Elimination of jawbone defects by means of a biologically transformed multicomponent graft

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This clinical study aimed to develop a method for the elimination of bone defects of jaws by means of a biologically transformed multicomponent graft (MG).

Methods

Fifteen patients were observed, 10 in the control group (A) and 5 in the experimental group (B). Both groups used biomaterials from Botiss GmbH: an osteoconductive graft, Cerabone® (OG); and a resorbed membrane, Jason® (RM). In Group A, augmentation of the bone defect was performed by guided bone regeneration with OG and RM. In Group B, the bone defects were treated by guided bone regeneration augmented with an MG.

To prepare the MG for this purpose, the lipid aspiration method was used to take fat tissue from the anterior abdominal wall. Mesenchymal stem cells (MSCs) were isolated enzymatically and placed in an incubator to increase the numerical volume of the cell mass.

On the day of surgery, autologous platelet-rich fibrin (PRF) was isolated and combined with MSCs and OG. The MG obtained was placed in the prepared bone defect. In both groups, transformation control was achieved by cone-beam computed tomography (CBCT) and x-ray parameterization.

Results

The reorganization of OG in the MG stimulated the growth of bone throughout the area of the graft augmentation. 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.

Summare

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. Transformation of MG is much faster. The bone structure is formed throughout the thickness of the augmentation.