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NEW ALGINATE IMPRESSION MATERIAL WITH DECONTAMINATION PROPERTIES

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Key words: orthopedic dentistry, materials science,
decontamination of impressions, alginate impression
material, denture defect, generalized periodontitis, partial
removable denture.

Actuality. The analysis of modern trends in the development of medicine and orthopedic stomatology in particular testifies to the urgent need for the development and implementation of effective methods of prevention, treatment and rehabilitation in the practice of providing medical care. At the same time, in the clinical practice of orthopedic dentistry, the quality of dental materials that are used at the clinical and laboratory stages of the manufacturing of the proper orthopedic constructions is a primary importance.

Disinfection of prints by applying advanced materials is a modern trend of dental materials usage, thus it is necessary also to pay attention to the basic properties of impression materials. The quality of impression materials with disinfecting effect - a generalized concept that includes ease of use and harmlessness of material for the patient's health and its ability to comply with the requirements for physical and mechanical properties and the ability to disinfect pathogenic and opportunistic pathogenic flora in contact of material with mucous membranes prosthetic bed. Improving the accuracy of evaluation of dental materials reaching that comprehensively take into account the physical and mechanical, clinical and technological properties that meets modern requirements for dental materials, and in addition - disinfecting effect. Last plays a crucial role in enhancing the

efficiency and quality of dental treatment, as well as technological and epidemic providing of dental care.

The main disadvantage of domestic alginate imprint materials is the lack of decontamination effect. The decontamination of the prints is carried out with using physical methods, or, for the most part, chemicals are used. But these methods can lead to deformation of the imprints, which in turn is reflected in the accuracy of reproduction of prosthetic lids on plaster models. In addition, these methods are quite labor-intensive, require the use of additional equipment and much time spent on disinfection.

Our research is devoted to the urgent problem of orthopedic dentistry – the problem of reducing the risk of infection of dentists, dental technicians, support staff of dental clinics, as well as other patients by decontamination of impressions.

The objective of our work was to develop a technology of estimation and testing a new national alginate impression materials with peroxide K-30, which has decontamination properties.

Materials and methods. We have developed recipe of such material and carried out a comprehensive assessment of its quality by the author's techniques [1, 2]. Experimental samples from the new alginate impression materials [3] was prepared according to the technical specifications of the tests. We made

20 samples that were tested further. These experimental researches were calculated statistically, reliability of medium differences was determined by Student [4].

Results and discussion of results. In order to substantiate its formulation, we studied the physical, mechanical and technological properties of different formulations of alginate repellent compositions, and their comparative rating was made. Based on the results of these studies, the formulation of the improved alginate repellent material was approved, which was subject to further researches to determine its properties.

The toxicological rating of the improved alginate imprint material was performed to determine the possibilities of clinical usage of the proposed material.

The researches were made to determine the physical and mechanical properties of the new material. The obtained data of physical and mechanical researches testify that the improved alginate imprint material in its properties fully meets the requirements of ISO 1563-2011. Comparative analysis showed that the new material according to the main indicators is not worse than the similar material ($p < 0,01$). It has been established that the material developed by us ($(149,5 \pm 2,5)$ s) is statistically ($p < 0,05$) less than 13,0% of the time of structuring than analogue ($(169,3 \pm 6,2)$ s) It also discovered ($(1,79 \pm 0,2)$ %)

significantly ($p < 0,05$) less by 5,3%, compared to the analogue ($(1,9 \pm 0,2) \%$) the deformation index at compression. The compressive strength index was the same for both materials ($(0,66 \pm 0,03) \text{ N/mm}^2$) ($p < 0,05$). The dimensional accuracy of gypsum models, when using new material, was provided at 99.3% of linear dimensions.

As a result of a microbiological study, it was found that the degree of contamination of the prints is due to the kind of alginate imprint that was applied. The use of advanced alginate imprint material significantly reduces in 30% the level of contamination of the prints compared with the analogue. In this case, the use of the material developed by us provides decontamination of prints from the main types of microbiota and its minimum possible presence on plaster models. Excluding the procedure of soaking the prints in aqueous solutions of antiseptics, which can affect their dimensional accuracy and deform the surface, allows you to produce more precise and qualitative models of prosthetic lodges.

Clinical and technological testing of the proposed imprint material was conducted in the conditions of the clinic of orthopedic dentistry. According to the results of clinical use of advanced alginate imprint material, it has been established that in the manufacture of removable dentures, the material

developed by us allows us to obtain high-precision, compared with analogues, imprints of patients' prosthetic lobes with the subsequent production of adequate plaster models that do not require additional decontamination. Also, its use in the clinic of orthopedic stomatology provides a significant ($p < 0,05$) greater by 10,3% relative to the analogue of the clinical and functional effect, which manifested in reducing the frequency of correction of bases of removable prostheses with ($1,82 \pm 0,05$) corrections for one prosthesis in the control group up to ($1,65 \pm 0,04$) in the main group.

Based on the results of clinical studies, the expediency of using an improved alginate imprint material with peroxide K-30 during the course of orthopedic treatment with removable constructions of prosthetics for patients with chronic generalized periodontitis with pathological mobility of teeth I-II degrees has been proved.

The carried out researches have theoretical and practical values in the field of clinical dentistry and dental materials science.

The results of laboratory tests determine the optimal parameters of new materials, and research of their clinical and technological properties will improve the quality of patient's treatment with defects in dentition and, in general, provide a reasonable and optimal selection of these materials for the manufacturing for

orthopedic structures.

Conclusions.

1. Among the clinical and technological properties of the new material is the most important the presence of disinfecting effect and reducing the total working time of this material within the acceptable ISO-1563 [5].
2. Assessment of quality for the alginate impression materials should be done with taking into account the influence of the material to the level of microbial colonization of print, implemented by the using the method, that we worked out.

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