Medicinal-and-prophylactic effectiveness of the natural extract based toothpastes among patients suffering from inflammatory parodentium diseases.

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Parodentium diseases are considered to be not only a stomatological, but also a general medical and even social problem. Its full solution still remains a principal direction of the modern dentistry development as these diseases are the most widespread ones among the population of the globe after caries. According to evidence received during the epidemiologic stomatological examination of the population in Russia, conducted in 1999 under the aegis of WHO, the prevalence of the parodentium diseases in this country is high. [1]. The results of the described examination indicate that the state of parodentium tissues of Russian kids and teenagers is better if to compare with adults. Nevertheless, such percent of those ones having symptoms of the parodentium diseases (twelve-year-olds — 48%, fifteen-year-olds — 57%) proves rather a high prevalence of this kind of lesion. In the 35-44 age group the number of individuals with the parodentium disease symptoms of various degree of intensity constitute more than 86%.

The questions of the parodentium disease etiology and pathogenesis have been disputable for many years that resulted in a great number of classifications and theories.

It is well-known that the parodentium disease can be described as being an accurate and certain set of symptoms of pathology of the supporting tooth apparatus. All the pathological processes occurring in the parodentium can be attributed to parodentium diseases. They can be confined to gum diseases solely or affect all the parodentium structures. The majority of the parodentium diseases are of the local character, but in certain cases they can be symptoms of systemic diseases or lesions of other organs.

The parodentium illnesses can lead not only to the tooth loss but also to complications hazardous to patient’s life. For instance, serious cases of periodontitis triple the risk of myocardial infarction and a mere presence of this disease is more likely to increase the risk of development of the complications during pregnancy than alcohol and smoking. This evidence is a solid and persuasive argument explaining a strong desire of specialists to give more attention and efforts to parodentium treatment and prevention.

One can say with strong confidence that the subgingival parodontal microflora is a basic causative factor of the parodentium disease origin. Numerous studies proved the subgingival bacteria pathogenesis for the parodentium tissues while certain kinds of microorganisms were recognized as being specific causative agents of periodontitis. Modern level of knowledge concerning parodentium disease etiology and pathogenesis makes acknowledge the bacteria-related model of the disease origin and development as that one which should be considered as just one among several causes and it would be more correct to consider it together with individual and specific reactions of the human organism and the ambient influence should be
taken into account as well. The results of the clinical, epidemiological and laboratory studies confirm that the development of the parodentium diseases results from the following causative factors closely bound to each other: bacteria, reactions of the human body and environment factors [2—16].

Schemes of the parodentium disease treatment vary. It is the quality individual hygiene of an oral cavity that is an integral part of all the schemes of parodentium disease treatment and prevention at any stage. No medical treatment will help and bring positive results in case of the insufficient oral hygiene.

The principal task of the individual hygiene of the oral cavity is to remove the nonmineralized dental deposits, first of all, by means of a toothpaste and toothbrush.

Introduction of medicinal-and-prophylactic components into the toothpaste formulation ensures additional possibilities for treatment and prevention of the parodentium diseases:

- directed regulation of the microbial ecology of the dental plaque, simultaneously inhibiting the activity of agents causing periodontitis;
- prevention of the deposition and mineralization of dental plaque;
- improvement of trophism and metabolism in a oral mucous coat and parodentium tissues;
- improvement of the local immunity of the oral cavity;
- anti-inflammatory and styptic effects;
- normalization of the epithelization processes.

Monitoring of the effectiveness of hygienic preparations comprising various medicinal-and-prophylactic additives is one of the basic directions of the department routine. When controlling the clinical performance of the preparations available on the market, the dentist becomes equipped with knowledge to give his patients clinically grounded recommendations on the use of hygienic remedies aimed at prevention of stomatological diseases as well as improvement of the treatment effectiveness.

While conducting clinical assessment of the hygienic preparations performance (namely, effectiveness of toothpastes) it is most important to reach the maximum resemblance to the real working conditions of the dentist. In majority cases, people see a therapist to treat dental caries, but at the moment of their visit of the therapist's room many of them have symptoms of the inflammatory lesion of the parodentium. Thus, a dentist must help his patient correct hygienic skills and select hygienic means (toothpastes, toothbrushes, other extra means for oral care). He should also assess the effectiveness of the recommendations he gave to his patient.

In the present paper we are presenting an analysis of performance of two toothpastes, comprising plant extracts and recommended to patients of the dentist in order to improve hygienic and gingival indices. Clinical effectiveness of toothpastes named «Parodontax Classic» and «R.O.C.S. Bionica» was being assessed. The assessment was carried out using a blind randomized method together with depersonalized toothpaste samples.
«Parodontax» toothpaste

This toothpaste contains sodium bicarbonate (45%) that acts as an abrasive and sage (Salvia officinalis) famous for its antibacterial, tissue strengthening and deodorizing effects. Peppermint (Mentha piperita) is used for breath refreshing and is a good anti-inflammatory and anaesthetizing agent. Chamomile (Matricaria recutita) provides antibacterial and anti-inflammatory effects and makes for wound healing. Coneflower (Echinacea purpurea) is added into the toothpaste formulation for its immunomodulatory action and effectiveness for chronic infection treatment. Myrrh (Commiphora molmol) possesses tissue strengthening and styptic properties. Ratanhia (Krameria triandra) is a good astringent.

«R.O.C.S. Bionica» toothpaste

Dicalcium phosphate dihydrate acts as an abrasive in this natural toothpaste (94,2% of its ingredients are of the natural origin). It includes extracts of medicinal plants used as food by the man. Licorice root extract (Glycyrrhiza glabra), a source of the glycyrrhetinic acid, has anti-inflammatory and antiviral (including herpesvirus) qualities and inhibits the activity of cariogenic bacteria. Essential oil out of thyme (Thymus serpyllum) acts as a source of thymol and carvacrol. Thymol battles cariogenic and periodontopathogenic microflora as well as inhibits ATP synthesis in Porphyromonas gingivalis and Streptococcus sobrinus. It also has anaesthetic properties. Carvacrol takes an antibacterial effect and successfully kills colon bacillus, blue pus bacillus and aurococcus. It is very effective against antibiotic-resistant bacterium strains. Mineral fraction of laminaria (Laminaria saccharina) includes a complex of microelements contributing to activation of metabolic processes. To refresh an oral cavity, the odorants based upon peppermint and eucalyptus essential oils are used.

30 patients of both sexes aged 15-35 diagnosed with “chronic catarrhal gingivitis” or “chronic periodontitis at a stage of mild severity” were examined. In these cases the period of observation by a dentist took two weeks and more. In this connection, data, which were obtained in the course of two weeks of the observation were statistically processed.
To estimate the state of oral hygiene and cleaning performance of the toothpastes under observation, OHI-S oral hygiene index was used. Anti-inflammatory effect was estimated by means of CPI index (complex parodontal index). The hemorrhage degree was estimated with SBI index. Selection of patients to make up a group for observation was carried out at random. Only those people were offered to participate in the investigation, whose indices data were within the borders of CPI (from 1 to 2), SBI (from 0,5 to 1). The determination of the investigated indices was fulfilled at the beginning of the investigation and after it, in other words, in 14 days. Statistical assessment of the received data was carried out by using Student’s criterion.

During the period of use of the tested toothpastes, a marked improvement of hygienic indices was registered. We suppose that this improvement is evidence of a regular use of the tested toothpastes by the participants of the investigation. The results received during the investigation prove a pronounced anti-inflammatory effect of both toothpastes that were tested.

After two weeks’ use of the tested toothpastes both of them really improved the indices of the parodontium condition. While using «Parodontax» toothpaste, the average value of CPI index dropped by 31,3% (p<0,05) and amounted to 0,90±0,13. When using «R.O.C.S. Bionica» toothpaste, the average value of CPI index decreased by 37,6% (p<0,001) and equaled 0,93±0,10 (picture 2). Usage of «Parodontax» toothpaste also resulted in the change in Sulcus Bleeding Index (SBI), which amounted to 64,4% (p<0,001). The average value of SBI became equal to 0,31±0,07. While using «R.O.C.S. Bionica» toothpaste, the bleeding rate decreased by 53,5% (p<0,001) and the average value of SBI index amounted to 0,4±0,06 (picture 3) at the end of the investigation. According to gum condition indices no significant differences between two toothpastes were detected. Both before the investigation and after it the average values of the
parodentium condition indices did not statistically differ from each other in the groups of patients under observation.

Pronounced anti-inflammatory effectiveness of toothpastes based upon natural plant extracts is of paramount importance in prophylaxis of parodentium diseases as it is common knowledge that bacteria fail to resist natural antibacterial substances. Moreover, one can find evidence in literature that antibiotic-resistant microorganisms keep being sensitive to antibacterial components of essential oils. Thanks to the mentioned qualities such components of essential oils, as thymol and carvacrol, are used in therapy of various diseases, namely nasopharynx and respiratory tract diseases. In contrast to toothpastes including anti-infective agents, the ones with natural plant extracts can impact not only on the microbial flora of the mouth but also on the course of the inflammatory process. Owing to the structural similarity with cortisol, glycyrrhizic acid takes a pronounced anti-inflammatory effect. But unlike the exogenic use of the corticoids it does not cause side effects and dependence as it does not make a true hormonal influence. In medicine Echinacea purpurea extract is widely used as an immunomodulator. The stimulating qualities of this plant are attributed to the presence of specific polysaccharides in it. [17—19].

Thus, provided that a natural ingredient based toothpaste contains required concentrations of active components such toothpastes are able to cause a marked medicinal-and-prophylactic effect upon the parodentium. And this fact has been confirmed by our investigation.