

Experimental Evaluation of the Effects of Ankaferd Blood Stopper and Collagenated Heterologous Bone Graft on Bone Healing in Sinus Floor Augmentation

ABSTRACT

In case of missing teeth, the use of dental implants is generally more difficult in the edentulous maxilla than in the edentulous mandible because of various complicating factors, as limited bone volume due to maxillary sinus pneumatization and alveolar resorption after tooth loss and poor bone quality. Maxillary sinus augmentation has frequently been proposed as the best option for attaining sufficient bone height and volume for implant placement in the posterior maxilla and for this procedure several grafting materials have been used for augmentation. The aim of this study was to evaluate the effect of collagenated heterologous bone graft (CHBG) and Ankaferd Blood Stopper (ABS), a plant extract, on bone healing after sinus floor augmentation. To the authors' knowledge, this is the first study of the effects of ABS on bone healing in sinus augmentation procedures. In 36 New Zealand rabbits 72 bone defects were created and bilateral sinus augmentation was performed. The maxillary sinuses were grafted with four different biomaterials: blood clot (control group), CHBG (OsteoBiol[®] Apatos Mix, Tecness[®], Giaveno, Italy) (graft group), ABS (ABS group), and ABS + CHBG (ABS + graft group). Material selection was done according to the blocked randomization method. Equal doses of graft materials were used, and mixed homogenously and the bone windows were covered with resorbable collagen membrane (OsteoBiol[®] Evolution, Tecness[®]). Twelve rabbits each were sacrificed at 1, 4, and 8 weeks after surgery and on all samples histochemical and immunohistochemical examinations were performed, showing that all the materials used in this study were biocompatible and did not elicit any foreign-body reaction. New bone formation started at the fourth week adjacent to the cortical bone walls, and by the eighth week it was seen in the center of the cavity in all groups. At the fourth week, new bone formation was greater in the ABS and ABS+graft groups than in the other groups. There were osteoclasts around the bone graft materials, but degeneration of the graft was seen only in the ABS+graft group at 4 and 8 weeks.

CONCLUSIONS

In bone regeneration procedure, collagenated heterologous bone graft (CHBG) has been used, thanks to its osteoconductive properties. CHBG proved to integrate well at host sites. In this study, this bone substitute was used alone and in combination with ABS. When used alone, there was no bone formation at the first week, but it increased gradually 1 to 8 weeks. Osteoclast numbers were high at the first week and declined thereafter. When used in combination with ABS, the bone formation rate was similar. Osteoblast density increased 1 to 8 weeks and osteoclast numbers were high in the first week and declined to 8 weeks.

From the results it is evident that in the ABS and the ABS+graft groups, new bone formation was rapid from 1 to 4 weeks, but by the end of the eighth week, new bone formation was similar in all groups. In all groups, new bone formation was increased from 1 to 8 weeks. According to these results, the Authors concluded that ABS may accelerate bone healing.

EXPERIMENTAL STUDIES

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