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GUIDED BONE REGENERATION BIOLOGICALLY TRANSFORMABLE MULTICOMPONENT GRAFT TO ELIMINATE BONE DEFECTS OF CRITICAL DIMENSIONS

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Relevance. The main reason for forming a bone defect of the jaw of critical size (BDCS) is odontogenic inflammatory diseases. The method of guided bone regeneration (GBR) is indicated to eliminate such defects. The use of bone-plastic biodegradable materials for GBR does not always lead to the desired result. Tissue engineering methods facilitate the production of tissue-cell transplants in the composition with biodegradable carriers when replacing BDCS. Therefore, studies aimed at studying the conditions that contribute to the qualitative restoration of the lost volume of bone tissue are relevant.

Aim: this clinical study aims to develop a method for repairing jawbone defects of critical size using a biologically transformable osteoconductive material into a multicomponent osteoinductive graft (MG).

Materials and methods. The patients included in the intervention study divide into two groups: 15 patients in the control group (A) and 15 patients in the experimental group (B). Both groups used biomaterials: an osteoconductive graft (OG), and a resorbed membrane (RM). In group A, the increase in the bone defect is carried out by GBR with the help of OG and RM. In group B, bone defects are treated with GBR supplemented with MG. Mesenchymal stem cells (MSC) were received by using the method of lipid aspiration from adipose tissue of the anterior abdominal wall. MSC were isolated enzymatically and placed in an incubator to increase the cell volume. Autologous platelet-rich fibrin (PRF) are isolated and combined with autologous blood serum, MSC and OG on the day of surgery. The resulting MG was placed in the BDCS. In both groups, biotransformation was monitored using cone-beam computed tomography (CBCT) and X-ray parameterization.

Results and discussion. CBCT and x-ray parameterization showed qualitative differences in augmentation and biotransformation in both groups six months and one year later. In Group B, the biotransformation of augmenting bone lasted throughout the volume of the defect. In Group A, the OG retained the same density.

Conclusions. CBCT and parameterization of the x-ray image show that the areas of biotransformation of the MG in Group B are comparable with the fields of healthy bone. The bone structure is formed throughout the thickness of the augmentation.