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## СТОМАТОЛОГИЯ

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Polushina G. L., Kotikova A. Y., Sementsova E. A., Jegalina N. M.  
STUDY OF THE EFFECTIVENESS OF A COMBINATION OF LASER  
CURETTAGE AND INJECTIONS OF HYALURONIC ACID-BASED GEL  
(EXPERIMENT ON LABORATORY ANIMALS)**

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**Annotation.** The article presents the results of a comprehensive treatment of experimental periodontitis in the author's model of the disease. Animals underwent a laser curettage procedure using a SiroLaser diode laser. Then they were divided into two groups: control and study, in the course of treatment of which were injections of hyaluronic acid. The positive dynamics of the periodontitis course was revealed in the group with a course of periodontal tissue biorevitalization.

**Аннотация.** В статье представлены результаты комплексного лечения экспериментального пародонтита на авторской модели заболевания. Животным проводили процедуру лазерный кюретаж с помощью диодного лазера SiroLaser. Затем они были разделены на две группы: контрольную и исследуемую, в курсе лечения которой были инъекции гиалуроновой кислоты. Выявлена положительная динамика течения пародонтита в группе с курсом биоревитализации тканей пародонта.

**Key words:** laser curettage, periodontal disease, treatment, injections, hyaluronate.

**Ключевые слова:** лазерный кюретаж, пародонтит, лечение, инъекции, гиалуронат.

### **Introduction**

Periodontal diseases are the main reason for the loss of natural teeth, which leads to a violation of the chewing function, aesthetics and impairs the quality of life. The prevalence of periodontal diseases in Russia, depending on the age, reaches from 48.2%-12 years, to 86.2% - 44 years, by 60 - 65 years, it will increase to 100%. Diagnostics and complex treatment is an urgent problem of dentistry due to the wide prevalence and intensity of periodontal tissue damage in all age groups [1,2,4].

On the territory of the Russian Federation, complex treatment of periodontitis is carried out in accordance with clinical recommendations (Approved By the decision of the Council of the Star Association on 23.04.2013 with amendments and additions based on Resolution № 18 of the Star Council of 30.09.2014, updated on 02.08.2018) and includes therapeutic treatment, surgical treatment, normalization of occlusion, rational prosthetics and supportive periodontal therapy.

The dental market offers a wide range of products for improving soft tissue regeneration [5]. One of the promising groups is hyaluronic acid-based products, which are available in the form of rinses, gels for application and injectable preparations. Of interest are injectable forms of hyaluronate, which are indicated for the complex treatment of inflammatory periodontal diseases. Hyaluronic acid-a natural polysaccharide due to its physical and chemical properties contributes to the appearance of trophic, barrier and plastic functions of connective tissue. It provides exchange between blood and tissues, facilitates the flow of nutrients to cells and the removal of metabolites, modulates the functional state of phagocytes. When hyaluronic acid interacts with receptors on the cell surface, fibroblast migration and cell proliferation are stimulated. Due to these properties, hyaluronic acid was selected as a substance that has a therapeutic effect on damaged periodontal tissues.

On the territory of the Russian Federation, the only hyaluronic injection gel for dentistry is registered - the Biodegradable elastic-viscous reident gel (approved by Star, certificate No 1272 and 1257 of 24.09.2018).

**Purpose of research** – study of the effectiveness of hyaluronic acid preparations in the complex treatment of periodontitis in experimental animals.

### **Research materials and methods**

The study was conducted from April to July 2018 in the USMU vivarium (head of the vivarium - N. A. Stukova), approved by the USMU LEC on 16.12.2016. On 12 rabbits of the Soviet Chinchilla breed weighing 2.8-3.6 kg, the effectiveness of the wound-healing action of the gel based on hyaluronic acid was evaluated. In the study and control groups, under the anesthesia of xylozin and zoletil 100, experimental periodontitis was simulated according to the author's method (Russian patent No. 2654598 of 21.05.2018) and left for observation for 4 weeks [3]. Then the animals under anesthesia performed the laser curettage procedure using a high-intensity diode laser SiroLaser (Sirona) power of 2.8 W wavelength 980 nm, fiber 320 microns,

illuminating each periodontal pocket for 10 seconds. Injections of dental gel "Revident" in animals of the study group were performed in the TST technique on days 3, 7 and 14. A clinical examination and morphological examination were performed. Withdrawal from observation of experimental animals was carried out in control periods-7, 10, 14, 28 days.

### **The results of the study and their discussion**

Histological examination of organs and tissues in animals (liver, kidneys, heart, lungs, spleen, stomach) that received hyaluronic acid injections revealed no pathological changes in any animal. No necrobiotic or destructive changes were detected in the study of acute and chronic toxicity.

When observing animals, the average epithelization time in the experimental group is 7 days. In the study group of animals that received a course of injections of the drug Revident, there was a rapid decrease in gingival edge hyperemia and edema of the gingival mucosa, marked epithelization of the wound (Fig. 1). In the control group of animals, there were no differences in the terms of wound healing, epithelization occurred on the 10th day.

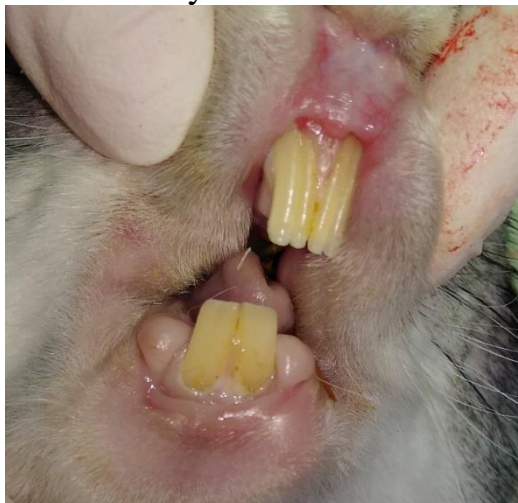


Fig. 1. Epithelization of a wound in an animal of the study group on the 7th day of observation

The morphological study showed that moderate infiltration by lymphoid elements of soft tissues and ligamentous apparatus was detected in the area of the root of the tooth of the animal of the study group on the 10th day of the experiment. In the projection of the tooth root, granulation tissue. The ligamentous apparatus is represented by functionally active fibroblasts and young collagen fibers. Closer to the dentoalveolar junction and the cervical region, more Mature, thick-diameter collagen fibers are determined (Fig. 2).

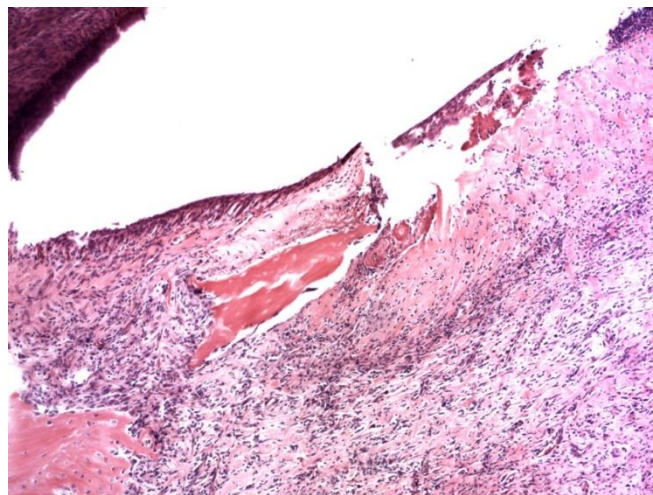


Fig. 2. Young collagen fibers and functionally active fibroblasts of the ligamentous apparatus of the tooth on the 10th day of the experiment. HC. 200.  
Hematoxylin-eosin staining

On the 14th day of the experiment, a moderate infiltration of limfoid elements with a small number of eosinophilic leucocytes was detected in the soft tissues and dentodesneval junction of the animal of the study group. On the 35th day of the experiment, the structures of the ligamentous apparatus represented by Mature collagen fibers with the correct orientation and fibroblastic cells are determined in the area of the tooth root. Bone resorption in these areas is not determined. Inflammatory infiltrate cells are not detected. In the projection of the tooth neck, in the gingival mucosa and submucosa, moderate infiltration by lymphoid elements is determined, which does not spread to the ligamentous apparatus.

In the control group, on day 14, focal destruction of fibrous structures of the ligamentous apparatus was detected in the perifocal areas of the periodontal area, marked fullness of microcirculatory vessels with capillarostasis and the presence of sludge complexes. Focal round-cell infiltrates represented by lymphocytes are also determined, but signs of functional activity of ligamentous fibroblasts are focal in nature and changes in the bone matrix of the alveoli are not determined. By the 45th day of observation, Mature collagen fibers of the ligamentous APPA-rat structure with the correct orientation and fibroblastic cells were detected in the projection of the tooth root in the control group animal. Inflammatory infiltration and resorption of the bone matrix in the field of vision is not determined.

Thus, the use of a course of injections leads to a decrease in the activity of the inflammatory process in experimental periodontitis, which was judged on the basis of positive dynamics of clinical observation and morphological research during 2 months of observation.

#### **ВЫВОДЫ:**

1. Clinical observation confirms the anti-inflammatory and regenerating effect of the drug, injecting hyaluronate into the area of operation improves the healing of soft tissues after laser curettage.

2. The studied drug stimulates functionally active fibroblasts and the formation of collagen fibers, which is confirmed by morphological data.

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CHOICE OF OPTIMAL SURGICAL APPROACH IN TREATMENT  
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