teaching the rules of caring for mouth hard and soft tissues, as well as

maintaining patient motivation, have shown high efficiency in the prevention of inflammatory periodontal diseases [31, 58, 72, 120, 121, 135, 139, 169, 172, 175].

A physiotherapeutic treatment-and-prevention complex based on laser immunocorrection with low-intensity infrared radiation has been developed. The impact is performed by the device with a wavelength of 0.89 microns on the area of the periodontal pocket. The results of the studies testified to the preservation of the preventive effect from 8 to 12 months [150].

In the treatment of inflammatory periodontal diseases, photodynamic therapy [73] demonstrated the highest efficiency with a lasting clinical effect. It destroys biological tissues by the interaction of radiation of a certain wavelength and a photosensitizer introduced previously into the patient's body [73]. The absorption of light by a molecule results in a series of photophysical processes, leading to the transition of molecular oxygen dissolved in tissues to an excited state and the formation of singlet oxygen that is a cytotoxic agent with extreme response. Photodynamic therapy is also an alternative sort of treatment for bacterial infection. The antibacterial, bactericidal, physiotherapeutic effects produced by this method in the treatment of inflammatory periodontal diseases [63, 118] have been made. It allows obtaining a long-term remission after a cycle of procedures in the treatment of chronic gingivitis and periodontitis. That method does not lead to dysbacteriosis and the formation of resistance of the pathogenic microflora of the mouth [61, 127, 135, 183].

After a course of treatment with Metrogyl-Dent, a decline in the frequency of isolation of potential periodontal pathogens (*Prevotella* spp., *Bacteroides* spp., *Streptococcus intermedius*) was observed, along with a decrease in the stabilizing resistant microflora of the mouth (*Streptococcus sanguis*, *Streptococcus salivarius*, *Streptococcus mitis*) and a rise in the frequency of *Candida albicans* isolation that indicates the development of dysbiosis in individual patients, while in individuals with chronic generalized catarrhal gingivitis after photodynamic therapy, the frequency of isolation of potential periodontopathogens (*Prevotella* spp., *Bacteroides* spp., *Streptococcus intermedius*) declines without changing the composition of stabilizing

species (*Streptococcus sanguis*, *Streptococcus salivarius*, *Streptococcus mitis*) microbiocenosis of the mouth [45, 51, 68, 71].

The analysis of the literature sources has revealed the use of antibacterial agents is the most common way to stop inflammation in periodontal tissues [38, 49]. 72% dentists prefer dressings and gum applications [16, 52]. Only 45% of 168 surveyed dentists explain the importance of precise compliance to prescribed medication to patients [164]. However, the growing trend in the formation of periodontopathogenic microflora resistance resulting from the use of antibacterial agents, the search for new preventive methods in periodontology is getting increasingly relevant. The importance of antimicrobial effect preliminary assessment of oral hygiene anti-inflammatory agents on the microflora of periodontal tissues is growing in order to increase their preventive effect at the post-surgery stage [55, 62, 104, 106, 113, 127, 136, 140, 161, 173, 175].

CHAPTER 2. MATERIALS AND RESEARCH METHODS

This research was performed at the Department of Preventive Dentistry of the First St. Petersburg State Medical University named after I.P. Pavlov of the Ministry of Health of Russia.

The research employed clinical, laboratory and medico-sociological methods.

2.1. General characteristics of the research group and design project of the research

The research involved 173 patients with chronic generalized periodontitis of moderate severity, which were followed up for 3 months.

All the examined were divided into 4 groups:

in the 1st group - persons after surgery performed in compliance with the method of closed curettage, who used the "Preventive dentistry kit No. 1" for periodontal patients at the post-surgery stage using the active component-based prophylactic toothpaste "Periodontol Healing Herbs" containing extracts of sage, walnut, echinacea, horsetail and rosemary; "Elixir with kelp" rinse, which composition contained such active ingredients as peppermint, chlorhexidine, vitamin C, kelp extract; medium hard "TePe Supreme soft" manual toothbrush; manual single-bundle toothbrush "TePe interspace medium" with a cone-shaped bundle of bristles and a replaceable head; dental tape "Collgate" (43 people);

in the 2nd group - persons after surgical intervention performed in compliance with the flap surgery method, who used the "Preventive dentistry kit No. 2" for periodontal patients at the post-surgery stage using the active component-based "Paradontax to maintain healthy gums" prophylactic toothpaste containing sodium bicarbonate, xanthan gum, echinacea purpurea juice, chamomile extract, sage, ratania, bitter myrrh, sodium fluoride; active component-based "Forest balm anti-inflammatory gum protective" rinse containing castor oil, aloe leaf juice, oak bark extract, nettle, yarrow

flowers, St. John's wort, celandine, sodium fluoride, cetylpyridinium chloride; medium "Biomed" manual toothbrush; "Curaprox 1009 single" manual mono-bundle toothbrush with a cone-shaped bundle of bristles; "TePe" brushes (45 people);

in the 3rd group - persons after surgical intervention performed in compliance with of flap surgery method using the Picasso Lite diode laser (USA), who used the "Preventive dentistry kit No. 3" for periodontal patients at the post-surgery stage. They were using the "Siberian Wellness Strawberry and Red clay" prophylactic toothpaste containing strawberry juice, strawberry pits, red clay, extracts of magnolia and papain; "ASEPTA parodontal" rinse, containing castor oil, extracts of chamomile, sage, witch hazel and povidone; "NANO Premium manual toothbrush" medium manual toothbrush; "Pesitro UltraClean" manual single-bundle toothbrush with a cone-shaped bundle of bristles; dental tape "Collgate"; "TePe" brushes (44 people);

in the 4th group – a control group, persons after surgery did not use "Preventive dentistry kits for periodontal patients at the post-surgery stage". Traditional oral hygiene schemes were used (41 people).

The research focused on persons with chronic generalized periodontitis of moderate severity with parameters corresponding to the inclusion criteria presented in Table 2.1.

Table 2.1 Inclusion/non-inclusion and exclusion parameters in research focus groups

№	Inclusion parameters	Non-inclusion parameters	Exclusion parameters in progress
1	Aged 40 to 59 years	Aged before 40 years and after 59 years	-----
2	Chronic generalized periodontitis of moderate severity	Missing chronic generalized periodontitis of moderate severity	Non-attending examination
3	Missing fixed orthopedic constructions	Fixed orthopedic constructions are present	Beginning of orthopedic treatment
4	At least 20 teeth present	Less than 20 teeth present	Loss of teeth during observation

End of table 2.1

№	Inclusion parameters	Non-inclusion parameters	Exclusion parameters in progress
5	Orthodontic appliances not present	Orthodontic appliances present	Beginning of orthodontic treatment
6	No complications after periodontal tissue surgery	-----	Divergence of seams
7	No complications after periodontal tissue surgery	-----	Suppuration of the wound
8	Missing inflammatory diseases of the mouth	Acute inflammatory diseases of the mouth	The occurrence of acute inflammatory diseases of the mouth
9	Missing diseases of the gastrointestinal tract	Diseases of the gastrointestinal tract	-----
10	Missing diabetes	Diabetes	-----
11	Missing chronic renal failure	Missing chronic renal failure	-----
12	Missing urolithiasis	Urolithiasis	-----
13	Missing coronary heart disease	Coronary heart disease	-----
14	Consent of the patient to follow the prescribed individual hygiene measures and visit the dentist according to the established schedule	Refusal of the patient to follow the prescribed individual hygiene measures and visit the dentist in compliance with the established schedule	Violation of prescribed conditions

The distribution by age in the research groups is given in Table 2.2.

Table 2.2 Distribution within the research groups by age

Distribution by groups	Age (years)	Abs. number	Relative number (%)
1 group	40-44	3	7,0
	45-49	19	44,1
	50-54	14	32,6

End of table 2.2

Distribution by groups	Age (years)	Abs. number	Relative number (%)
1 group	55-59	7	16,3
	Total	43	100,0
2 group	40-44	4	8,9
	45-49	20	44,4
	50-54	12	26,7
	55-59	9	20,0
	Total	45	100,0
3 group	40-44	2	4,5
	45-49	22	50,0
	50-54	15	34,1
	55-59	5	11,4
	Total	44	100,0
4 group	40-44	7	17,1
	45-49	16	39,0
	50-54	11	26,8
	55-59	7	17,1
	Total	41	100,0

In the 1st, 2nd and 3rd groups, persons with chronic generalized periodontitis of moderate severity aged 45-49 years amounted to for 44.1%, 44.4% and 50.0%, respectively, in the 4th group to 39.0% (Table 2.2).

Table 2.3 summarizes the results on the chronic generalized periodontitis prevalence of saren of severity depending on sex.

Table 2.3 Distribution of persons with chronic generalized periodontitis of middle severity within the studied groups depending on gender

Distribution by groups	Sex	Abs. number	Relative number (%)
1 group	Men	18	41,9
	Women	25	58,1
	Total	43	100,0
2 group	Men	21	46,7
	Women	24	53,3
	Total	45	100,0
3 group	Men	20	45,5
	Women	24	54,5
	Total	44	100,0
4 group	Men	16	39,0
	Women	25	61,0
	Total	41	100,0

In the 1st group, 41.9% examined men had chronic generalized periodontitis of moderate severity, in the 2nd group - 46.7%, in the 3rd group - 45.5%, in the 4th group - 39.0%; women - in the 1st group - 58.1%, in the 2nd group - 53.3%, in the 3rd group - 54.5%, in the 4th group - 61.0% (Table 2.3).

2.2. Methods of inflammatory periodontal disease prevalence estimation

2.2.1. The study of inflammatory periodontal diseases prevalence and intensity

To assess periodontal tissues in individuals with chronic generalized periodontitis of moderate severity, P.A. Leus (1989) offered a complex periodontal index (CPI) to assess the signs of the periodontal tissue damage greatest severity using a button probe, the availability of soft plaque, tartar, bleeding of the periodontal groove, of periodontal pockets and tooth mobility.

The Index can be interpreted as follows UMTEI:

0 - signs are not detected;

1 - there is plaque;

2 - bleeding;

3 - tartar;

4 - periodontal pocket;

5 - tooth mobility.

Based on the age of the patient, the research was performed in the area of the following teeth: 17, 16, 11, 26, 27, 36, 37, 31, 46, 47.

The calculation was performed in compliance with the formula:

$$\text{CPI (Complex Periodontal Index)} = \frac{\text{sum of indicators}}{\text{number of teeth}} \quad (1)$$

CPI based results:

0.1 - risk of disease;

1.1 - 2 - mild form;

2.1 - 3.5 - moderate;

3.6–5 - severe form;

2.2.2. The study of dental status in persons with chronic generalized periodontitis of moderate severity

The following indicators were used to assess the incidence of dental caries: the caries course prevalence and intensity.

The study of the intensity and prevalence of dental caries is a good means for dental care planning employing CFE index to estimate the quality and, by its growth, the preventive work efficiency.

High indicators of the index also indicate an insufficient level of preventive work being performed or its lack.

To optimize the study of dental status in individuals with chronic generalized periodontitis of moderate severity, we used a questionnaire developed by us (Figure 2.1).

_Maxilla

	PP Depth																		
	PP Depth																		
	PP Depth																		
		18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28		
B																			
O																			
	PP Depth																		
	PP Depth																		
	PP Depth																		

_Mandible

	PP Depth																		
	PP Depth																		
	PP Depth																		
		48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38		
O																			
B																			
	PP Depth																		
	PP Depth																		
	PP Depth																		

Date of examination _____		ID _____	
Primary/Secondary examination			
Date of birth _____			
Workplace _____			
Full years _____			
This appeal to the dentist: a) for the purpose of sanitation; b) with acute pain; c) by negotiability (treatment of 1 tooth); d) preventive examination			
The frequency of visits to the dentist: a) irregularly; b) regularly			
№ III	Indicator	Indicator characteristics	Cypher
1	Extraoral examination	no signs of injury	0
		ulceration (head, neck, shoulders)	1
		ulceration (nose, cheeks, chin)	2
		ulceration of the nasolabial folds	3
		ulceration of the red border of the lips	4
		malignant neoplasms	5

Figure 2.1. Questionnaire - a questionnaire to study dental status in persons with chronic generalized periodontitis of moderate severity.

End of figure 2.1

№ III	Indicator	Indicator characteristics	Cypher
1	Extraoral examination	pathology in the upper and lower lips	6
		swollen lymph nodes (head, neck)	7
		other swelling of the face and jaws	8
2	Assessment of temporomandibular joint symptoms	missing	0
		manifestation	1
		pain is not recorded (on palpation)	2
		limitation of jaw mobility (opening < 30 mm)	3
3	Oral mucosa	no signs of lesion	0
		malignant tumor	1
		leukoplakia	2
		lichen planus	3
4	Tongue	form pathology	1
		pathology of papillae size	2
		plague	3
5	Palate	shape pathology	1
		pathology of papillae size	2
		plague	3
6	Bite	physiological	1
		pathological	2
7	Bleeding gums	missing	1
		occurs intermittently after brushing teeth	2
		occurs regularly after brushing teeth	3
		occurs periodically spontaneously	4
		bleeding gums	5
8	Tooth mobility	missing	1
		practically undefinable	2
		weak	3
		distinct	4
		Extremely distinct	5
9	Aesthetic component	missing	0
		single signs of increasing the distance between the teeth	1
		slight signs of an increase in the distance between the teeth	2
		significant signs of an increase in the distance between the teeth	3
10	Diseases of the endocrine system	missing	0
		diseases of the esophagus	1
		stomach diseases	2
		diseases of the pancreas	3
		diseases of the liver and gallbladder	4
		duodenal disease	5

Figure 2.1. Questionnaire - a questionnaire to find a dental status in persons with chronic generalized periodontitis of moderate severity.

To assess the dental status in periodontal patients, an examination of the mouth was performed before surgery. The state of the lip mucosa, cheeks and tongue was examined, the presence of mineralized and non-mineralized supragingival and subgingival dental deposits, the condition of the gingival margin, its color, shape, the presence of edema, fistulous tracts and abscesses, the presence of periodontal pockets were determined. We studied gum bleeding and the degree of inflammation. For that purpose, 173 outpatient cards and questionnaires were filled in and statistically processed (Figure 2.1).

2.3. Methods of laboratory research

To form Preventive dentistry kits, a comparative laboratory testing of oral hygiene products and items was performed.

2.3.1. Efficiency assessment of oral hygiene products - toothpastes

To assess the toothpaste efficiency, a method is used based on S.B. Ulitovskiy toothpaste efficiency index (1998).

Parameters used to assess the S.B. Ulitovskiy toothpaste efficiency index (1998) consisted in the characteristics of toothpaste by attributing it to one of the groups: hygienic (0) or preventive (5). Further, the assessment was performed within the prophylactic group, where the origin of the paste was revealed by its action - anti-caries (3), anti-inflammatory (3), for diseases of the oral mucosa (3), desensitizing (3), combined (5). The consistency of the studied pastes was examined - gel (5), paste (5), mixed (5); density - moderate density (5), dense (3), extra dense (0); function - children (5), children and teenagers (5), adolescents (5), adults (5), for the whole family (3); the degree of foaminess is slightly foaming (0), moderate (3), strongly foaming (5). The fluorine compounds was found - does not contain (0), does contain (one fluorine compound (3), various fluorine compounds and its combination with calcium (5); the

concentration of fluorine-containing compounds - in children's pastes (up to 6 years old) is very low (3), low (5), moderate (3), high (0); in children and adolescents (6-9 years old) - very low (3), low (5), moderate (3), high (0); in adolescents (9-14 years) - very low (0), low (3), moderate (5), high (3); in adults - very low (0), low (0), moderate (5), high (3) The availability of active elements in the composition of the toothpaste was analysed: without active elements (0), with active elements (5), biologically active ingredients - yes (5), no (0), herbal supplements - yes (5), no (0) content of active elements - fluorine-containing (3), calcium-containing (3), mixed (5), calcium missing (0) The packaging of toothpaste was assessed - in a tube made of aluminum (0), made of laminated aluminum (3), made of plastic (5) The abrasive filler was taken into account - chalk (0), silicon compounds (5), dicalcium phosphate (5), aluminum compounds (3), additional abrasives (3). Based on the Green-Vermillion index indicators, the cleaning ability of the toothpaste was assessed - good (5), satisfactory (3), low (0). During the use of the hygiene product, its local irritating and allergenic effect was studied - detected during the use of the paste (0), not detected (5), it is doubtful, since it is detected in individuals (3). The anti-inflammatory effect of toothpaste was taken into account - distinct (5), moderate (3), missing (0). Toxicity was assessed - missing (5), available (0). The microbial purity was assessed as corresponding to the GOST of Russia (3), does correspond to the international standard ISO (5), does not correspond (0). The physical and chemical properties of the toothpaste were assessed in compliance with GOST (3), in compliance with the international standard (5), does not comply (0). In case of non-compliance, the certification procedure is interrupted till the causes are eliminated. The availability of expiration dates on the package: yes (5), no (0). Availability of information in the language of the country of origin - yes (5), no (0). The homogeneity of the paste was studied - homogeneous (5), with foreign inclusions (0), exfoliating (0); taste: pleasant, perfumery, corresponding to the pastes of this name (5), unpleasant and does not correspond (0), with an extraneous taste, slightly interrupting the taste of the fragrance, such as an admixture of chalky taste (3), specific, not always pleasant, but corresponds

to the name (3); smell - pleasant, corresponds to the pastes of this brand name (5), unpleasant and does not correspond (0), specific, far from being always pleasant, but corresponds to this brand name (3), when it is difficult to determine or there is no corresponding standard, we put a score of 3 points; color: corresponds to the color of the paste of this name (5), does not correspond (0), it is difficult to differentiate in a doubtful case (lack of a standard guest sample) - 3 points; change in the PMA index during the use of the paste: distinct (5), moderate (3), missing (0); additional characteristics of the abrasive properties of the toothpaste: high (0), moderate (5), low (3). We studied the availability of antiseptic components such as chlorhexidine, triclosan and the like that have an anti-inflammatory effect - distinct (5), moderate (3), missing (0). In case of chlorhexidine or the like components availability, the score will be 3 points.

The Ulitovskiy's toothpaste efficiency index is a ratio of the summarized received, evaluated points to the total evaluated criteria number.

$$UTEI = \frac{\sum (\alpha_1 + \dots + \alpha_n)}{n} \quad (2)$$

where \sum - sum of quantitative evaluations of criteria;

α_1 - number of points for the first criterion;

α_n - number of points for the n-th criterion;

n - number of criteria included in the index.

In this UTEI index, the number of criteria is equal to 30, respectively, the formula can be rewritten, as follows:

$$UTEI = \frac{\sum (a_1 + \dots + a_{30})}{30} \quad (3)$$

in the denominator, the indicator of the sum of criteria points varies within limits (if the number of criteria changes, then the units of the sum indicator will change, but the limits of the index will remain unchanged) $0 \leq (a_1 + \dots + a_{30}) \leq 150$, The limits of UTEI amount to: $0 \leq UTEI \leq 5$

The results obtained for the UTEI index can be interpreted as follows - evaluation criteria:

with indicators exceeding 3 points and tending to 5 - indicates a good quality of toothpaste with effective and safe indicators;

within 3 points - satisfactory paste;

index indicator within 2 points - unsatisfactory properties of toothpaste that shall not be recommended for use.

The research was made on 10 different types of toothpastes containing different active ingredients:

- The 1st toothpaste (“Colgate Medicinal Herbs”) contained extracts of aloe leaves, chamomile flowers, essential oil of tea tree leaves and sage as active ingredients;
- 2nd toothpaste (“Periodontol Healing Herbs”) based on active components of extracts of sage, walnut, echinacea, horsetail and rosemary;
- 3rd toothpaste (“New Pearl Seven Herbs”) containing echinacea, peppermint, stinging nettle, St. John's wort, calendula, sage and chamomile extract active components;
- 4th toothpaste (“Siberian Wellness Strawberry and red clay”) containing strawberry juice, strawberry pits, red clay, magnolia and papain extracts;
- 5th toothpaste (“Lacalut active”) containing on essential oils of star anise, common fennel, eucalyptus spherical leaves, myrrh extracts, limonene, aluminum fluoride, chlorhexidine digluconate active ingredients;
- 6th toothpaste (“Forest balm against gum disease”) containing castor oil, aloe leaf juice, extracts of oak bark, nettle, yarrow flowers, St. John's wort, celandine, sodium fluoride, cetylpyridinium chloride active components;
- 7th toothpaste (“Colgate Total”) containing: zinc oxide, zinc citrate, sodium fluoride, eugenol active ingredients;

- 8th toothpaste ("Paradontax for gum health") sodium bicarbonate, xanthan gum, echinacea purpurea juice, chamomile, sage, rattania, bitter myrrh extract, sodium fluoride;
- 9th toothpaste ("ELGYDIUM anti-plaque") containing water, calcium carbonate, silicon dioxide, titanium oxide, chlorhexidine digluconate;
- 10th toothpaste ("SPLAT Medicinal Herbs") containing sage, chamomile, hawthorn, calcis, sea buckthorn extract and geranium essential oil active ingredients.

2.3.2. Assessment liquid hygiene products – mouthrinse efficiency

S.B. Ulitovskiy mouth rinse efficiency index (1998) was assessed according to a number of criteria that affect the choice of liquid hygiene products, such as mouthrinse, and their inclusion in the "Preventive dentistry kits" for periodontal patients at the post-surgery stage.

The opportunity was considered to affiliate the rinse with hygienic (0 points) or prophylactic (5 points) liquid oral hygiene products; affiliation of the rinse to one of the types, in accordance with the classification - preventive: for the prevention of caries (3 points); to reduce tooth sensitivity (3 points); to prevent the formation of plaque (3 points); for better plaque removal (3 points); for anti-inflammatory therapy of diseases of the soft tissues of the mouth (3 points); combined (4 points); complex (5 points). For rinse aids with only hygienic properties, i.e. removal of food debris and deodorization of the mouth and mouth breathing, in this column there will always be a "0" score; according to accessory: children's mouthrinse (5 points), teenage mouthrinse (5 points), adult mouthrinse (5 points), mixed mouthrinse, i.e. for the whole family, regardless of age and dental status (2 points); by alcohol content: non-alcoholic (5 points), alcohol is up to 5% (4 points), from 5 to 10% (3 points), from 11 to 15% (2 points), from 16 to 20% (1 point), 21% and above - 0 points; according to the degree of foaminess, the rinse aid during rinsing: slightly foaming - 0 points, moderately - 5 points, strongly

foaming (provokes a gag reflex) - 2 points; the fluorine content in the mouthrinse: does not contain fluorine - 0 points, does contain fluorine - 5 points. If the mouthrinse belongs to another type of preventive mouthrinse, in which the content or missing fluorine does not affect its specified properties, then the score will be - 5 points, if the rinse possesses only hygienic properties, then the score will be - 0 points; available-missing biologically active substances: did not contain - 0 points, did contain - 5 points; content of active ingredients: fluorine (5), triclosan (5), chlorhexidine (3), cetylperidium chloride (5), missing (0); local irritant and allergenic effect: detected during use of the rinse (0), not detected (5); it is doubtful, since it is detected in individual probants (2); has an anti-inflammatory effect: no (0), moderate (3), distinct (5); toxicological safety: dangerous (0), in this case the rinse aid is not suitable for use, non-toxic (5); microbial purity: comply with the permissible standards (5), does not comply with (0) - rinse aid is not suitable; physical and chemical properties: complies with permissible standards (3), do not comply with permissible standards (0), comply with international permissible standards (5); organoleptic properties: comply with GOST for this type of product (3), complies with international permissible standards and properties declared by the manufacturer (5), does not comply with permissible standards and properties declared by the manufacturer (0). In case of non-compliance, a negative conclusion is given, and the certification procedure is interrupted; the availability of expiration dates on the package: yes (5), yes, but difficult to decode by an ordinary consumer (2), missing (0); the availability of information about the composition on the packaging, properties, method of application, possible side effects (if any) in the language of the country of sale (i.e. Russian): yes (5), missing (0); the number and sign of the national body for certification of perfumery and cosmetic products of the state standard system on the package: available (5), missing (0); cap-measuring cup: available (5), missing (0); rinse aid homogeneity: homogeneous (5), heterogeneous (0) (there is sediment or suspension – that is not supposed to be in the rinse, this is allowed only in vegetable elixirs); taste: pleasant, corresponding to the taste of the rinse aid of the given name (5), unpleasant and not corresponding (0), specific, not always pleasant, but corresponding

to the ODA of the given name (3); smell: pleasant, corresponding to the smell of the rinse aid of the given brand (5), specific, but corresponding to the smell of the rinse aid of the given name (3); unpleasant and inappropriate (0); color: corresponds to the color of the rinse aid of this brand (5), does not correspond (0); change in the digital indicators of the PMA index during the use of the tested rinse aid: distinct (5), moderate (3), missing (0); deodorizing effect: short-term, up to 10 minutes (0); moderate, up to 30 minutes (2); good, 30 to 60 minutes (3); distinct - more than 60 minutes (5); sensations during use: pleasant (3), unpleasant (0), very pleasant (5); sensations in the oral cavity after using the rinse: very pleasant (5), pleasant (3), unpleasant (0); fire hazard: may ignite if there is an open flame nearby, but there is a sign or information on the packaging (label) - a warning

UMREI (S. B. Ulitovskiy mouthrinse efficiency index) is the ratio of the sum of the scores of all the criteria under study to the number of criteria.

$$\text{UMREI} = \frac{\sum (\alpha_1 + \dots + \alpha_n)}{n}, \quad (4)$$

where \sum - sum of criteria quantitative estimates of criteria;

α_1 - number of points for the first criterion;

α_n - number of points for the n-criterion;

n - number of criteria included in the index.

In the UMREI index, the number of criteria is 30, respectively, the formula is the ratio of the summarized points obtained as a result of total criteria assessment to the number of criteria:

$$\text{UMREI} = \frac{\sum (\alpha_1 + \dots + \alpha_{30})}{30}, \quad (5)$$

in the denominator, the indicator of the sum of criteria points varies within limits (if the number of criteria changes, then the indicator summarized score will change, but the

limits of the index will remain unchanged) $0 \leq (a_1 + \dots + a_{30}) \leq 150$, and the limit values of the index are: $0 \leq \text{UMREI} \leq 5$

The data obtained from the assessment of UMREI index can be interpreted as follows:

with a score of 0 points - unsatisfactory rinse and unsuitable for use;

With a score of 1 point - a rinse of low quality and conditionally suitable, if the comments are not sufficiently significant and fundamental, and unsuitable, if the rating is negative according to the leading indicators;

with a score of 2 points - the rinse is characterized as satisfactory and suitable for use;

with a score of 3 points - the rinse is characterized as good quality;

with a score of 4 points - the rinse quality is characterized as very good;

with a score of 5 points - the rinse of the highest quality.

The following types of rinses have been analysed:

1st rinse ("Forest gum balm") containing castor oil, aloe leaf juice, extracts of camellia leaves, nettle, chamomile, celandine, sodium fluoride, cetylpyridinium chloride active ingredients;

2nd rinse ("Taiga recipes") containing such active ingredients as pine nuts extract and mint essential oil in its composition;

3rd rinse ("Colgate Plax") based on active components of oak and fir bark extracts;

4th rinse ("R.O.C.S. double mint") containing kelp extract, phosphorus, calcium and magnesium active components;

5th used mouthrinse ("ASEPTA parodontal") containing castor oil, extracts of chamomile, sage, witch hazel and povidone;

6th rinse ("Elixir with kelp") containing: peppermint, chlorhexidine, vitamin C, kelp extracts in its composition;

7th rinse ("Bluem oxygen for health") containing the active ingredients of lactoferrin, sodium citrate and castor oil;

8th rinse ("Foramen") containing active components of panthenol, sodium fluoride, allantoin, castor oil, chlorhexidine, acesulfame potassium;

9th rinse ("Buccotherm with thermal spring water") containing active components of green tea leaves, cranberries extracts;

10th mouthrinse ("Microfilling doctor recommends") containing hydroxyapatite, chlorophyll derivatives, castor oil, sodium fluoride.

2.3.3. Hygiene item efficiency assessment - toothbrushes

In order to effectively form an appropriate "Preventive dentistry kit" for periodontal patients after surgery, the characteristics of toothbrushes were analysed. To do this, we used the S.B. Ulitovskiy manual toothbrush efficiency index (1997).

Criteria for evaluating toothbrushes in compliance with the S.B. Ulitovskiy manual toothbrush efficiency index (1997):

Evaluation criteria for the efficiency index of a manual toothbrush S.B. Ulitovskiy (UMTEI):

1. Assessment of the oral hygiene index, simplified (OHI-S Index) prior to and after brushing - the digital indicators have not changed (0 points), the digital indicators tend to the maximum (5 points), intermediate indicators (3 points) ;
2. brush field of the toothbrush: homogeneous (3 points), not homogeneous (5 points);
3. type of planting beams: linear (5), mixed (3), cellular (0);
4. bristle retention under pressure: resiliently springy (5), rigid (3), easily disintegrating (0);
5. type of brush field formation: multi-level (5), two-level (3), single-level (0);
6. degree of penetration into the interdental spaces, retromolar region, periodontal sulcus: good (5), satisfactory (3), missing (0);
7. the opportunity of massaging the attached gums: a good massage without injury (5) is likely, but traumatic (3), impossible and very traumatic if performed (0);

8. degree of tip rounding: good (5), satisfactory (3), missing (0);
9. by the type of bristles: artificial fiber (5), natural (0);
10. by the degree of rigidity of the synthetic fiber: hard (0), soft (3) and medium hardness (5). The exception is manual periodontal toothbrushes, intended for persons with increased tooth sensitivity. In this case, the assessment is performed differently: the average degree of hardness (3), soft (5);
11. the bristle tufts indicator reflecting the degree of brush wear: present (5), missing (0);
12. toothbrush head shape: torpedo-shaped (5), rounded and without sharp corners (3), rectangular (0);
13. toothbrush neck: rigid (5), springy (3), bending (0);
14. toothbrush handle: round (5), flat (3), thin (0);
15. toothbrush handle: has pressed rubber (5), missing (0);
16. maneuverability of the toothbrush: good (5), satisfactory (3), poor (0);
17. size of the head: corresponds to the size of the teeth (5), less than necessary (3), larger than required (0);
18. availability of grip: rubber or corrugated (5), available (3), missing (0).

UMTEI is the ratio of the sum of the scores of all the criteria under study to the number of criteria.

$$\text{UMTEI} = \frac{\sum (\alpha_1 + \dots + \alpha_n)}{n}, \quad (6)$$

where \sum - sum of quantitative evaluations of criteria;

α_1 - number of points for the first criterion;

α_n - number of points for the n-th criterion;

n - number of criteria included in the index.

In this UMTEI index, the number of criteria is equal to 18, respectively, the formula can be rewritten as follows:

$$\text{UMTEI} = \frac{\sum (a_1 + \dots + a_{18})}{18}, \quad (7)$$

UMTEI limits are: $0 \leq \text{UMTEI} \leq 5$.

The obtained results of UMTEI can be interpreted as follows - assessment criteria: with indicator value exceeding 3 points and tending to 5 - good cleaning ability of the toothbrush; within 3 points - low cleaning ability of the toothbrush; index value of 0 points - poor cleaning ability of the toothbrush.

10 different toothbrushes were tested within the research:

1st - toothbrush "NANO Premium manual toothbrush";

2nd - Elgidium clinic toothbrush;

3rd - "Biomed" toothbrush;

4th - "Colgate Classics of Health" toothbrush;

5th - "R.O.C.S. BLACK EDITION" toothbrush;

6th - "Colgate neo" toothbrush;

7th - "Aquafresh standard" toothbrush;

8th - "ELGYDIUM WHITENING" toothbrush;

9th - TePe Supreme soft toothbrush;

10th - Oral-B BLACK toothbrush.

2.3.4. Single-bundle toothbrush efficiency test

To assess the single-bundle toothbrush efficiency and include them in Preventive dentistry kits for periodontal patients at the post-surgery stage, we have developed and applied an index assessment the efficiency of manual mono-bundle toothbrushes (MMTEI), based on the assessment of the following indicators:

1. Homogeneity of the brush field: inhomogeneous multilevel - 1 point; heterogeneous single-level - 2 points; homogeneous with a single-level field - 3 points; multilevel homogeneous with a truncated cone - 4 points; multi-level homogeneous cone-shaped - 5 points;

2. Cleaning ability by the plaque index on the approximate surfaces from 70% to 100% of the painted surfaces - 1 point; from 40% to 69% of painted surfaces - 2 points; from 25% to 39% of painted surfaces - 3 points; from 1% to 24% of painted surfaces - 4 points; staining missing - 5 points;

3. Stepped arrangement of the bundle: single-step - 1 point; two-step with different shapes and lengths of bristles - 2 points; two-step with the same shape of bristles - 3 points; multi-step with different shapes of bristles - 4 points; multi-step with the same shape of bristles - 5 points;

4. Depth of bristle penetration into the interdental spaces: 1/5 of the length of the interdental space – 1 point; 2/5 of the length of the interdental space - 2 points; 3/5 of the length of the interdental space - 3 points; 4/5 of the length of the interdental space - 4 points; for the entire length of the interdental space - 5 points;

5. Massage of attached gums: missing – 1 point; massage with trauma to the interdental papillae and marginal gums - 2 points; massage with marginal gum injury - 3 points; massage with trauma to the interdental papillae - 4 points; massage without injury - 5 points;

6. Rounding of the ends of the bristles: missing rounding - 1 point; from 1% to 25% bristles are rounded - 2 points; from 26% to 50% bristles are rounded - 3 points; from 51% to 75% of bristles are rounded - 4 points; from 76% to 100% bristles are rounded - 5 points;

7. Bristle material: natural horsehair - 1 point; natural pork bristle - 2 points; artificial fiber made from a biodegradable polymer - 3 points; artificial fiber made of polymer - 4 points; artificial fiber from nylon 612 - 5 points;

8. The degree of rigidity of the synthetic fiber: hard cut fiber - bristle diameter 0.18 mm - 1 point; hard with rounded tips - bristle diameter 0.17 mm - 2 points; soft cut fiber - bristle diameter 0.12 mm - 3 points; soft with rounded tips - bristle diameter 0.10 mm - 4 points; medium hardness with rounded tips - bristle diameter 0.15 mm - 5 points;

9. Indicator bristle: missing - 1 point; on the periphery - 25% indicator bristle - 2 points; 25% indicator bristle in the center - 3 points; 50% indicator bristles - 4 points; medium hardness with rounded tips - 100% indicator bristles - 5 points;

10. Head shape: rectangular - 1 point; trapezoidal - 2 points; conical - 3 points; oval - 4 points; round - 5 points;

11. neck structure: arched - 1 point; straight line - 2 points; at an angle of 90° - 3 points; springy - 4 points; hard - 5 points;

12. Handle shape: elliptical cylinder - 1 point; elliptical - 2 points; cylindrical - 3 points; flat - 4 points; spherical - 5 points;

13. Handle lock structure: missing - 1 point; homogeneous concave - 2 points; homogeneous with a ledge - 3 points; has pressed plastic - 4 points; has pressed rubber - 5 points;

14. Grip for the thumb: missing - 1 point; plastic straight grip - 2 points; plastic convex - 3 points; rubber straight - 4 points; rubber concave - 5 points;

15. Replaceable head structure: missing - 1 point; with a cone - 2 points; with a truncated cone - 3 points; with bristle wear indicator - 4 points; located at an angle of 600 or 1200 - 5 points.

The scores obtained are summed up and the quality of the manual mono-bundle toothbrush is assessed on the efficiency index of the manual mono-bundle toothbrushes.

Assessment criteria:

- up to 15 points - a basic indicator of the manual mono-bundle toothbrush quality;
- from 16 to 31 points - a relative indicator of the manual mono-bundle toothbrush quality;
- from 32 to 47 points - a nominal indicator of the manual mono-bundle toothbrush quality;
- from 48 to 63 points - an acceptable indicator of the quality of a manual mono-bundle toothbrush;

- from 64 points or more - the best indicator of the quality of a manual mono-bundle toothbrush.

10 different manual mono-bundle toothbrushes were tested within the research:

1st - "Paro39 swiss" mono-bundle toothbrush;

2nd - "TePe Compact Tuft" mono-bundle toothbrush;

3rd - "Revyline Single" mono-bundle toothbrush;

4th - "TePe interspace medium" mono-bundle toothbrush; 1 gr

5th - "Curaprox 1006 single" mono-bundle toothbrush;

6th - "ESYA PRO SERIES 3008" mono-bundle toothbrush;

7th - "Curaprox 1009 single" mono-bundle toothbrush; 2 gr

8th - "Dentalpik" mono-bundle toothbrush;

9th - "Pesitro UltraClean" mono-bundle toothbrush; 3 gr

10th - "Longa Vita" mono-bundle toothbrush.

2.3.5. Antimicrobial activity study of oral hygiene products

Comparing the growth inhibition zones sizes of microorganism test strains that are formed during solution tests of a standard sample and the test agent allows a proper determination. During the study of oral hygiene products, antimicrobial activity was identified using glass Petri dishes that were placed on a flat, flat, horizontal surface. Petri dishes contained nutrient agar, into which a test culture of microorganisms (0.1 ml) diluted with 0.9% NaCl solution to a ratio of 1:1000 and 20 ml of nutrient medium was immersed. After agar solidification, standard wells were isolated by means of sterile glass, into which 0.1 g of the sample was added in a volume of 0.2 ml per well. To perform a comparative assessment aimed at determination of antimicrobial activity, 2 weighings of each test sample of the oral hygiene product were added to the Petri dish. Growing and cultivation were performed in compliance with the recommended routines of the State Pharmacopoeia of the Russian Federation XII part I, 2007.

Each test culture was inoculated into a nutrient medium using three Petri dishes in order to obtain reliable results. When zones of microorganism growth inhibition appeared around the holes, the antimicrobial activity was identified.

2.3.6. Identifying microbiological indicators in oral hygiene products

The method is based on building favorable conditions for the growth and development of microorganisms, the inoculation of which was performed in a nutrient medium with its further cultivation. A single number of mesophilic aerobic and facultative anaerobic microorganisms was identified; the availability of such bacteria as Enterobacteriaceae, *Pseudomonas aeruginosa*, *Staphylococcus aureus* was identified; availability of molds and yeasts (San.PiN. 1.2.676-97).

Testing of microbial contamination of the studied oral hygiene products revealed such microorganisms as saprophytic microorganisms, yeast and mold fungi as well as such microorganisms as *Proteus*, *Salmonella*, *Shigella*, *Escherichia Coli* families; staphylococci (*Cl. Botulinus*, *Cl. Perfrungens*, *Cl. Telani*). In order to study oral hygiene products, they were diluted in ten milliliters with a 0.1 M solution of disinfected phosphate buffer (pH 7.0) and (0.1 M a mixture of dibasic potassium phosphate - 13.61 grams in 1 liter - a mixture of disubstituted sodium phosphate - mixed in ratio 48.8:51.2).

In order to identify the number of saprophytic microorganisms, molds and yeast fungi, cultivation of 1 gram of oral hygiene products in one hundred milliliters of 0.1 M phosphate buffer solution (pH 7.0) was created (Pakhomov G.N. et al., 1983).

The number of saprophytic bacteria was studied by means of two Petri dishes with meat-peptone agar, into which 0.1 ml of a suspension (1:10) of oral hygiene products was added. In 2 Petri dishes, 0.1 ml of the studied toothpaste suspension was immersed in a ratio of 1: 100. Depending on the area of the agar the studied material was divided by means of a spatula. It was permitted to have single colonies of

saprophytic microorganisms in crops of 0.1 ml of the initial suspension of the preparation (Pakhomov G.N. et al., 1983).

A 90 mm dish was filled with ten milliliters of 1.5% beef agar to extract anaerobic biofilms. At the next stage, semi-liquid Schaedler agar was applied along with the studied microorganisms. After that, the holes were cut out in Petri dishes, 0.1 ml of the sample was immersed in them, the assessment of them was performed after two days.

2.3.7. The study of oral fluid in periodontal patients

The saturation of hydrogen ions in the oral liquid was measured using a pH-meter (HANNA), with a removable nozzle HI 1270 having a screw connector, a large screen, with the reliability corresponding to ± 0.2 ; featuring a large measurement range (0 to 14 c.u.). Before using the pH-meter, its calibration was performed by the degree of acidity, supporting 2 calibration solutions:

HI 70007 - 7.01 pH Single Use Calibration Fluid;

HI 70004 is a 4.01 pH single use calibration fluid.

The electrode tip was immersed in a solution, acidity 7.01 pH, to stabilize the parameter to the value 7.01 pH. After washing the electrode, it was immersed in the 2nd calibration solution, the acidity 4.01 pH, and the regulation of the parameter was resumed.

To study the pH index, oral fluid in persons with chronic generalized periodontitis of moderate severity was collected from 10.00 to 12.00 hours after eating and the tip of the pH meter was immersed in it, fixing the pH value on the device screen.

2.4. Study of the periodontal status dependence on the level of dental hygienic knowledge in the surveyed population

2.4.1. Assessment of the dental hygiene knowledge in periodontal patients

To study the level of preventive knowledge in periodontal patients after surgery, a survey of patients was performed involving a questionnaire that assessed the level of dental hygiene knowledge and acquired skills by persons with chronic generalized periodontitis of moderate severity (Ulitovskiy S.B., 1993).

Prior to surgical treatment in periodontal patients, a survey was conducted. Totally 173 periodontal patients with chronic generalized periodontitis of moderate severity took part in the sociological survey. The data obtained was assessed on a 4-point system, where the minimum score was 1 point, and the maximum score was 4 points.

The limit values of UHKI: $1 \leq \text{UHKI} \leq 4$

$$\text{Formula UHKI: } \text{UHKI} = \frac{\text{summarized score on each parameter}}{\text{sum of parameters}} \quad (8)$$

The main components of the UHKI:

UHKI characteristics:

from 1.0 to 1.9 points - low level of hygiene knowledge;

from 2.0 to 2.9 points - a satisfactory level of hygiene knowledge;

from 3.0 to 4.0 points - a good level of hygiene knowledge;

To study the level of hygienic knowledge, a repeated questioning was conducted throughout the entire period of the study.

2.4.2. Assessment of Preventive Knowledge Survival of in Periodontal Patients

To assess the survival of preventive dental knowledge in periodontal patients, a study was performed on the preventive knowledge survival index by Ulitovskiy (2021). The index indicators enabled finding out how the information provided to them is stored in the patient's memory, as well as to monitor the survival of the knowledge gained.

Table 2.4 Criteria under study for the UPKS index

№ III	Indicators	Characteristic/ assessment
1.	How often should one brush his teeth?	
A.	Once a day	No/ 0 points Yes/ 1 point
B.	Twice a day. With a positive assessment for this item, the previous item gets positive assessment as well	No/ 0 points Yes/ 1 point
C.	After every meal. With a positive assessment for this item, the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
D.	Once a week.	No/ 0 points Yes/ 1 point
E.	Once a month. If this item is assessed positively the previous item get positive assessment as well	No/ 0 points Yes/ 1 point
2.	When should one brush his teeth?	
A.	No need to clean.	No/ 0 points Yes/ 1 point
B.	Before meal. If this item is assessed positively the previous item get positive assessment as well	No/ 0 points Yes/ 1 point
C.	At noon after lunch. If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
D.	In the morning before breakfast. If this item is assessed positively three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	In the morning after breakfast. If this item is assessed positively the four previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
3.	Does bad breath affect the quality of dental health?	
A.	It does.	No/ 0 points Yes/ 1 point
B.	It does in case of recurrent bad breath (occasionally). If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	It does if there is a constant bad breath, but weak. It disturbs but not strongly. If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point

Continuation of table 2.4

№ III	Indicators	Characteristic/ assessment
D.	It does if there is a constant and rather moderate bad breath, but sufficiently distinct for the surrounding people. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	It does if there is a constant strong fetid odor from the mouth. Open aversion from other people. If this item is assessed positively the previous four items get positive assessment as well.	No/ 0 points Yes/ 1 point
4.	Does gingival inflammation affect the quality of dental health?	
A.	It does.	No/ 0 points Yes/ 1 point
B.	It does if there are single areas of gum inflammation on one jaw, on one side. If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	It does if there are single areas of gum inflammation on one jaw, on both sides. If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
D.	It does if there are single areas of gum inflammation on one jaw, on both sides in individual segments. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	It does if there is inflammation on both jaws including the entire periodontium (generalized). If this item is assessed positively the four previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
5.	Does bleeding gums affect the quality of dental health?	
A.	It does.	No/ 0 points Yes/ 1 point
B.	It does extremely seldom. If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	It does when brushing teeth / when chewing hard food. If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
D.	It does when chewing soft foods. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	It does on a regular basis. If this item is assessed positively the four previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
6.	Does tooth mobility affect the quality of dental health?	
A.	It does, even if it is barely perceptible (natural - physiological).	No/ 0 points Yes/ 1 point

Continuation of table 2.4

№ III	Indicators	Characteristic/ assessment
B.	It does if the tooth displacement takes place is in the 1 st surface. If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	It does if the tooth displacement takes place is in 2 surfaces. If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
D.	It does if the tooth displacement takes place is in 3 surfaces. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	It does if the tooth displacement takes place all directions. If this item is assessed positively the four previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
7.	Should one use dental floss?	
A.	One should do it always.	No/ 0 points Yes/ 1 point
B.	One should do it if there are gaps between the teeth. If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	One should do it if there are carious cavities on the contact surfaces of the teeth. If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
D.	One should do it if there is bad breath. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	One should do it if one has periodontal disease. If this item is assessed positively all the previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
8.	Should one use prophylactic rinses to improve dental health?	
A.	One should do it always.	No/ 0 points Yes/ 1 point
B.	One should do it if one has bad breath. If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	One should do it if gums bleed. If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
D.	One should do it if there are deep carious cavities in the teeth. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	One should do it in case of periodontal disease. If this item is assessed positively the four previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
9.	Does soft plaque affect the quality of dental health?	

Continuation of table 2.4

№ III	Indicators	Characteristic/ assessment
A.	It does.	No/ 0 points Yes/ 1 point
B.	It does if it is weakly expressed in individual teeth. If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	It does if distinct soft plaque covers up to $\frac{1}{2}$ of the crown height. If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
D.	It does if distinct soft plaque covers up to $\frac{3}{4}$ of the crown height. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	It does if distinct soft plaque covers up to $\frac{3}{4}$ of the crown height. If this item is assessed positively all previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
10.	Does dental plaque (calculus) affect the quality of dental health?	
A.	It does.	No/ 0 points Yes/ 1 point
B.	It does, even if it is weakly distinct in individual teeth above the gum or below it (single). If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	It does if there is distinct soft plaque covering up to $\frac{1}{2}$ of the height of the crown, or the tooth surface under the gum and it occupies most of the pocket upper part. If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
D.	It does if there is a distinct covering up to $\frac{3}{4}$ of the crown height, or the tooth surface under the gum and it occupies most of the root surface. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	It does if there is a distinct covering up to $\frac{3}{4}$ of the crown height, or the tooth surface under the gum everywhere. If this item is assessed positively all previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
11.	Should one use interdental brushes?	
A.	One should do it.	No/ 0 points Yes/ 1 point
B.	One should do it if one has bad breath. If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	One should do it if there are deep periodontal pockets. If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
D.	One should do it if there are deep carious cavities on tooth contact surfaces of the teeth. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point

Continuation of table 2.4

№ III	Indicators	Characteristic/ assessment
E.	One should do it if one has periodontal disease. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
12.	Should one use tongue scrapers?	
A.	One should do it always.	No/ 0 points Yes/ 1 point
B.	One should do it if one has bad breath. If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	One should do it if there is tongue desquamation. If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
D.	One should do it if there are deep gaps in the tongue. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	One should do it if there is a black hairy tongue. If this item is assessed positively all previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
13.	Do dentures affect the quality of dental health?	
A.	They do.	No/ 0 points Yes/ 1 point
B.	They do if there are single crowns (single fixed dentures). If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	They do if there are bridges (multi-component fixed dentures). If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
D.	They do if there are limited removable dentures (single). If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	They do if there are multiple multi-component removable dentures or a complete removable denture on one jaw. If this item is assessed positively all previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
14.	Does general physical illness(es) affect dental health?	
A.	It does, even if the patient is practically healthy.	No/ 0 points Yes/ 1 point
B.	Intermittent colds do affect. If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	Recurrent acute diseases of the body do affect. If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point

Continuation of table 2.4

№ III	Indicators	Characteristic/ assessment
D.	Allergic diseases do affect / Asthma and similar chronic diseases. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	The complex of chronic diseases occurring for many years do affect. If this item is assessed positively all previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
15.	Can the age affect dental health?	
A.	Age 3 - 12 probably affects.	No/ 0 points Yes/ 1 point
B.	Age 13 - 20 probably affects. If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	Age 21 - 40 probably affects. If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
D.	Age 41 - 60 probably affects. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	Age 61 and higher probably affects. If this item is assessed positively all previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
16.	Does smoking harm your dental health?	
A.	Certainly, it does	No/ 0 points Yes/ 1 point
B.	Probably not, if one smoked for a long time, in his youth. If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	Hardly anyone, if the smoking background does not exceed 5 years.. If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
D.	It does if one smokes for at least 10 years. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	Definitely it does if one smokes constantly (15 years or more) and a lot (1 pack or more per day). If this item is assessed positively the four previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
17.	Is alcohol harmful to dental health?	
A.	Probably it is not if used in limited quantities.	No/ 0 points Yes/ 1 point
B.	Probably it is, even if consumed in limited quantities (on holidays).. If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	It is if consumed infrequently (at least once a week). If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point

End of the table 2.4

D.	Consumes frequently, but no more than a few times a week. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	Drinks alcohol regularly for many years. If this item is assessed positively the four previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
18.	Does the cardiovascular disease affect dental health?	
A.	It doesn't.	No/ 0 points Yes/ 1 point
B.	It does if the patient is sensitive to changes in atmospheric pressure that affects his own blood pressure.. If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	It does if the patient suffers from hypertensive or hypotensive heart disease. If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
D.	It does if suffering from cardiovascular disease relatively recently, less than 3 years. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	It does if suffers for a long time, has a chronic CCC disease. If this item is assessed positively the four previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
19.	Do extracted teeth affect the quality of dental health?	
A.	Does not affect if 1-2 teeth are missing, spaced apart.	No/ 0 points Yes/ 1 point
B.	It has little effect if there are separate extracted teeth (up to 5 teeth). If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	It does if up to 10 teeth are missing. If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
D.	It does if up to 14 teeth are missing. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	It does if teeth are completely missing on one of the jaws (14 teeth, wisdom teeth do not count). If this item is assessed positively the four previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
20.	How much time should one spend for a hygiene procedure in the mouth?	
A.	As many as you need to complete all stages.	No/ 0 points Yes/ 1 point
B.	2 minutes. If this item is assessed positively the previous item gets positive assessment as well.	No/ 0 points Yes/ 1 point
C.	3 minutes. If this item is assessed positively the two previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
D.	5 minutes. If this item is assessed positively the three previous items get positive assessment as well.	No/ 0 points Yes/ 1 point
E.	10 minutes. If this item is assessed positively all previous items get positive assessment as well.	No/ 0 points Yes/ 1 point

$$UPKSI = \sum (\alpha_1 + \dots + \alpha_n), \quad (9)$$

where \sum - number of points for each criterion;

α_1 – points for 1-st criterion;

α_n – баллы по n criterion.

Assessment criteria for indicators in compliance with the Ulitovskiy PKS Index (UPKSI)

0.0 - 15.0 points - very poor knowledge

15.1 - 30.0 points - poor knowledge

30.1 - 50.0 points - satisfactory knowledge

50.1 - 70.0 points - good knowledge

70.1 - 85.0 points - very good knowledge

85.1 - 100.0 points - excellent knowledge

In order to monitor the survival of preventive knowledge, we apply the formula for calculating the knowledge survival efficiency (KS efficiency):

$$KS \text{ efficiency } (\%) = \frac{N_1 - N_n}{N_1} \times 100 \%, \quad (10)$$

where N_1 – digital indicator determined during the initial survey;

N_n – digital indicator found during the n-th survey.

Characteristics of assessment criteria:

81.0 - 100.0% - very low knowledge survival efficiency;

61.0 - 80.0% - low knowledge survival efficiency;

51.0 - 60.0% - moderate knowledge survival efficiency;

41.0 - 50.0% - good knowledge survival efficiency;

21.0 - 40.0% - high knowledge survival efficiency;

0 - 20.0% - very high knowledge survival efficiency.

2.5. Clinical Research Methods

Prior to surgery, professional oral hygiene, oral sanitation, monitoring and training in individual oral hygiene were performed as a part of preoperative preparation in periodontal patients, after assessing the hygienic and periodontal status.

2.5.1. The study of hygienic status in periodontal patients

In order to assess the hygienic status in periodontal patients before and after surgery, the Green-Vermillion simplified hygiene indices (1964), Silness-Loe (1964) index, the Lange method-based proximal surfaces simplified plaque index (1977) were used.

The assessment of all indicators, including the oral hygiene product efficiency, was performed following the evolution of those indicators that were defined on the 3rd day after surgery, after 7, 30 and 90 days, where indicators of hygiene indices were also recorded. In order to find hygiene indices' values, indicators with the active ingredient, erythrosin, were used.

Simplified Green-Vermillion index - OHI-S (1964) was used to assess dental deposits. Plaque staining was performed in the vestibular surfaces of the 16th, 11th, 26th, and 31st teeth and the lingual surfaces of the 46th and 36th teeth.

The evaluation of the obtained data on the OHI-S index was performed in accordance with the evaluation criteria:

0 - no staining;

1 - no more than 1/3 of the crown is stained;

2 - stained from 1/3 to 2/3 of the crown;

3 - more than 2/3 of the crown is stained.

To calculate the OHI-S hygiene index, the formula was used:

$$\text{DI-S} = \frac{\text{the summarized score of each tooth}}{\text{number of stained teeth}} \quad (11)$$

The Tartar Index (CI-S) rating scale corresponds to the plaque scale.

Calculating the simplified Green-Vermillion hygiene index was performed according to the formula: $\text{OHI-S} = (\text{DI-S}) + (\text{CI-S})$ (12)

The obtained results of OHI-S index can be interpreted, as follows:

0 - 0.6 points - a good level of hygiene;

0.7 - 1.6 points - satisfactory;

1.7 - 2.5 points - unsatisfactory;

over 2.6 points - bad.

Resulting from the studied data, the cleaning efficiency was calculated in compliance with the OHI-S index by comparing them: the data obtained at the initial appointment were compared with the indicators obtained at subsequent visits that was defined by means of the formula:

$$\text{Efficiency (\%)} = \frac{(\text{OHI-S}_1 - \text{OHI-S}_n)}{\text{OHI-S}_1} \times 100 \quad (13)$$

OHI-S₁ – indicator obtained during the initial treatment

OHI-S_n – indicator obtained during the repeated treatment.

Assessment criteria for the Silness-Loe index, defined in points:

0 - no plaque was found in the tooth neck area.

1 - dental plaque in the tooth neck area is detected when moving with the tip of the probe.

2 - dental plaque is found in the areas of gingival margin and periodontal pocket.

3 - dental plaque is found in the areas of tooth crown, gingival margin and periodontal pocket.

16, 12, 24, 32, 36, 44 teeth were examined. The average score of the assessment obtained during the examination of 4 surfaces of a single tooth and all teeth, in compliance with the Silness-Loe index, was defined in accordance with the rules for calculating the arithmetic mean.

Resulting from the analysed data the cleansing efficiency of oral hygiene products was calculated in compliance with the Silness-Loe index. The data obtained at the initial appointment were compared with the indicators obtained at subsequent visits that was defined by means of the formula:

$$\text{Efficiency (\%)} = \frac{(S-L_1 - S-L_n)}{S-L_1} \times 100 \quad (14)$$

$S-L_1$ – indicator obtained during the initial treatment

$S-L_n$ – indicator obtained during the repeated treatment.

Staining with an indicator solution and analysing the obtained data obtained allows performing the assessment of the proximal plaque index (API) according to the Lange (1977) method. It studies the plaque on the proximal crown tooth crown surfaces. Removal of plaque in those tooth surfaces is possible, while observing sequence of individual oral hygiene routine by a periodontal patient that plays significant role in assessing his commitment to the implementation of preventive measures recommended by a dentist. The plaque test on the proximal tooth surfaces in compliance with the API index was performed on the lingual and palatal surfaces of the 1st and 3rd quadrants and the vestibular surfaces of the 2nd and 4th quadrants.

The sum of the positive results of the plaque determination:

$$\text{API} = \frac{\text{sum of the positive results of the plaque determination}}{\text{The sum determined in the proximal areas}} \times 100 \quad (15)$$

API index values are assessed as follows:

API < 25% - the optimal hygienic condition of the oral cavity;

API = 25 - 39% - a sufficient hygienic condition of the oral cavity;

API = 40 - 69% - satisfactory hygienic condition of the oral cavity;

API = 70 - 100% - unsatisfactory hygienic condition of the oral cavity.

An API score corresponding to < 35% identifies the adherence of the periodontal patient to the active implementation of all recommended preventive actions at home.

2.5.2. The assessment of periodontal status in periodontal patients

PMA in Parma modification (1960) periodontal index was used to examine the inflammation in the periodontal tissues of the examined individuals. To identify inflammation of periodontal tissues, periodontal tissues were stained with Schiller-Pisarev solution in the area of all tooth groups.

The resulting data were assessed involving the following criteria:

0 - inflammation of periodontal tissues missing.

1 - inflammation of the papilla of the gums.

2 - inflammation of the gingival papilla and marginal gingiva.

3 - inflammation of the papilla of the gums, marginal and alveolar gums.

The number of teeth examined was determined according to the age range.

The PMA index was calculated by the following formula:

$$\text{PMA} = (\sum \text{points} / 3 \times n) \times 100\%, \quad (16)$$

where,

Σ points — the sum of points according to the assessment criteria,

n — number of examined teeth

Normally, the indicators for the PMA index correspond to 0. The higher the index for the PMA index, the higher the intensity of the inflammatory periodontal disease - gingivitis.

The results of the assessment by the PMA index were defined as follows:

- at the values up to 30% - mild severity of gingivitis.
- The values ranging from 31 to 60%, denote average severity of gingivitis.
- In the case when the result exceeds 61%, a severe degree of severity was established.

To assess periodontal tissues the Mühlemann gingival sulcus bleeding index was used in the modification of Cowell (1975). The study with that index was performed visually using a bellied probe, "Ramfjord's teeth" were assessed - 16, 21, 24, 36, 41 and 44 teeth of the vestibular and oral surfaces. Research methodology: the tip of the periodontal probe without pressure was performed from the medial to the distal surfaces of the teeth, pressing the probe to the periodontal groove.

The assessment of the obtained indicators in compliance with the Muhllemann - Cowell index was performed by the formula:

$$\text{Muhllemann – Cowell (\%)} = \frac{\text{number of inflamed periodontal sulci}}{\text{number of examined periodontal sulci}} \times 100 \quad (17)$$

Muhllemann – Cowell index scoring criteria:

- 0 - no bleeding.
- 1 - the minimum bleeding - after 30 seconds.
- 2 - bleeding up to 30 seconds and immediately after the periodontal probe.
- 3 - the appearance of bleeding during brushing teeth and eating.

Index values can be interpreted as follows:

- <10% - very mild gingival inflammation;
- 10% -20% - mild inflammation of the gums;
- 20% -50% - the medium degree of gum inflammation;
- 50% -100% - severe generalized inflammation of the gums.

Schiller-Pisarev test was used to find the intensity of the inflammatory course in the periodontal tissues. Schiller-Pisarev iodine-iodide-potassium solution was applied to

the periodontal tissues: 1 g of crystalline iodine, 2 g of potassium iodide, 40 ml of distilled water.

The degree of staining was to be found:

2 - coloring of gingival papillae;

4 - coloring of the gingival margin;

8 - coloring of the alveolar gums.

The data obtained were evaluated by the formula:

$$\text{Iodine number} = \frac{\sum \text{points of the examined tooth}}{\sum \text{all examined teeth}} \quad (18)$$

Assessment of the points obtained by the Schiller-Pisarev test:

Up to 2.3 - weak inflammation.

From 2.4 to 5.0 - moderate inflammation.

From 5.1 to 8.0 - intense inflammation.

2.6. The content of "Preventive dentistry kits" and hygiene programs

Based on the results of the study of various oral hygiene products, "Preventive dentistry kits" were developed for periodontal patients at the post-surgery stage for persons with chronic generalized periodontitis of moderate severity.

Figure 2.2 shows the "Preventive dentistry kit No. 1" for periodontal patients after surgery performed in compliance with the closed curettage method, recommended in the 1st group.



Figure 2.2. "Preventive dentistry kit No. 1" for periodontal patients at the post-surgery stage.

"Preventive dentistry kit No. 1" included: active component-based prophylactic toothpaste containing extracts of sage, walnut, echinacea, horsetail and rosemary; rinse, containing such active ingredients as peppermint, chlorhexidine, vitamin C, kelp extract in its composition; manual toothbrush of medium hardness; single-bundle toothbrush with a cone-shaped bristle bundle and a replaceable head; with dental tape (Figure 2.2).

Figure 2.3 shows the "Preventive dentistry kit No. 2" for periodontal patients after surgery performed in compliance with the patchwork technique, recommended in the 2nd group.



Figure 2.3. "Preventive dentistry kit No. 2" for periodontal patients at the post-surgery stage.

"Preventive dentistry kit No. 2" included active ingredient-based prophylactic toothpaste with sodium bicarbonate, xanthan gum, echinacea purpurea juice, chamomile extract, sage, rattania, bitter myrrh, sodium fluoride; active ingredient-based conditioner with castor oil, aloe leaf juice, oak bark extract, nettle, yarrow flowers, St. John's wort, celandine, sodium fluoride, cetylpyridinium chloride; manual toothbrush of medium hardness; monobundle toothbrush with a cone-shaped bundle of bristles, brushes (Figure 2.3).

Figure 2.4 demonstrates the "Preventive dentistry kit No. 3" for periodontal patients after surgery performed with the patchwork technique using the Picasso Lite diode laser (USA), recommended in the 3rd group.



Figure 2.4. "Preventive dentistry kit No. 2" for periodontal patients at the post-surgery stage.

"Preventive dentistry kit No. 3" included: prophylactic toothpaste containing strawberry juice, strawberry pits, red clay, magnolia and papain extracts; mouthrinse containing castor oil, extracts of chamomile, sage, witch hazel and povidone; manual toothbrush of medium hardness; monobundle toothbrush with a cone-shaped bundle; dental tape; brushes (Figure 2.4).

In the 4th group the examined, did not use "Preventive dentistry kits" for periodontal patients at the post-surgery stage, did hygiene procedures following the recommended generally accepted methods of oral hygiene after surgical interventions. Used traditional oral hygiene products.

In view of the type of surgical intervention in the 1st group the pattern of sequential individual hygienic preventive measures in the mouth in periodontal patients, where the successive stages of the hygienic procedure and its functions are formed is given in Table 2.5.

Table 2.5 The content of the "Hygienic prevention program in periodontal patients at the post-surgery stage" using the "Preventive dentistry kit No. 1"

Hygiene program stages in the 1 st group		
№	Contents	Duration
1	2	3
1-st	Pre-rinsing mouth with water	15 s
2-nd	Interdental Cleaning: Colgate Tape	1-2 min.
3-rd	Intermediate rinsing mouth with water	5 s
4-th	Teeth cleaning: anti-inflammatory toothpaste "Periodontol Healing herbs", manual toothbrush "TePe Supreme soft"	2-3 min.
5-th	Intermediate rinsing of the mouth with water	5 s
6-th	Cleaning fissures with a "TePe interspace medium" manual mono-bundle toothbrush	30-60 s
7-th	Intermediate rinsing of the mouth with water	5 s
8-th	Final rinsing of the mouth with "Elixir with kelp" anti-inflammatory rinse -	30-60 s
The total time spent on the entire hygiene procedure ranges from 4 minutes 30 seconds to 6 minutes 30 seconds, which averages 5 minutes 30 seconds		

Sequentially performed individual prevention hygienic stages in periodontal patients in the 2nd group are given in Table 2.6.

Table 2.6 Using the "Preventive dentistry kit No. 2" in the "Hygienic prevention program in periodontal patients at the post-surgery stage"

Hygiene program stages in the 2 nd group		
№	Contents	Duration
1	2	3
1-st	Pre-rinsing mouth with water	15 s
2-nd	Interdental Cleaning: "TePe" brushes	1-2 min.
3-rd	Intermediate rinsing mouth with water	5 s
4-th	Teeth cleaning: "Parodontax for gum health" anti-inflammatory toothpaste, «Biomed» manual toothbrush	2-3 min.
5-th	Intermediate rinsing of the mouth with water	5 s

Continuation of the table 2.6

№	Contents	Duration
6-th	Cleaning fissures with a "Curaprox 1009 singl" manual multi-bundle toothbrush	30-60 s
7-th	Intermediate rinsing of the mouth with water	5 s
8-th	Final rinsing of the mouth with "Forest anti-inflammatory gum balm"	30-60 s
The total time spent on the entire hygiene procedure ranges from 4 minutes 30 seconds to 6 minutes 30 seconds that averages 5 minutes 30 seconds		

The stages of the "Hygienic prevention program for periodontal patients at the post-surgery stage" used in the 3rd group are given in Table 2.7.

Table 2.7 The description of the "Hygienic prevention program in periodontal patients at the post-surgery stage" with the "Preventive dentistry kit No. 3"

Hygiene program stages in the 3 rd group		
№	Contents	Duration
1	2	3
1-st	Pre-rinsing mouth with water	15 s
2-nd	Interdental Cleaning: "TePe" brushes, Colgate toothpaste	1-2 min.
3-rd	Intermediate rinsing mouth with water	5 s
4-th	Teeth cleaning: "Siberian Wellness Strawberry and red clay" anti-inflammatory toothpaste, "NANO Premium manual toothbrush"	2-3 min.
5-th	Intermediate rinsing mouth with water	5 s
6-th	Cleaning fissures with a " Pesitro UltraClean" manual multi-bundle toothbrush	30-60 s
7-th	Intermediate rinsing mouth with water	5 s
8-th	Final rinsing of the mouth with anti-inflammatory rinse "ASEPTA parodontal"	30-60 s
The total time spent on the entire hygiene procedure ranges from 4 minutes 30 seconds to 6 minutes 30 seconds that averages 5 minutes 30 seconds		

During the first 3 days after surgery, gentle hygiene measures were envisaged: the use of a prophylactic toothbrush and prophylactic toothpaste was excluded, as well as

interdental oral hygiene. In addition to rinsing the mouth after meals it was recommended to rinse it with a solution of chlorhexidine 0.2% for 1 minute 3 times a day from the 1st to the 7th day, from the 8th to the 14th day, rinse with solutions of chamomile and sage decoctions.

2.7. Statistical processing of obtained results

When conducting statistical processing of the studied data that were obtained in the course of the research, Student's criteria were used to ensure indicators values normality. The correlation analysis (Spearman's coefficient) was used to analyse the relationship between diagnostic indicators. A personal computer and MS Excell 7.0 application to the MS Windows XP PE software operating system was used for the statistical processing of the obtained data.

A set of representative samples as well as the methods and adequate statistical analysis was used to substantiate the reliability of the research results.

CHAPTER 3. RESULTS OF OWN RESEARCH

3.1 The results of the inflammatory periodontal diseases prevalence research

3.1.1. The results of inflammatory periodontal disease prevalence and intensity research

When studying and analyzing periodontal tissues in the examined individuals, the prevalence of inflammatory periodontal diseases was defined. The average indicator amounted to $88.97 \pm 10.68\%$, $89.31 \pm 10.72\%$ in the 1st, 2nd and 3rd groups and $90.68 \pm 10.88\%$, respectively. Depending on the age, the indicators were distributed as follows: in the group aged from 40 to 44 years - $83.94 \pm 9.23\%$; in the group aged from 45 to 49 years - $87.43 \pm 10.49\%$; in persons aged 50 to 54 years - $90.79 \pm 10.90\%$; at the age of 55 to 59 years, the prevalence of inflammatory periodontal diseases amounted to $95.21 \pm 10.47\%$ (Table 3.1).

Table 3.1 shows the prevalence of inflammatory periodontal diseases in the study groups, depending on the age.

Distribution by groups	Age (years)				Average indicator
	40-44	45-49	50-54	55-59	
1 group	$83,45 \pm 9,03$	$86,27 \pm 7,30$	$89,76 \pm 8,98$	$96,38 \pm 11,57$	$88,97 \pm 10,68$
2 group	$85,21 \pm 8,34$	$88,50 \pm 8,61$	$90,29 \pm 9,93$	$93,22 \pm 11,19$	$89,31 \pm 10,72$
3 group	$85,74 \pm 7,56$	$89,31 \pm 7,15$	$92,17 \pm 10,14$	$95,51 \pm 10,95$	$90,68 \pm 10,88^*$
4 group	$81,35 \pm 8,12$	$85,64 \pm 7,42$	$90,94 \pm 10,00$	$95,74 \pm 11,03$	$88,42 \pm 10,61$
Average indicator	$83,94 \pm 9,23$	$87,43 \pm 10,49$	$90,79 \pm 10,90$	$95,21 \pm 10,47$	$89,34 \pm 10,78$

P<0,01

The prevalence rate of inflammatory periodontal diseases at the beginning of the research in periodontal patients before surgery at the age of 40-44 years in the 1st group amounted to $83.45 \pm 9.03\%$, in the 2nd and 3rd groups $85.21 \pm 8.34\%$, and $85.74 \pm 7.56\%$, respectively, and in the fourth, where the prevalence of inflammatory periodontal diseases amounted to $81.35 \pm 8.12\%$ (Table 3.1).

At the beginning of the research, the assessment of indicators in compliance with the CFE index in periodontal patients before the start of surgical treatment was

performed, that enabled identifying the intensity of inflammatory periodontal diseases among the examined individuals. The research has revealed that the average intensity of inflammatory periodontal diseases in the 1st and 4th groups amounted to 3.95 ± 0.37 c.u. per one periodontal patient, in the 2nd and 3rd groups - 4.21 ± 0.40 c.u. and 4.10 ± 0.39 c.u. respectively (table 3.2).

Table 3.2 Intensity of inflammatory periodontal diseases in periodontal patients depending on the age

Distribution by groups	Age (years)				Average indicator
	40-44	45-49	50-54	55-59	
1 group	$3,73 \pm 0,39$	$3,92 \pm 0,42$	$3,99 \pm 0,35$	$4,15 \pm 0,44$	$3,95 \pm 0,37$
2 group	$3,95 \pm 0,41$	$4,10 \pm 0,39$	$4,31 \pm 0,40$	$4,46 \pm 0,39$	$4,21 \pm 0,40$
3 group	$3,81 \pm 0,36$	$4,03 \pm 0,37$	$4,22 \pm 0,43$	$4,35 \pm 0,41$	$4,10 \pm 0,39^*$
4 group	$3,70 \pm 0,34$	$4,01 \pm 0,40$	$4,05 \pm 0,37$	$4,03 \pm 0,38$	$3,95 \pm 0,41$
Average indicator	$3,79 \pm 0,40$	$4,02 \pm 0,42$	$4,14 \pm 0,39$	$4,25 \pm 0,40$	$4,05 \pm 0,42$

P<0,01

The intensity of inflammatory periodontal diseases in the 1st group in the examined persons, in which surgical intervention was performed by the method of closed curettage, at the age of 55-59 years amounted 4.15 ± 0.44 c.u., in the 2nd group, where surgical intervention was performed by the method of flap surgery - 4.46 ± 0.39 c.u., in the 3rd group, the method of patchwork operation using a diode laser was used - amounted to 4.35 ± 0.41 c.u., in the 4th group, periodontal patients with various methods of surgical intervention to 4.03 ± 0.38 c.u. (table 3.2).

The performed dental examinations enabled analysing the prevalence of inflammatory periodontal diseases in periodontal patients. The analysis of inflammatory periodontal disease prevalence depending on gender is presented in Figure 3.1.

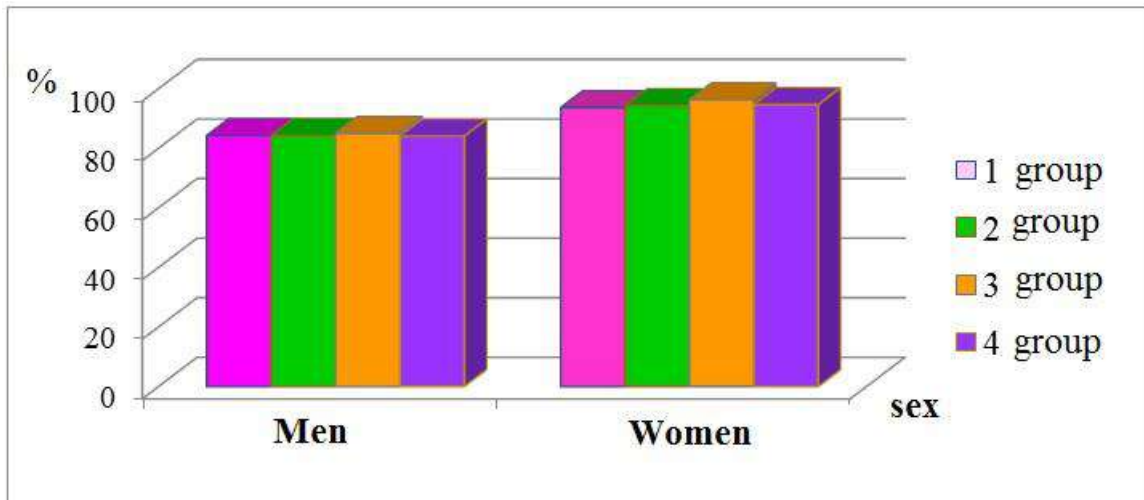


Figure 3.1. The totals of the inflammatory periodontal disease prevalence distribution in the examined individuals, depending on gender within the research groups

In the 1st group (Figure 3.1), in men in the 1st group, the prevalence rate of inflammatory periodontal diseases amounted to $84.29 \pm 10.12\%$, and in women to $93.65 \pm 11.24\%$ ($p \leq 0.01$), in In the control group, the indicator in men was lower ($84.04 \pm 10.07\%$) than the indicator in the examined women ($94.64 \pm 11.39\%$).

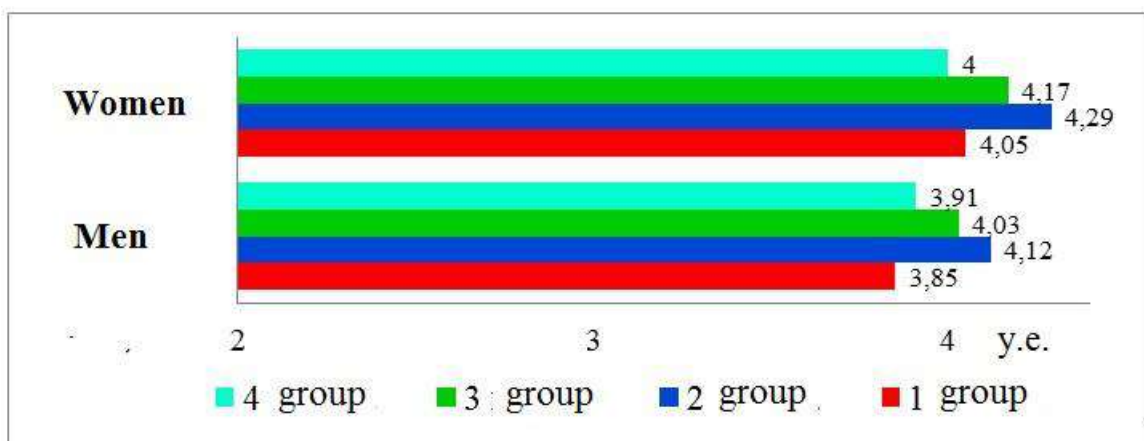


Figure 3.2. The results of the distribution of the inflammatory periodontal diseases intensity within the research groups.

The average inflammatory periodontal disease intensity indicator rate in the examined men amounted to 3.98 ± 0.48 , and in women to 4.13 ± 0.50 (Figure 3.2).

The analysis of periodontal status at the beginning of the research enabled revealing the correlation between the prevalence and intensity of inflammatory periodontal diseases, depending on the pH of the oral fluid at the beginning of the

research. On average, the prevalence and intensity rate of inflammatory periodontal diseases in the 1st group amounted to $88.97 \pm 10.68\%$ and 3.95 ± 0.37 c.u. respectively, at pH of the oral fluid 6.15 ± 0.20 c.u., in the 2nd group to $89.31 \pm 10.72\%$ and 4.21 ± 0.40 c.u. at a pH of the oral fluid of 6.00 ± 0.20 c.u., in the 3rd group to $90.68 \pm 10.88\%$ and 4.10 ± 0.39 c.u. with oral fluid pH - 6.19 ± 0.20 c.u., in the 4th group, the prevalence and intensity indicator rates amounted to $88.42 \pm 10.61\%$ and 3.95 ± 0.41 c.u. respectively, at pH of the oral fluid equal to 6.18 ± 0.20 c.u. (table 3.3).

Table 3.3 The prevalence and intensity of inflammatory periodontal diseases, depending on the pH of the oral fluid

Distribution by groups	pH oral fluid (c.u.)	Prevalence (%)	CPI rate (c.u.)
1 group	$6,15 \pm 0,20$	$88,97 \pm 10,68$	$3,95 \pm 0,37$
2 group	$6,00 \pm 0,20$	$89,31 \pm 10,72$	$4,21 \pm 0,40$
3 group	$6,19 \pm 0,20$	$90,68 \pm 10,88$	$4,10 \pm 0,39$
4 group	$6,18 \pm 0,20$	$88,42 \pm 10,61$	$3,95 \pm 0,41$

P<0,01

Surgical intervention on periodontal tissues create conditions for disruption of self-cleaning and complicate dental hygiene care, thus, increasing the time of rehabilitation and adversely affecting the course of inflammatory periodontal diseases. Therefore, to increase the treatment efficiency of this group of diseases, it is necessary to develop hygiene programs and create Preventive dentistry kits used at the post-surgery stage for hygienic oral care.

3.2. Study of the oral hygiene product and item anti-inflammatory efficiency

3.2.1. The results of anti-inflammatory toothpaste efficiency

Ten types of anti-inflammatory toothpastes have been tested resulting in a a study and comparative assessment of their quality and efficiency. That test enabled selection

of oral hygiene products for the formation of "Preventive dentistry kits" in periodontal patients at the post-surgery stage.

The results of calculating the toothpaste efficiency basing on the UTPEI index are presented in Figure 3.3.

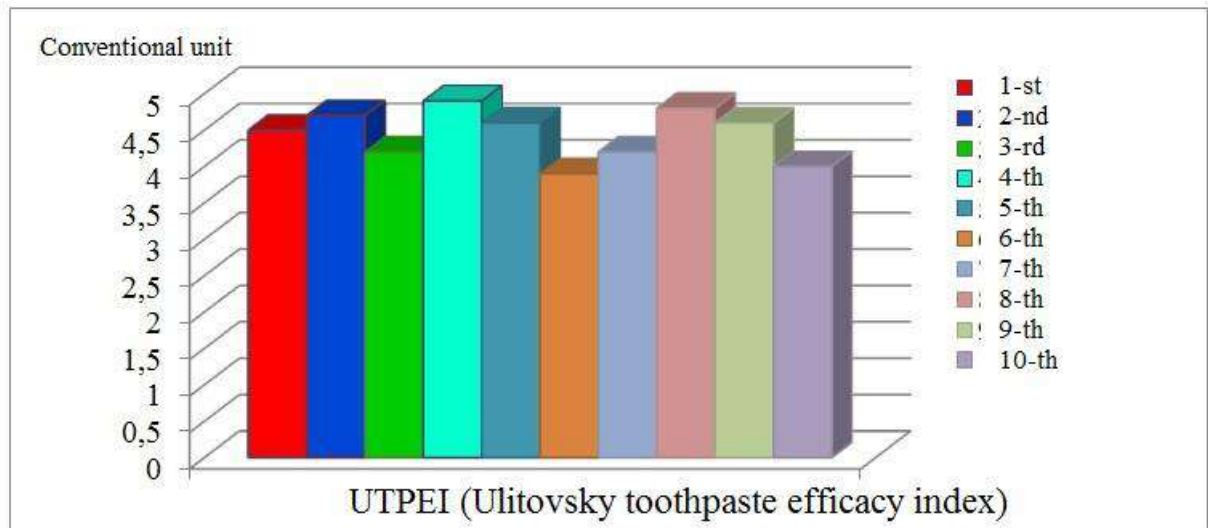


Figure 3.3. Totals of calculating the toothpaste efficiency basing on the UTPEI index.

Assessment of preventive toothpastes in terms of oral cavity care efficiency showed that out of ten samples studied one toothpaste had satisfactory quality and efficiency in terms of physical and chemical properties and microbial frequency, the availability of herbal additives and antiseptic components, consistency, density, foaminess, content and concentration of fluorine, active elements, abrasiveness of fillers, taste, smell, color and homogeneity, the remaining nine samples were rated as effective and safe hygiene products (Figure 3.13).

Figure 3.4 shows the significant preventive toothpastes with the highest scores on the UTPEI index.

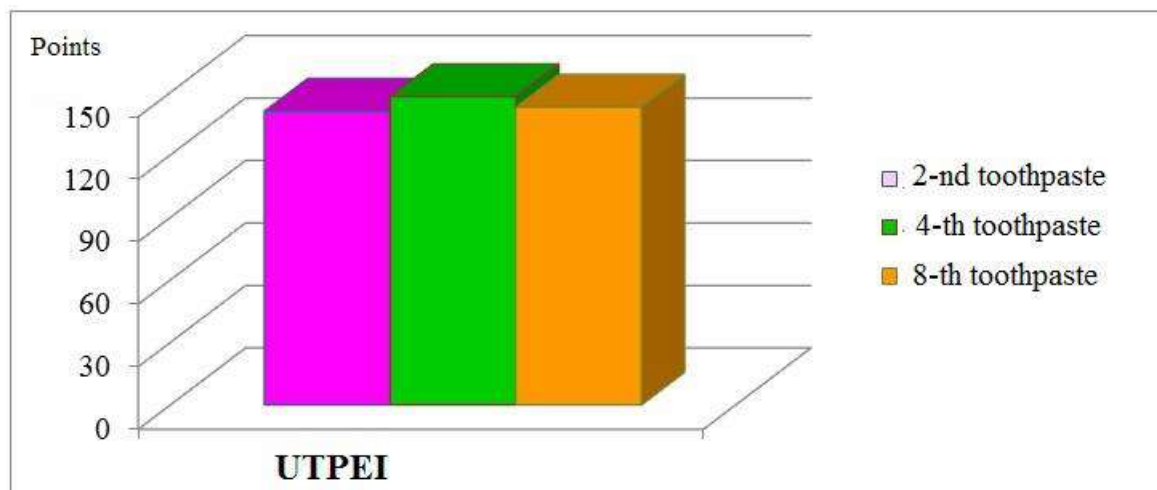


Figure 3.4. Comparative assessment of the toothpaste parameters with the maximum UTPEI index indicators.

Based on the results obtained, presented in Figure 3.4, the choice of toothpastes for inclusion in Preventive dentistry kits was made.

Thus, analysing the main properties of oral hygiene products allows making a conclusion that active component-based toothpastes containing extracts of sage, walnut, echinacea, horsetail and rosemary (UTPEI index 4.7 points); containing strawberry juice, strawberry pits, red clay, extracts of magnolia and papain (UTPEI index 4.9 points); active ingredients such as sodium bicarbonate, xanthan gum, echinacea purpurea juice, chamomile, sage, ratania, bitter myrrh extract, sodium fluoride (UTPEI index 4.8 points) provide high anti-inflammatory efficiency. Those oral hygiene products were included in the Preventive dentistry kits for periodontal patients at the post-surgery stage.

Obviously, not only the effective selection of hygiene products, but also the degree of motivation in periodontal patients after surgery, as well as recommendations and comments on rules and techniques for the use of oral hygiene products indicating the need for dental education and selection oral hygiene items considering the peculiarities of the dentition anatomical structure and the type of surgical intervention on periodontal tissues determine the individual oral hygiene quality improvement.

3.2.2. The results of the preventive toothpaste antimicrobial activity assessment

The results of laboratory analysis of the preventive toothpaste antimicrobial activity are presented in Table 3.4.

Table 3.4 preventive toothpaste antimicrobial activity

№	Investigated test-culture	Prototype (located at the top of the picture)	Control sample (located at the bottom of the picture)
		Growth on Muller-Hinton Solid Nutrient Medium	
1	<i>Streptococcus mitis</i>	meager growth (18 KOE)	Inclusive growth
2	<i>Staphylococcus aureus</i>	Growth missing	Inclusive growth
3	<i>Escherichia coli</i>	Inclusive growth	Inclusive growth
4	<i>Candida albicans</i>	Growth missing	Inclusive growth
5	<i>Bacillus subtilis</i>	Growth missing	Inclusive growth

The studied toothpaste sample reveals the most distinct activity resulting from the studied samples of microorganisms such as *Staphylococcus aureus*, *Candida albicans* and *Bacillus subtilis*. In relation to *Streptococcus mitis*, a slight rise is determined (table 3.4). In the upper part of Figure 3.5 there is a prototype, in the lower part - a control sample illustrating the assessment of the preventive toothpaste antimicrobial quality.

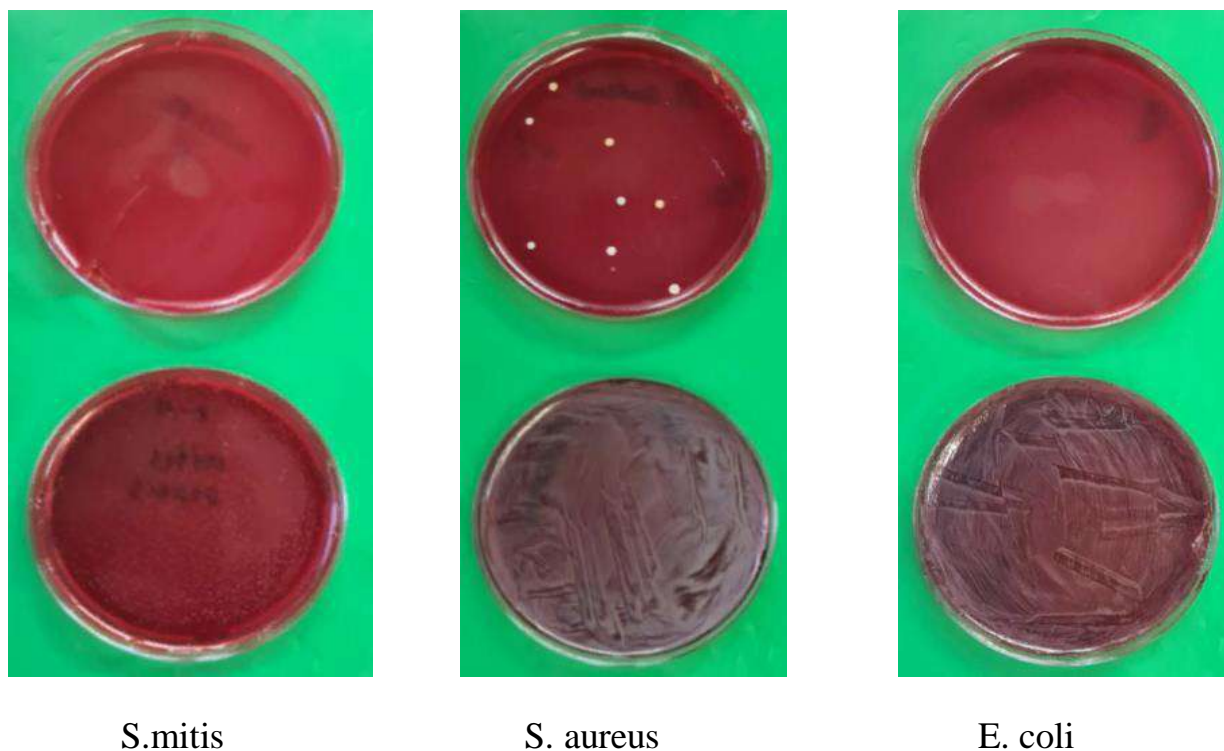
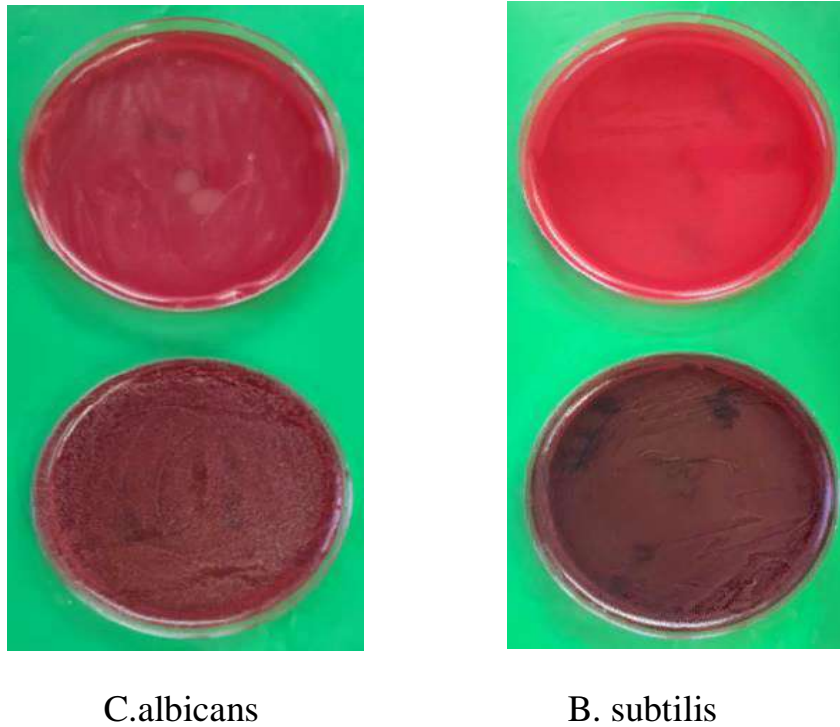


Figure 3.5. Study of the toothpaste microorganism growth inhibiting capacity in the toothpaste containing strawberry juice, strawberry pits, red clay, magnolia and papain extracts



Continuation of the figure 3.5. Study of the toothpaste microorganism growth inhibiting capacity in the toothpaste containing strawberry juice, strawberry pits, red clay, magnolia and papain extracts

3.2.3. The results of the preventive rinse anti-inflammatory efficiency assessment

A study of ten different types of preventive rinses was performed in the course of the study of preventive liquid oral hygiene products to find the most effective option aimed at formation a preventive kit for periodontal patients after surgical interventions,. The most distinct anti-inflammatory effect on periodontal tissues was revealed on the basis of indicators for the S.B. Ulitovskiy e mouthrinse efficiency index.

The UMREI-based preventive rinse quality and efficiency assessment results index with a view to their subsequent inclusion in Preventive dentistry kits are shown in Figure 3.6.

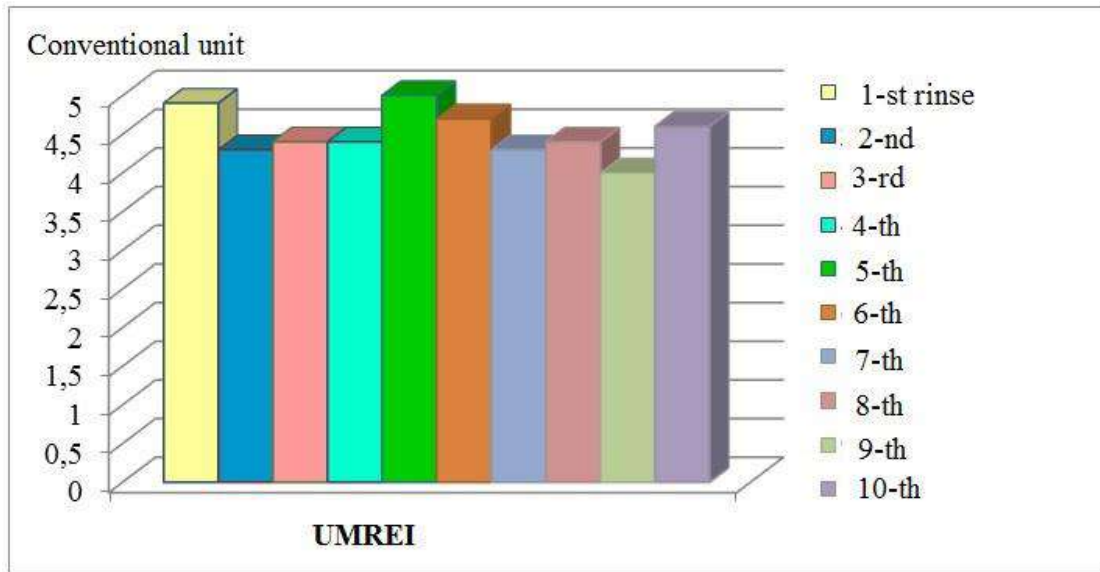


Figure 3.6. Mouthrinse efficiency assesment in compliance with the S.B. Ulitovskiy UMREI index.

The efficiency assessmnet of the oral hygiene products anti-inflammatory properties of in terms of UMREI index, presented in Figure 3.6., preventive rinses with maximum indicator rates were identified under numbers 1 - based on active components of castor oil, aloe leaf juice, extracts of camellia leaves, nettle, chamomile,celandine, sodium fluoride, cetylpyridinium chloride; 5 - based on castor oil, extracts of chamomile, sage, witch hazel and povidone; and 6 - based on such active ingredients as peppermint, chlorhexidine, vitamin C, kelp extract.

Figure 3.7 shows the parameters significant in terms of prevention for the assessment of the studied rinses.

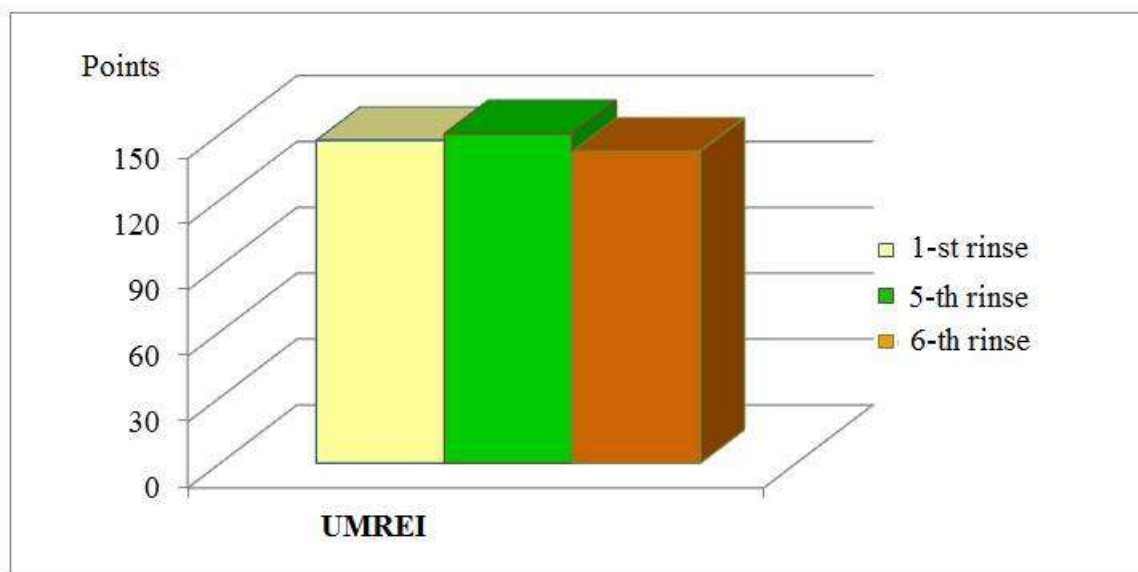


Figure 3.7. Comparative parameter assessment of rinses with the maximum UMREI indicator rate.

The anti-inflammatory rinses analysis in compliance with the UMREI index determined their inclusion in Preventive dentistry kits for periodontal patients after surgery. The total value of the evaluation criteria for the UMREI index for the 1st rinse amounted to - 147 points; for the 5th rinse - 150 points; the 6th rinse amounts to 142 points (Figure 3.7).

3.2.4. The results of prophylactic rinse antimicrobial efficiency

The results of mouth rinse antimicrobial activity clinical and laboratory analyses of the rinses based on castor oil, chamomile, sage, witch hazel and povidone extract are presented in Table 3.5.

Table 3.5 Antimicrobial activity of rinse sample

№	Investigated test-culture	Prototype (located at the top of the picture)	Control sample (located at the bottom of the figure)
		Growth on Muller-Hinton Solid Nutrient Medium	
1	Streptococcus mitis	Growth missing	Inclusive growth
2	Staphylococcus aureus	Growth missing	Inclusive growth
3	Escherichia coli	Inclusive growth	Inclusive growth
4	Candida albicans	Growth missing	Inclusive growth
5	Bacillus subtilis	Growth missing	Inclusive growth

The analysed sample of the rinse shows the most distinct activity preventing *Streptococcus mitis*, *Staphylococcus aureus*, *Candida albicans* and *Bacillus subtilis* (table 3.5).

Figure 3.8 presents a rinse antimicrobial effect assessment.

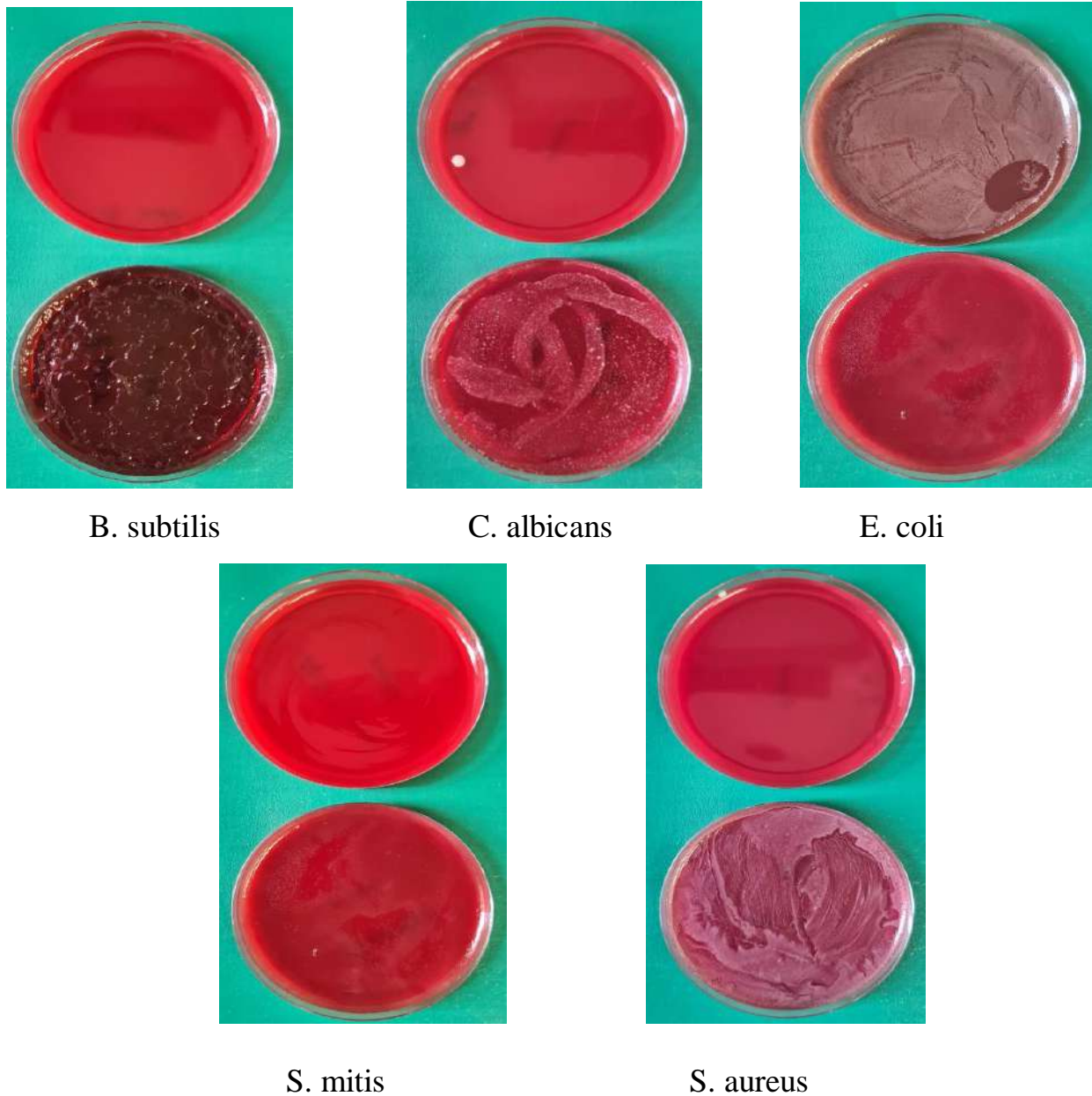


Figure 3.8. Antimicrobial Growth Control Efficiency of Castor Oil, Chamomile, Sage, Witch Hazel and Povidone Rinses

The analysis of liquid oral hygiene product monitoring, as a validation of the anti-inflammatory effect has revealed antimicrobial activity preventing test cultures such as

Streptococcus mitis, *Staphylococcus aureus*, *Candida albicans* and *Bacillus subtilis*, which determined the choice of preventive oral hygiene products (Table 3.5).

To exclude bacterial contamination, samples of liquid oral hygiene products included in Preventive dentistry kits were tested for microbial contamination. A small amount of individual mesophilic aerobic and facultative aerobic microorganisms was discovered in the studied samples of prophylactic rinses (1×10^2 CFU/1 g). Also, no growth of the main micro-organisms (bacteria of the family Enterobacteriaceae, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, as well as molds and yeasts) was found.

3.2.5. Studying the efficiency of manual toothbrushes

The study of the structural properties of the prophylactic manual toothbrush, its brush field, the fit of the bristle bundles, the bristle retention under pressure, the degree of penetration into the interdental spaces, the possibility of massaging the attached gums, the degree of rounding of the bristle tips, the degree of rigidity of the bristle fibers, the shape of the head and handle has revealed that the 1st and 3rd manual toothbrushes were the most effective of the specified hygiene items, the indicator rate of which amounted 4.8 c.u. and 9th manual toothbrush - 5.0 respectively (Figure 3.9).

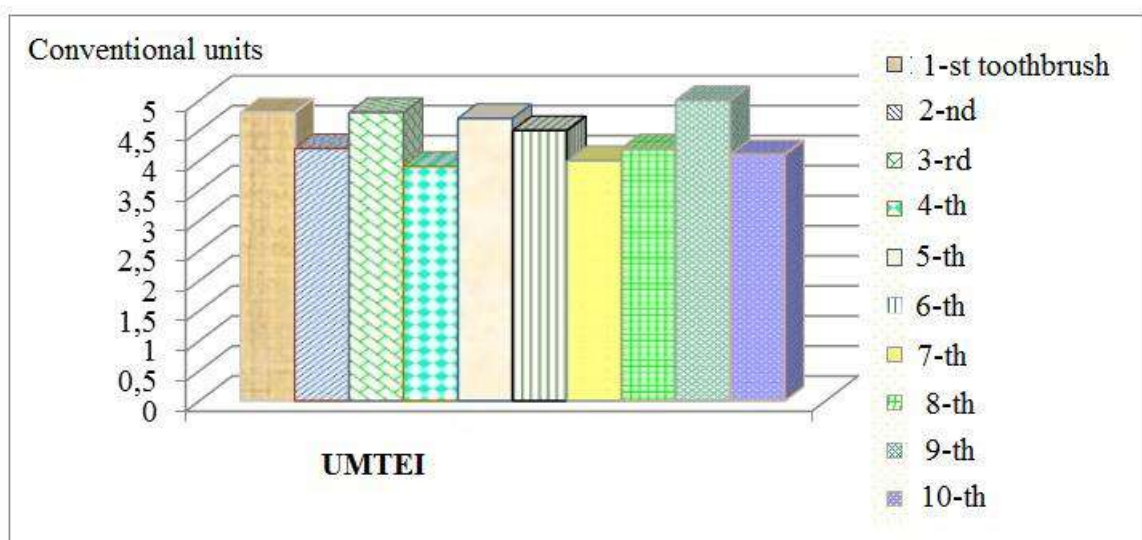


Figure 3.9. UMTEI-based comparative parameter assessment of manual toothbrushes.

3.2.6. Studying the mono-bundle toothbrushes performance

Table 3.6 presents data on the evolution in the manual mono-bundle toothbrush performance index. The today's oral hygiene item assessment manual single-bundle toothbrushes with the highest quality were identified to be included in Preventive dentistry kits for periodontal patients after their surgical intervention. Monobundle toothbrush "TePe interspace medium" in terms of quality assessment of a manual monobundle toothbrush scored 67 points, "Curaprox 1009 single" - 71 points, "Pesitro UltraClean" - 74 points that correspond to the optimal quality indicator of a manual monobundle toothbrush (table 3.6) .

Table 3.6 Changes in the quality indicators of a manual mono-bundle toothbrush

Manual mono-bundle toothbrushes	Quality indicators of a manual mono-bundle toothbrush (points)
«Paro39 swiss»	62
« TePe Compact Tuft»	49
«Revyline Single»	60
«TePe interspace medium»	67
«Curaprox 1006 single»	52
«ESYA PRO SERIES 3008»	48
«Curaprox 1009 single»	71
«Dentalpik»	55
«Pesitro UltraClean»	74
« Longa Vita»	56

The efficiency index of a manual mono-bundle toothbrush that we proposed enabled assessment of the oral hygiene item quality in the formation of "Preventive dentistry kits" and the achievement of effective outcomes of the rehabilitation period in periodontal patients.

Thus, the composition of Preventive dentistry kits for periodontal patients was identified basing on the assessment of oral hygiene products and items in compliance with the S.B. Ulitovskiy toothpaste efficiency, the S.B. Ulitovskiy mouthrinse

efficiency, the S.B. Ulitovskiy manual toothbrush efficiency indices, a method for assessing the quality of a manual mono-bundle toothbrush, as well as laboratory studies of the activity of the preventive toothpaste and rinse antimicrobia activityl.

3.3. Assessment of dental status in periodontal patients

3.3.1. The results of the mouth hygienic status study

The study of the nouth hygienic status in periodontal patients enabled revelation a low level of oral hygiene at the beginning of the research, but after 7 days the hygiene indices decreased in all the examined groups, in contrast to the control, where the of oral hygiene indices remained at the same level or had statistically not significant digital fluctuations.

Table 3.7 presents data on the Green-Vermillion Index (OHI-S) evolution in all research groups.

Table 3.7 Evolution in the Green-Vermillion Index

Distribution by groups	Green-Vermillion Index indicators (c.u.)				
	Period of examination (days)				
	Outcome	3	7	30	90
1 group	3,43 ± 0,27	3,07 ± 0,34	3,00 ± 0,27	2,03 ± 0,20	1,77 ± 0,14
2 group	3,37 ± 0,27	3,00 ± 0,24	2,97 ± 0,36	2,03 ± 0,18	1,63 ± 0,15
3 group	3,40 ± 0,37	3,00 ± 0,36	2,73 ± 0,25	1,93 ± 0,21	1,27 ± 0,11
4 group	3,33 ± 0,23	3,07 ± 0,31	3,03 ± 0,24	2,97 ± 0,33	2,83 ± 0,20*

*P<0,01 compared to the 4th group

Oral hygiene assessment in periodontal patients enabled identifying the indicators for the OHI-S index before surgery and while using Preventive dentistry kits: in the 1st group, the indicator at the beginning of the research amounted to 3.43 ± 0.27 c.u., in 2nd group – to 3.37 ± 0.27 c.u., in 3rd group - 3.40 ± 0.37 c.u., in the 4th group - 3.33 ± 0.23 c.u. . It was found that in the 3rd group, the Green-Vermillion index reached clinically significant estimates and by the end of the research amounted to 1.27 ± 0.11 c.u. (Table 3.7).

Figure 3.10 shows evolution in the OHI-S index reductions.

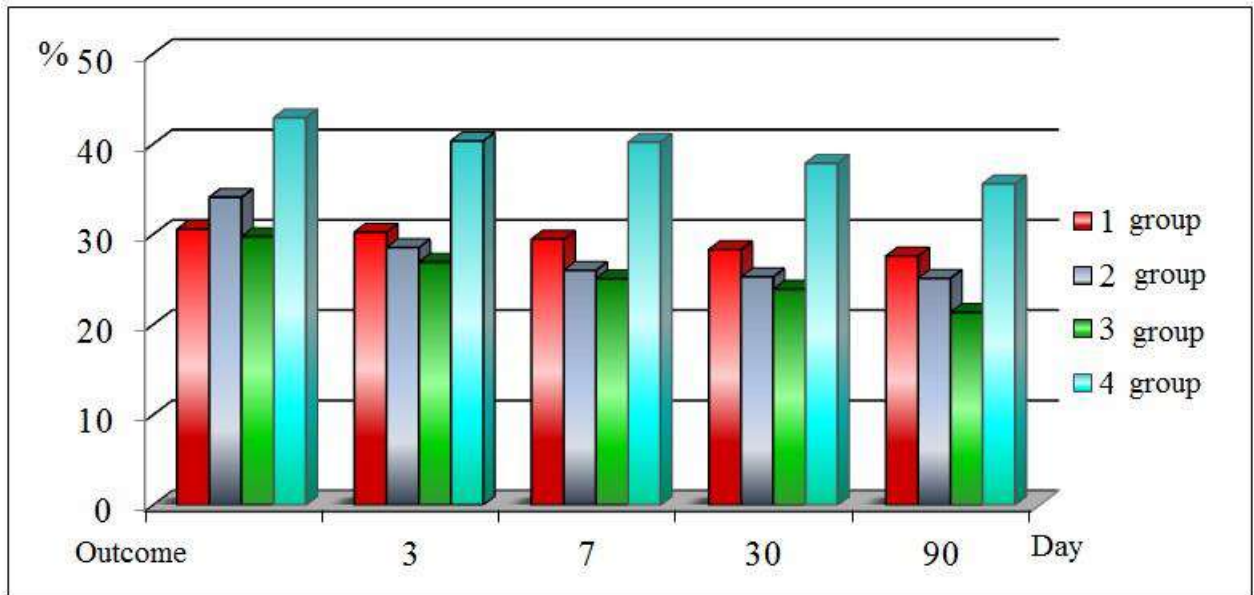


Figure 3.10. evolution in the Green-Vermillion index OHI-S index reductions ($P<0,05$).

The course of the research has revealed the most effective indicator reduction in compliance with the Green-Vermillion index in the 3rd group was $21.38 \pm 2.35\%$, in contrast to the 1st and 2nd groups, where $27.61 \pm 3.04\%$ and $25.14 \pm 2.01\%$, respectively, in contrast to the control group - the indicator did not change significantly $35.62 \pm 4.27\%$ ($P<0.05$) (Figure 3.10).

Table 3.8 shows the results of the Silness-Lohe hygiene index-based research in periodontal patients.

Table 3.8 Silness-Lohe hygiene index indicator evolution

Distributions by groups	Silness-Lohe hygiene index indicator (c.u.)				
	Period of examination (days)				
	Outcome	3	7	30	90
1 group	$3,75 \pm 0,30$	$3,40 \pm 0,41$	$3,34 \pm 0,33$	$2,35 \pm 0,21$	$2,00 \pm 0,18$
2 group	$3,72 \pm 0,41$	$3,38 \pm 0,27$	$3,29 \pm 0,30$	$2,31 \pm 0,19$	$1,93 \pm 0,21$
3 group	$3,82 \pm 0,27$	$3,33 \pm 0,40$	$3,11 \pm 0,28$	$2,21 \pm 0,22$	$1,48 \pm 0,22$
4 group	$3,80 \pm 0,27$	$3,54 \pm 0,39$	$3,46 \pm 0,38$	$3,42 \pm 0,31$	$3,36 \pm 0,27^*$

* $P<0,01$

The research of the Silness-Lohe hygiene index in periodontal patients 3 days after surgery showed a decline in the index from 3.75 ± 0.30 c.u. up to 3.40 ± 0.41 c.u.

in the 1st group; from 3.72 ± 0.41 c.u. to 3.38 ± 0.27 c.u. in the 2nd group, and there was a statistically significant decrease - from 3.82 ± 0.27 c.u. up to 3.33 ± 0.40 c.u. in the 3rd group (Table 3.8).

The evolution in the reduction of the Silness-Loe index among the examined persons is most clearly shown in Figure 3.11.

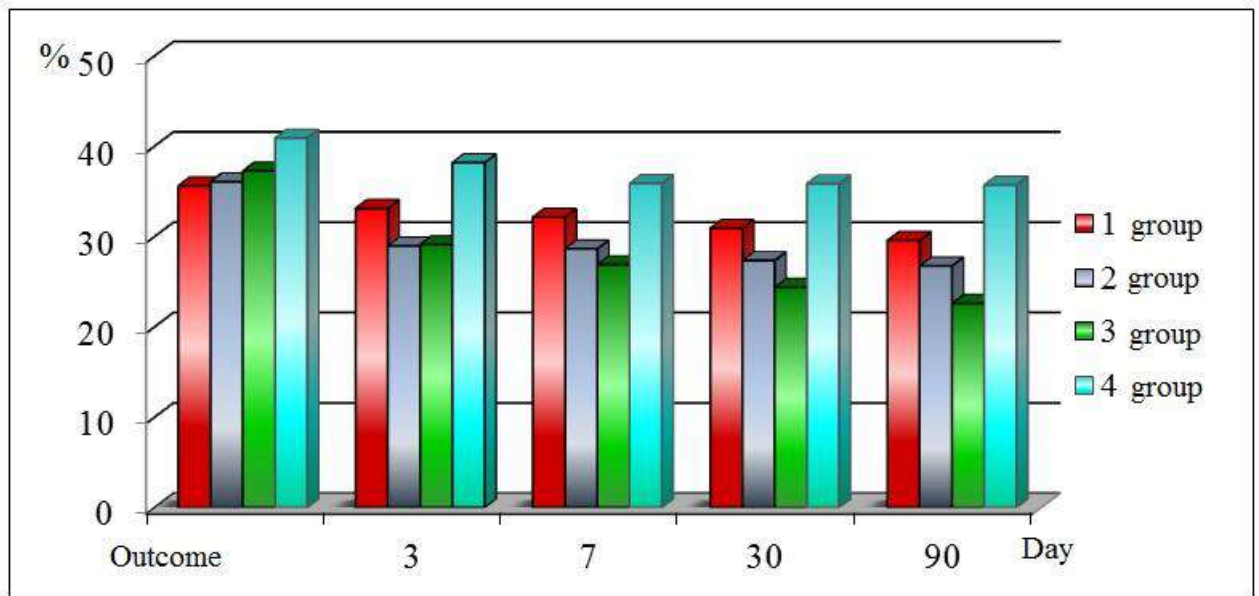


Figure 3.11. Silness-Loe index reduction evolution ($P < 0,05$).

The reduction of non-mineralized dental plaque in compliance with the Silness-Loe index in the 1st group after 30 days of the study decreased to 30.94%, in the 2nd group - up to 27.38%, in the 3rd group - up to 24.41%, and in the control group, the reduction rate amounted to 35.89% ($P < 0,05$) (Figure 3.11).

Table 3.9 provides information on proximal surface plaque index evolution, simplified by the Lange method (API).

Table 3.9 Dental plaque index evolution (API)

Distribution by groups	Dental plaque index indicators (%)				
	Period of examination (days)				
	Outcome	3	7	30	90
1 group	$77,85 \pm 7,00$	$71,16 \pm 6,40$	$69,98 \pm 5,60$	$49,10 \pm 3,93$	$43,55 \pm 3,92$
2 group	$80,14 \pm 8,82$	$73,00 \pm 5,11$	$70,34 \pm 7,74$	$50,68 \pm 4,56$	$42,39 \pm 2,97$
3 group	$83,69 \pm 5,86$	$75,20 \pm 8,27$	$69,12 \pm 6,91$	$45,27 \pm 3,62$	$34,29 \pm 3,77$
4 group	$79,21 \pm 9,51$	$78,65 \pm 7,08$	$77,83 \pm 6,22$	$73,45 \pm 8,81$	$72,36 \pm 5,79^*$

* $P < 0,01$

The research has revealed the API index decreased from $77.85 \pm 7.00\%$ to $43.55 \pm 3.92\%$ that in the 1st group, from 80.14 ± 8.82 to $42.39 \pm 2.97\%$ in the 2nd group, in - from 83.69 ± 5.86 to $34.29 \pm 3.77\%$ the 3rd group, in contrast to the 4th group, where the indicator did not change significantly by the end of the study - $72.36 \pm 5.79\%$ (Table 3.9).

By the end of the study, no significant statistical differences in clinical indicators of hygienic indices in periodontal patients at various stages of treatment has been revealed.

The results of API index reduction evolution are shown in Figure 3.12.

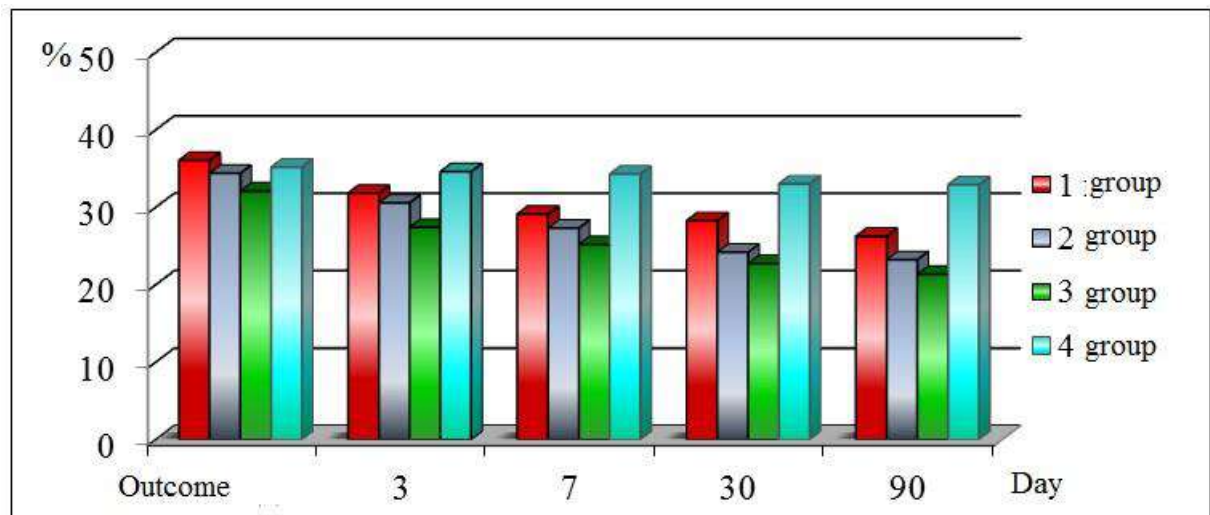


Figure 3.12. API index reduction evolution ($P < 0,05$).

Dental plaque value in the 3rd group by the end of the research decreased to 21.36%, and in the control group - to 32.92% ($P < 0.05$) in compliance with API index (Figure 3.12).

3.3.2. Results of studying the condition of periodontal tissues in periodontal patients

After 7 days of Preventive dentistry kit use a decline of anti-inflammatory efficiency, reduced inflammation in periodontal tissues after surgery in all examined groups was revealed.

The study of anti-inflammatory effect indicators in compliance with PMA index is shown in table 3.10.

Table 3.10 evolution of PMA index indicators (%)

Distribution by groups	PMA indicators (%)				
	Period of examination (days)				
	Outcome	3	7	30	90
1 group	63,11 ± 5,05	57,21 ± 6,28	51,36 ± 6,16	44,73 ± 3,58	30,12 ± 2,71
2 group	60,54 ± 7,27	55,93 ± 5,03	48,19 ± 4,34	40,61 ± 4,06	29,00 ± 3,48
3 group	64,98 ± 7,80	58,12 ± 4,07	51,40 ± 4,62	35,23 ± 4,23	28,05 ± 3,37
4 group	61,86 ± 4,95	58,31 ± 6,41	50,46 ± 4,04	39,88 ± 4,79	34,24 ± 2,40*

*P<0,01 compared to the 4th group

3 days after surgical treatment, in the 1st group, the PMA index amounted to 57.21 ± 6.28%, in the 2nd group - 55.93 ± 5.03%, in the 3rd her group - 58.12 ± 4.07%, in the 4th group - 58.31 ± 6.41%. A re-clinical assessment of periodontal tissues in compliance with PMA index was performed 90 days after the start of the study. It has revealed the indicator corresponding to 30.12 ± 2.71% in the 1st group, 29.00 ± 3.48 % in the 2nd group, 28.05 ± 3.37% in the 3rd group, and 34.24 ± 2.40% in the control group that reliably determines the positive trend in the use of Preventive dentistry kit No. 3 (Table 3.10).

Table 3.11 shows evolution in Mühlemann and Cowell bleeding index in periodontal patients.

Table 3.11 Evolution in Mühlemann and Cowell bleeding index (%)

Distribution by groups	Mühlemann and Cowell bleeding index indicators (%)				
	Period of examination (days)				
	Outcome	3	7	30	90
1 group	43,81 ± 5,26	41,54 ± 2,91	37,41 ± 4,49	29,18 ± 2,04	15,31 ± 1,38
2 group	41,35 ± 4,55	40,10 ± 2,81	34,22 ± 2,40	26,74 ± 2,14	12,80 ± 1,29
3 group	44,19 ± 3,09	40,36 ± 4,44	35,68 ± 2,85	27,12 ± 2,17	10,25 ± 0,72
4 group	40,82 ± 3,67	39,72 ± 4,37	36,30 ± 3,27	28,11 ± 2,25	20,03 ± 1,60*

*P<0,01 compared to the 4th group

The decline in Muhlemann and Cowell index values in the 1st group reached 15.31 ± 1.38%, in the 2nd group - 12.80 ± 1.29% that corresponds to a mild degree of gingival inflammation, in the 3rd group the indicator amounted to 10.25 ± 0.72% that was defined as a very mild degree of gingival inflammation, and in the control group, the bleeding index amounted to 20.03 ± 1.60% after 90 days of the study (Table 3.11).

Table 3.12 shows evolution in Schiller-Pisarev test parameters in all the studied groups.

Table 3.12 evolution in Schiller-Pisarev test parameters

Distribution by groups	Schiller-Pisarev test parameters (c.u.)				
	Period of examination (days)				
	Outcome	3	7	30	90
1 group	7,91 ± 0,63	7,62 ± 0,84	7,25 ± 0,73	3,91 ± 0,35	2,30 ± 0,18
2 group	7,55 ± 0,53	7,26 ± 0,65	6,81 ± 0,75	3,67 ± 0,40	2,19 ± 0,15
3 group	7,26 ± 0,80	6,93 ± 0,55	6,50 ± 0,72	3,42 ± 0,38	1,88 ± 0,13
4 group	7,38 ± 0,81	6,95 ± 0,65	5,81 ± 0,82	4,33 ± 0,35	3,74 ± 0,34*

*P<0,01 compared to the 4th group

Table 3.13 Assessment of oral fluid pH values before and after surgery in all examined groups

The decline in the values of the Schiller-Pisarev test after 3 months of research in the 1st group reached 2.30 ± 0.18 c.u., in the 2nd group - 2.19 ± 0.15 c.u., in the 3rd her group - 1.88 ± 0.13 c.u., and in the 4th group the indicator of the Schiller-Pisarev test amounted to 3.74 ± 0.34 c.u. (Table 3.12).

3.3.3. Study of oral fluid in the examined groups

A decline in periodontal tissue inflammation and the change of the concentration indicator of oral fluid pH index were revealed that in the 1st, 2nd and 3rd groups in periodontal patients, where Preventive dentistry kits were used. The results are presented in Table 3.13.

Table 3.13 Estimation of oral fluid pH indicators before and after surgery in all examined groups

Distribution by groups	pH oral fluid indicators				
	Period of examination (days)				
	Outcome	3	7	30	90
1 group	6,15 ± 0,20	6,17 ± 0,20	6,21 ± 0,20	6,25 ± 0,20	6,27 ± 0,20
2 group	6,00 ± 0,20	6,05 ± 0,20	6,17 ± 0,20	6,38 ± 0,20	6,53 ± 0,20
3 group	6,19 ± 0,20	6,27 ± 0,20	6,36 ± 0,20	6,30 ± 0,20	6,74 ± 0,20
4 group	6,18 ± 0,20	6,18 ± 0,20	6,19 ± 0,20	6,19 ± 0,20	6,20 ± 0,20*

*P<0,01 compared to the 4th group

Despite those recommendations and the means and items of individual oral hygiene, used in Preventive dentistry kits for periodontal patients, the maximum positive evolution in the acid-base balance of the oral fluid was not achieved in the 1st and 2nd groups, in contrast to the 3rd group where the indicator changed from 6.19 ± 0.20 to 6.74 ± 0.20 , the pH of the oral fluid increased towards the alkaline side. In the control group in periodontal patients at the post-surgery stage no effect on the acid-base state of the oral fluid was detected (Table 3.13).



Figure 3.13. Patient A., an example of a chronic generalized periodontitis manifestation - after staining with an indicator solution

Clinical example of a periodontal patient (patient A., 45 years old). Objectively: the oral mucosa in the area of 13, 12, 11, 21, 22, 23, 31, 32, 33, 41, 42, 43 teeth is hyperemic, swollen. Dental deposits were found in the area of all tooth groups on the maxilla and mandible. There are filling defects on the contact surfaces of 26 and 27 teeth. Periodontal pockets in the area of the anterior tooth group on the mandible with a depth of 6 mm. Mobility II degree in the area of 31, 32, 33, 41, 42, 43 teeth. The indices of oral hygiene are unsatisfactory: OHI-S = 3.38; S.-L. = 3.74, API = 81.25%. Indicators for periodontal indices reflect the intense process of inflammation: Schiller-Pisarev test = 7.41; PMA = 62.39%; Mühlemann and Cowell = 42.74% (Figure 3.13).



Figure 3.14. Patient C., an example of a chronic generalized periodontitis manifestation - after staining with an indicator solution

Clinical example of a periodontal patient (patient S., 49 years old). Objectively: the oral mucosa in the area of teeth 13, 12, 11, 21, 22, 23, 24, 31, 32, 33, 34, 41, 42, 43, 44, 45 is hyperemic, swollen. Dental deposits were found in the area of all groups of teeth on the upper and lower jaws. On the vestibular surfaces of 33, 34, 43, 44 teeth there are defects in fillings. Dentin caries in the area of 27, 36 and 37 teeth. Periodontal pockets in the area of 12, 21, 22, 33, 32, 31, 41, 42 teeth 5 mm deep. I degree tooth mobility in the area of 31, 32, 41 teeth. The indices of oral hygiene are unsatisfactory: OHI-S = 3.36; S.-L. = 3.79, API = 83.10%. Indicators for periodontal indices reflect the intense process of inflammation: Schiller-Pisarev test = 7.45; PMA = 63.71%; Mühlemann and Cowell = 41.58% (Figure 3.14).

3.4. Assessment of dental hygiene knowledge among the surveyed patients

3.4.1. Assessment of hygiene knowledge

To assess dental hygienic knowledge and its preservation in periodontal patients during the rehabilitation period after surgery, an analysis was performed in compliance with the S.B. Ulitovskiy index of hygienic knowledge. Before the dental instruction at the beginning of the study in the 1st group, the indicator amounted to 1.88 ± 0.15 c.u., in

the 2nd group to 1.79 ± 0.16 c.u., in the 3rd group to $1 - 1.70 \pm 0.19$ c.u., in the 4th group to 1.90 ± 0.21 c.u. (Table 3.14).

Table 3.14 Evolution of indicators in compliance with the S.B. Ulitovskiy hygiene knowledge index in periodontal patients

Distribution by groups	S.B. Ulitovskiy hygiene knowledge index indicators (c.u.)				
	Period of examination (days)				
	Outcome	3	7	30	90
1 group	$1,88 \pm 0,15$	$2,37 \pm 0,26$	$2,55 \pm 0,23$	$2,71 \pm 0,22$	$3,00 \pm 0,27$
2 group	$1,79 \pm 0,16$	$2,12 \pm 0,23$	$2,63 \pm 0,32$	$2,84 \pm 0,31$	$3,22 \pm 0,26$
3 group	$1,70 \pm 0,19$	$2,00 \pm 0,18$	$2,71 \pm 0,24$	$3,08 \pm 0,28$	$3,61 \pm 0,40$
4 group	$1,90 \pm 0,21$	$2,15 \pm 0,15$	$2,28 \pm 0,18$	$2,30 \pm 0,21$	$2,34 \pm 0,19^*$

*P<0,05 compared to the 4th group

Examination of periodontal patients after surgery showed that after 30 days of the research, the indicators for the S.B. Ulitovskiy hygienic knowledge index in the 1st group amounted to 2.71 ± 0.22 a.u., in the 2nd group to 2.84 ± 0.31 a.u., in the 3rd group to 3.08 ± 0.28 c.u., in contrast to the control group, where the indicator amounted to 2.34 ± 0.19 c.u. (P<0.05) (Table 3.14).

3.4.2. Assessing the level of survival of preventive knowledge

Table 3.15 Evolution of indicators in compliance with the S.B. Ulitovskiy preventive knowledge survival index during the entire study period

Distribution by groups	S.B. Ulitovskiy preventive knowledge survival index indicators (points)				
	Period of examination (days)				
	Outcome	3	7	30	90
1 group	$76,73 \pm 6,14$	$69,40 \pm 4,86$	$64,21 \pm 5,14$	$57,69 \pm 5,19$	$50,33 \pm 4,03$
2 group	$79,21 \pm 7,13$	$71,05 \pm 6,39$	$66,82 \pm 4,68$	$63,15 \pm 5,05$	$57,40 \pm 4,59$
3 group	$75,84 \pm 6,07$	$73,59 \pm 5,15$	$72,31 \pm 6,51$	$69,24 \pm 7,62$	$68,19 \pm 6,14$
4 group	$76,52 \pm 8,42$	$61,27 \pm 5,52$	$48,56 \pm 5,34$	$36,23 \pm 3,26$	$20,61 \pm 1,44^*$

*P<0,05 compared to the 4th group

Even after 30 days the indicators of Ulitovskiy preventive knowledge survival index remained at a good level, so in the 1st group this indicator amounted to 57.69 ± 5.19 points, in the 2nd group to $63.15 \pm 5, 05$ points, in the 3rd group to 69.24 ± 7.62 points, in contrast to the control group, where the indicator amounted to at a very good

level (76.52 ± 8.42 points), and after 1 month of the research in periodontal patients satisfactory knowledge was identified in a value amounting to 36.23 ± 3.26 points (Table 3.15).

In periodontal patients the hygienic and periodontal status was assessed before and after surgical treatment, and the dental hygiene knowledge evolution was assessed throughout the entire study period that revealed a statistically significant positive trend 30 days after surgical treatment in the 3rd group that amounted to 1.93 ± 0.21 c.u. in terms of indices OHI-S, 2.21 ± 0.22 c.u. in terms of Silness-Lohe, API to 45.27 ± 3.62 c.u., PMA to $35.23 \pm 4.23\%$, Mühlemann and Cowell index to $27.12 \pm 2.17\%$ and Schiller-Pisarev samples to 3.42 ± 0.38 c.u. The level of dental hygienic knowledge in periodontal patients at the post-surgery stage in compliance with the S.B. Ulitovskiy hygienic knowledge index after 1 month in the 3rd group matched a good level of knowledge.

3.5. The study of the motivation strategy and a periodontal patient supervision

The strategy of motivation and personal supervision of a periodontal patient consisted of five stages. Ensuring patient's psychological readiness and commitment to take actions leading to the success of the treatment and fixing its result constituted the first stage of the strategy. Those efforts ensuring the patient's psychological readiness to perform the necessary hygiene procedures were implemented in a form of instructions, oral hygiene products and items were demonstrated, and methods for their effective use were taken into account. The psychological readiness of the patient to take appropriate steps resulting in a successful treatment and fixing its result included several components: motivational component, associated with the need to successfully complete the task; cognitive component, providing an understanding of their responsibilities for the implementation of the necessary hygienic preventive procedures, knowledge of the means to achieve the goal; emotional component, expressed in taking responsibility for the result of treatment and its consolidation, as well as accompanied

by a rise in confidence to succeed, inspiration; strong-will component, manifested in various forms of self-control and accompanied by the mobilization of forces, focusing on the task.

The second stage of the strategy was supplemented by the assessment of oral hygiene indices and educational work with periodontal patients. At this stage, in addition to assessing hygienic and periodontal indices, the diagnostic test of Schiller-Pisarev was performed and its results were analyzed. Then an empathic interview with the patient took place followed by the instruction and counseling. The second stage ended with a plan to achieve the goal, formulated and explained to the patient, including a set of daily oral hygiene activities and a schedule of visits to the periodontist.

The third stage of the strategy was dedicated to the comparison of the indicators of hygiene and periodontal indexes with the results obtained during previous visits that strengthened the interaction between the doctor and the periodontal patient.

At the fourth stage, interaction with the patient reached the level of mutual partnership that the patient perceived as a joint movement towards the desired goal. The patient perceived the doctor as a person interested in the overall success.

At the fifth stage of the strategy, a control examination was performed to assess the condition of the mouth hard and soft tissues utilizing methods previously familiar to the patient. The attention of the periodontal patient was focused on the result obtained, he was shown the successes achieved in the course of daily dental hygiene procedures.

The joint activities of the doctor and the periodontal patient, monitoring and teaching him oral hygiene, empathic conversation and introspection of the results achieved with the patient, as well as consolidating his hygienic knowledge determine the significance of the methods and techniques performed.

Thus, the patient acquired a motivational tool for his health and improved the quality of life, expanding the range of knowledge and skills necessary to maintain the result of periodontal treatment.

**CHAPTER 4. RESULTS OF "PREVENTIVE DENTISTRY KITS "THE
IMPLEMENTATION IN PARODONTOLOGICAL PATIENTS
IN THE POST-SURGERY PERIOD**

**4.1. Cleansing effect of "Preventive dentistry kits" at a post-surgery rehabilitation
period**

Table 4.1 presents data on the cleansing effect evolution in compliance with the Green-Vermillion Simplified Index (OHI-S) in all research groups.

Table 4.1 cleansing effect evolution in compliance with the Green-Vermillion Simplified Index (OHI-S)

Distribution by groups	Green-Vermillion Simplified Index (OHI-S) (%)			
	Period of examination (days)			
	3	7	30	90
1 group	10,50 ± 0,84	12,54 ± 1,13	40,82 ± 3,27	48,40 ± 3,87
2 group	10,98 ± 0,99	11,87 ± 0,95	39,76 ± 3,18	51,63 ± 4,65
3 group	11,76 ± 0,94	19,71 ± 2,17	43,24 ± 2,59	62,65 ± 3,76
4 group	7,81 ± 0,47	9,01 ± 0,72	10,81 ± 0,97	15,02 ± 1,05*

*P<0,01

Table 4.2 cleansing effect indicator evolution according to the Silness-Lohe Hygiene Index

In the course of the research it has been established that when using "Preventive dentistry kits" in periodontal patients the cleansing effect on the OHI-S index amounted to 48.40 ± 3.87% in the 1st group, to 51.63 ± 4, 65% in the 2nd group, in the 3rd group the maximum indicator reached 62.65 ± 3.76%, in contrast to the control group to 15.02 ± 1.05% (Table 4.1).

Table 4.2 presents the results of studying cleaning effect on the Silness-Loe hygiene index in periodontal patients.

Table 4.2 Changes in cleansing effect indicators in compliance with the Silness-Lohe Hygiene Index

Distribution by groups	Silness-Lohe Hygiene Index (%)			
	Period of examination (days)			
	3	7	30	90
1 group	9,33 ± 0,75	10,93 ± 0,87	37,33 ± 3,36	46,67 ± 5,13
2 group	9,14 ± 0,82	11,56 ± 1,04	37,90 ± 2,27	48,12 ± 3,37
3 group	12,83 ± 1,15	18,59 ± 1,49	42,15 ± 2,11	61,26 ± 5,51
4 group	6,84 ± 0,48	8,95 ± 0,63	10,00 ± 0,80	11,58 ± 0,93*

*P<0,01 compared to the 4th group

The dynamic monitoring of the hygienic status in periodontal patients at the post-surgery stage has revealed the maximum cleansing effect in compliance with the Silness-Loe index in the 3rd group that amounted to 61.26 ± 5.51%, in contrast to the 4th group - 11, 58 ± 0.93% (Table 4.2).

Table 4.3 provides information on the cleansing effect evolution on the plaque index on the proximal surfaces, simplified by the Lange method (API).

Table 4.3 API plaque cleansing effect evolution (API)

Distribution by groups	API cleansing effect evolution (%)			
	Period of examination (days)			
	3	7	30	90
1 group	8,59 ± 0,60	10,11 ± 0,81	36,93 ± 2,95	44,06 ± 3,52
2 group	8,91 ± 0,71	12,23 ± 1,10	36,76 ± 2,57	47,11 ± 3,77
3 group	10,14 ± 0,81	17,41 ± 1,39	45,91 ± 2,75	59,03 ± 5,31
4 group	0,71 ± 0,06	1,74 ± 0,10	7,27 ± 0,65	8,65 ± 0,61*

*P<0,01 compared to the 4th group

In the examined groups, statistically significant changes in the cleansing effect in compliance with the API index by the end of the research were established: in the 1st group amounting to 44.06 ± 3.52%, in the 2nd group - 47.11 ± 3.77%, in the 3rd group - 59.03 ± 5.31%, and in the 4th group - 8.65 ± 0.61% (Table 4.3).

4.2. Anti-inflammatory "Preventive dentistry kits" efficiency in the rehabilitation period after surgery

The study anti-inflammatory indicators efficiency of in compliance with the PMA index is presented in Table 4.4.

Table 4.4 Evolution of anti-inflammatory efficiency by PMA index (%)

Distribution by groups	Evolution of anti-inflammatory efficiency by PMA index (%)			
	Period of examination (days)			
	3	7	30	90
1 group	9,35 ± 0,75	18,62 ± 1,30	29,12 ± 2,04	52,27 ± 3,14
2 group	7,61 ± 0,68	20,40 ± 1,84	32,92 ± 2,96	52,10 ± 5,73
3 group	10,56 ± 0,63	20,90 ± 1,63	45,78 ± 3,20	56,83 ± 4,55
4 group	5,74 ± 0,52	18,43 ± 1,29	35,53 ± 2,84	44,65 ± 3,57*

*P<0,01 compared to the 4th group

The assessment of the "Preventive dentistry kits" anti-inflammatory effect on periodontal tissue in the postoperative period has revealed the efficiency indicator of the PMA index amounting to 52.27 ± 3.14%, 52.10 ± 5.73 % and 56.83 ± 4.55% in the 1st, 2nd and 3rd groups, respectively, and in the control group, anti-inflammatory efficiency indicator amounted to 44.65 ± 3.57% (Table 4.4).

Table 4.5 demonstrates anti-inflammatory efficiency indicator evolution in compliance with the Mühlemann and Cowell bleeding index in periodontal patients.

Table 4.5 Evolution of Muhlemann and Cowell bleeding index anti-inflammatory efficiency (%)

Distribution by groups	Evolution of Muhlemann and Cowell bleeding index anti-inflammatory efficiency (%)			
	Period of examination (days)			
	3	7	30	90
1 group	5,18 ± 0,36	14,61 ± 1,61	33,39 ± 1,34	65,05 ± 5,85
2 group	3,02 ± 0,27	17,24 ± 1,55	35,33 ± 2,83	69,04 ± 4,14
3 group	8,67 ± 0,61	19,26 ± 1,54	38,63 ± 2,70	76,80 ± 6,91
4 group	2,69 ± 0,22	11,07 ± 0,89	31,14 ± 1,87	50,93 ± 3,57*

*P<0,01 compared to the 4th group

A positive dynamics of hemostatic efficiency in compliance with the Muhlemann and Cowell index was established throughout the entire research period. By the end of

the research the indicator amounted to $65.05 \pm 5.85\%$ in the 1st group, $69.04 \pm 4.14\%$ in the 2nd group, in the 3rd group - $76.80 \pm 6.91\%$, in the 4th group - $50.93 \pm 3.57\%$.

Table 4.6 demonstrates parameter evolution of the Schiller-Pisarev test in all the studied groups.

Table 4.6 Evolution in the Schiller-Pisarev test

Distribution by groups	Indicator evolution of the Schiller-Pisarev test (%)			
	Period of examination (days)			
	3	7	30	90
1 group	$3,67 \pm 0,22$	$8,34 \pm 0,75$	$50,57 \pm 4,05$	$70,92 \pm 4,97$
2 group	$3,84 \pm 0,31$	$9,80 \pm 0,78$	$51,39 \pm 4,63$	$70,99 \pm 5,68$
3 group	$4,55 \pm 0,36$	$10,47 \pm 1,15$	$52,89 \pm 3,17$	$74,10 \pm 5,19$
4 group	$5,83 \pm 0,52$	$21,27 \pm 1,91$	$41,33 \pm 3,31$	$49,32 \pm 3,95^*$

*P<0,01 compared to the 4th group

The Schiller–Pisarev test was used to find the anti-inflammatory efficiency evolution in all the examined groups with the highest indicator in the 3rd group - $74.10 \pm 5.19\%$, in contrast to the control group, where the indicator reached $49.32 \pm 3.95\%$ (Table 4.6).

4.3. Impact of "Preventive dentistry kits" on the acid-base the oral fluid

Table 4.7 presents data on the acid-base balance efficiency evolution of the oral fluid in periodontal patients.

Table 4.7 Assessment of acid-base balance efficiency evolution of the oral fluid

Distribution by groups	Acid-base balance efficiency evolution of the oral fluid (%)			
	Period of examination (days)			
	3	7	30	90
1 group	$0,32 \pm 0,03$	$0,96 \pm 0,09$	$1,59 \pm 0,14$	$1,91 \pm 0,21$
2 group	$2,30 \pm 0,21$	$5,51 \pm 0,61$	$7,35 \pm 0,66$	$8,12 \pm 0,89$
3 group	$6,53 \pm 0,72$	$5,64 \pm 0,45$	$6,97 \pm 0,56$	$8,16 \pm 0,73$
4 group	$0,16 \pm 0,01$	$0,16 \pm 0,01$	$0,32 \pm 0,04$	$0,32 \pm 0,04^*$

*P<0,01 compared to the 4th group

The statistically significant acid-base effect evolution indicators when using the "Preventive dentistry kits" in the 2nd and 3rd groups amounted to $8.12 \pm 0.89\%$ and $8.16 \pm 0.73\%$, respectively, in contrast to the control group with $0.32 \pm 0.04\%$ (Table 4.7).

4.4. Monitoring dental hygiene knowledge maintenance efficiency in periodontal patients

Table 4.8 demonstrates the evolution of dental hygiene knowledge survival efficiency in compliance with the S.B. Ulitovskiy hygienic knowledge index in all examined groups.

Table 4.8 evolution of dental hygiene knowledge survival efficiency in compliance with the S.B. Ulitovskiy hygiene knowledge index in periodontal patients

Distribution by groups	S.B. Ulitovskiy hygiene knowledge index efficiency evolution(%)			
	Period of examination (days)			
	3	7	30	90
1 group	$9,67 \pm 0,87$	$15,00 \pm 1,35$	$21,00 \pm 1,89$	$37,33 \pm 3,40$
2 group	$11,80 \pm 1,30$	$18,32 \pm 1,65$	$34,16 \pm 3,07$	$44,41 \pm 4,89$
3 group	$14,68 \pm 1,32$	$23,27 \pm 1,86$	$44,60 \pm 4,91$	$52,91 \pm 4,23$
4 group	$1,71 \pm 0,19$	$2,56 \pm 0,28$	$8,12 \pm 0,73$	$18,80 \pm 1,69^*$

*P<0,01 compared to the 4th group

The assessment of dental hygiene knowledge survival efficiency during the research period has revealed a positive trend in the 1st group - from $9.67 \pm 0.87\%$ to $37.33 \pm 3.40\%$, in the 2nd group - from $11.80 \pm 1, 30\%$ to $44.41 \pm 4.89\%$, in the 3rd group - from $14.68 \pm 1.32\%$ to $52.91 \pm 4.23\%$, in the 4th group the efficiency value reached only $18.80 \pm 1 .69\%$ (Table 4.8).

4.5. Preventive Knowledge Survival Efficiency in Periodontal Patients

Table 4.9 presents the results of efficiency assessment of the hygienic knowledge survival in compliance with the Ulitovskiy preventive knowledge survival index.

Table 4.9 Efficiency of hygiene knowledge survival in compliance with Ulitovskiy preventive knowledge survival index in periodontal patients

Distribution by groups	Efficiency by the Ulitovskiy preventive knowledge survival index (%)			
	Period of examination (days)			
	3	7	30	90
1 group	9,55 ± 0,76	16,32 ± 1,47	24,81 ± 1,98	34,41 ± 3,10
2 group	10,30 ± 1,13	15,64 ± 1,55	20,28 ± 1,62	27,53 ± 2,20
3 group	2,79 ± 0,22	4,65 ± 1,41	8,70 ± 0,78	10,09 ± 0,81
4 group	33,00 ± 3,63	36,54 ± 3,29	52,65 ± 4,74	73,07 ± 8,04*

*P<0,01 compared to the 4th group

Monitoring the efficiency of dental hygiene knowledge survival in compliance with the Ulitovskiy preventive knowledge survival index has revealed a high efficiency of knowledge survival - 34.41 ± 3.10%, 27.53 ± 2.20% and 10.09 ± 0.81% by the end of the study in the 1st, 2nd and 3rd groups, respectively, in contrast to the control group (73.07 ± 8.04%) - low efficiency of knowledge survival (Table 4.9).

DISCUSSION

To increase the anti-inflammatory effect efficiency on periodontal tissues after surgery "Preventive dentistry kits" were developed and implemented for the use during in the rehabilitation period in periodontal patients.

The data obtained testify to the high efficiency of "Preventive dentistry kits", taking into account the type of surgical intervention. The research has revealed the highest efficiency of "Preventive dentistry kit No. 3" recommended for periodontal patients in the 3rd group, confirmed by the data 59.03 ± 5.31 % on the proximal surface plaque index, simplified by the Lange method (API). The PMA index and the Schiller-Pisarev test-based analysis of anti-inflammatory has revealed the maximum values in the 3rd group - $56.83 \pm 4.55\%$ and $74.10 \pm 5.19\%$, respectively.

The developed "Preventive dentistry kit No. 3" included prophylactic toothpaste "Siberian Wellness Strawberry and red clay" containing strawberry juice, strawberry pits, red clay, magnolia and papain extracts; rinse "ASEPTA parodontal", containing castor oil, extracts of chamomile, sage, witch hazel and povidone; manual toothbrush "NANO Premium manual toothbrush" of medium hardness; manual single-bundle toothbrush "Pesitro UltraClean" with a cone-shaped bundle of bristles; dental tape "Collgate" and brushes "TePe".

During the entire period of the research, personal supervision for periodontal patients was provided. Self-assessment providing resulting data on periodontal treatment as well as monitoring and training in oral hygiene have been performed. The patients have been interviewed on the importance of the implemented prevention methods in the rehabilitation period and the consolidation of emerging hygiene knowledge in periodontal patients after surgery.

The ongoing monitoring and oral hygiene instruction using the elaborated "Preventive dentistry kits" taking into account the type of surgical intervention that significantly boost the preventive dental knowledge survival efficiency (Ulitovskiy's index of HKE = $10.09 \pm 0.81\%$) and implementation of the necessary stages of the

hygiene prevention program were core particulars of the post-surgery stage for periodontal patients. The ongoing monitoring of dental hygienic knowledge enabled adjustment of the sanitary and educational work focus in periodontal patients, thus, reducing the rehabilitation time for the examined individuals after surgical intervention on periodontal tissues.

In the course of a clinical study incorporating the "Preventive dentistry kit No. 1", a cleansing effect was proven in compliance with of hygiene indices: OHI-S - $48.40 \pm 3.87\%$, S.-L. - $46.67 \pm 5.13\%$, API - $44.06 \pm 3.52\%$; anti-inflammatory efficiency in compliance with periodontal indices: PMA - $52.27 \pm 3.14\%$, Muhlemann and Cowell - $65.05 \pm 5.85\%$ and Schiller-Pisarev test - $70.92 \pm 4.97\%$; the efficiency of the acid-base balance of the oral fluid ($1.91 \pm 0.21\%$), the efficiency of maintaining dental hygiene knowledge ($37.33 \pm 3.40\%$), as well as the efficiency of preventive knowledge survival - $34.41 \pm 3.10\%$. Clinical comparison of the use of "Preventive dentistry kit No. 2" has revealed the cleansing effect in compliance with hygiene indices: OHI-S - $51.63 \pm 4.65\%$, S.-L. - $48.12 \pm 3.37\%$, API - $47.11 \pm 3.77\%$; anti-inflammatory efficiency in compliance with periodontal indices: PMA - $52.10 \pm 5.73\%$, Muhlemann and Cowell - $69.04 \pm 4.14\%$ and Schiller-Pisarev test - $70.99 \pm 5.68\%$; the efficiency of the acid-base balance of the oral fluid amounting to $8.12 \pm 0.89\%$, the efficiency of maintaining dental hygiene knowledge ($44.41 \pm 4.89\%$), as well as the survival efficiency - $27.53 \pm 2.20\%$. The implementation of the "Preventive dentistry kit No. 3" aroused the maximum cleansing effect in terms of hygiene indices: OHI-S - $62.65 \pm 3.76\%$, S.-L. - $61.26 \pm 5.51\%$, API - $59.03 \pm 5.31\%$; high anti-inflammatory efficiency in compliance with the PMA indices - $56.83 \pm 4.55\%$, Muhlemann and Cowell - $76.80 \pm 6.91\%$ and the Schiller-Pisarev test - $74.10 \pm 5.19\%$; the highest efficiency of the acid-base balance of the oral fluid ($8.16 \pm 0.73\%$), the high efficiency of maintaining dental hygiene knowledge ($52.91 \pm 4.23\%$) and the efficiency of the preventive knowledge survival - $10.09 \pm 0.81\%$.

CONCLUSIONS

1. To optimize preventive work during surgical interventions in periodontal patients, a clinical analysis on the prevalence of inflammatory periodontal diseases was performed having revealed the indicator that amounted to $89.34 \pm 10.78\%$ in severe form of periodontal tissue damage to 4.05 ± 0.42 c.u. by the CPI index, preventive knowledge with the shift in the acid-base state of the oral fluid towards the acid side - 6.13 ± 0.20 .
2. The most effective toothpaste containing strawberry juice, red clay, extracts of magnolia and papain (UTPEI index = 4.9 c.u.), castor oil, extracts of chamomile, sage, witch hazel and povidone-based mouthrinse (UMREI index = 150 points), a manual toothbrush (UMTEI index = 5.0 c.u.) and a manual mono-bundle toothbrush with an optimal indicator of its quality - MMTB = 74 points that was confirmed by an increase in periodontal health at the post-surgery stage in compliance with the PMA index with the indicators amounting to $28.05 \pm 3.37\%$ by the end of the study with a satisfactory level of oral hygiene (OHI-S = 1.27 ± 0.11 c.u.).
3. Our comparative assessment of the oral hygiene items in periodontal patients after surgical interventions allowed developing an index to assess the efficiency of manual mono-bundle toothbrushes used in periodontal practice. An application to assess the quality of a manual mono-bundle toothbrush was filed No. 2023108334.
4. The growth of dental hygienic knowledge in periodontal patients in the rehabilitation period after surgery was assessed by the index of S.B. Ulitovskiy hygienic knowledge: in the 1st group with 1.88 ± 0.15 c.u. up to 3.00 ± 0.27 c.u., in the 2nd group ranging from 1.79 ± 0.16 c.u. up to 3.22 ± 0.26 c.u., in the 3rd group ranging from 1.70 ± 0.19 c.u. to 3.61 ± 0.40 c.u., in contrast to the 4th group, where the indicator changed from 1.90 ± 0.21 c.u. up to 2.34 ± 0.19 c.u.
5. To improve preventive care in periodontal patients at the post-surgery stage, the following actions were developed and implemented: "Preventive dentistry kit No. 1", exhibiting the efficiency in the 1st group by the end of the research equal to $44.06 \pm$

3.52% in compliance with API indices and Muhlemann and Cowell - $65.05 \pm 5.85\%$; "Preventive dentistry kit No. 2", exhibiting the efficiency in the 2nd group equal to API - $47.11 \pm 3.77\%$ and Muhlemann and Cowell - $69.04 \pm 4.14\%$; "Preventive dentistry kit No. 3", exhibiting the maximum efficiency in the 3rd group after 90 days of the research equal to $59.03 \pm 6.49\%$ for API indices and $76.80 \pm 6.14\%$ for Muhlemann and Cowell that enabled to significantly increase anti-inflammatory effect and recommend "Preventive dentistry kit No. 3" to persons after periodontal surgery.

PRACTICAL RECOMMENDATIONS

1. Prescribing "Preventive dentistry kit No. 1" to periodontal patients at the post-surgery stage after surgical intervention performed by closed curettage, consisting of prophylactic toothpaste "Periodontol Healing Herbs" containing active components of sage, walnut, echinacea, horsetail and rosemary extracts; "Elixir with kelp" rinse, containing peppermint, chlorhexidine, vitamin C, kelp extract active ingredients; manual toothbrush "TePe Supreme soft" of medium hardness in its composition; single-bundle toothbrush "TePe interspace medium" with a cone-shaped bundle of bristles and a replaceable head; "Collgate" dental tape.
2. Prescribing "Preventive dentistry kit No. 2" for periodontal patients at the post-surgery stage after surgical intervention performed in compliance with the patchwork method, including the "Paradontax to maintain healthy gums" prophylactic toothpaste containing sodium bicarbonate, xanthan gum, echinacea juice purple, extract of chamomile, sage, ratania, bitter myrrh, sodium fluoride active components; "Forest balm" anti-inflammatory conditioner containing castor oil, aloe leaf juice, oak bark extract, nettle, yarrow flowers, St. John's wort, celandine, sodium fluoride, cetylpyridinium chloride active components; "Biomed" manual toothbrush of medium hardness; "Curaprox 1009 single" mono-bundle toothbrush with a cone-shaped bundle of bristles; "TePe" brushes.
3. Prescribing "Preventive dentistry kit No. 3" for periodontal patients at the post-surgery stage after surgical intervention incorporating patchwork technique involving a diode laser and consisting of "Siberian Wellness Strawberries and red clay" prophylactic toothpaste containing strawberry juice, strawberry pits, red clay, extracts of magnolia and papain; "ASEPTA parodontal" rinse, containing castor oil, chamomile, sage, witch hazel and povidone extracts; "NANO Premium manual toothbrush" manual toothbrush of medium hardness; "Pesitro UltraClean" single-bundle toothbrush with a cone-shaped bundle of bristles; "Collgate" dental tape; "TePe" brushes.

LIST OF ABBREVIATIONS

1. 1. UPKSI - S.B. Ulitovskiy preventive knowledge survival index
2. UHKI – S.B. Ulitovskiy hygiene knowledge index
3. UTEI - S.B. Ulitovskiy toothpaste efficiency index
4. UMTEI - S.B. Ulitovskiy manual toothbrush index of efficiency
5. MMTEI - manual mono-bundle toothbrush efficiency
6. UMREI - S. B. Ulitovskiy mouthrinse efficiency index
7. CPI - complex periodontal index
8. CFE - caries, filling, extracted tooth
9. MT - manual toothbrush
10. SanPiN - sanitary rules and regulations
11. MTBE - manual toothbrush efficiency
12. MMBTBE - manual mono-bundle toothbrush efficiency
13. PPI - proximal plaque index simplified by the Lange method
14. S.-L. – Silness-Loe

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