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Xenograft versus extraction alone for ridge preservation after tooth removal: a clinical and histomorphometric study

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ABSTRACT

In order to allow a proper implant placement from both esthetics and function points of view, it is fundamental to preserve as much as possible the ridge bone volume immediately after tooth extraction. In order to obtain this, different biocompatible materials and autogenous bone have been used to treat the bone atrophy of the alveolar ridges.
The purpose of this randomized clinical trial was to compare the bone dimensional changes following tooth extraction with extraction plus ridge-preservation using cortico-cancellous porcine bone and a collagen membrane. Moreover, the Authors analyzed and compared the histologic and histomorphometric aspects of the extraction-alone sites to the grafted sites.

40 patients who required tooth extraction and implant placement were enrolled in this study and randomly assigned to the control group (EXT; extraction alone) or to the test group (RP; ridge-preservation procedure). In this last group, cortico-cancellous porcine bone (OsteoBiol® *mp3*®, Tecnoss®, Giaveno, Italy) was packed into the socket and collagen membrane (OsteoBiol® *Evolution*, Tecnoss®) was hydrated in sterile saline and trimmed to completely cover the socket.

The clinical and histologic evaluations showed significant differences between the two treatments. The implants were placed at all sites, although some implants in the extraction-alone group showed a buccal dehiscence that required guided bone regeneration procedures after implant insertion. The bone biopsies taken from the control and test sites 7 months after the surgical treatment and the histologic and histomorphometric analyses showed a significantly greater horizontal reabsorption (4,3±0,8 mm EXT vs. 2,5±1,2 mm RP) and a greater ridge height reduction (3,6±1,5 mm) at the buccal side in the EXT group (RP: 0,7±1,4 mm). The vertical change at the lingual sites was inferior in the ridge-preservation group. The biopsies harvested from the grafted sites revealed the presence of trabecular bone, which was highly mineralized and well structured. The amount of connective tissue was significantly higher in the extraction-alone group than in the ridge-preservation group.

CONCLUSIONS

This study showed that the almost complete incorporation of the cortico-cancellous particles in bone created a dense and hard tissue network in which the porcine bone particles were completely surrounded by vital bone. The results obtained suggest that the ridge-preservation approach using porcine bone in combination with collagen membrane can limit the resorption of hard tissue ridge after tooth extraction. Moreover, the new bone formation observed between the porcine bone particles might indicate that the biomaterial is osteoconductive and acts as a natural scaffold for new bone formation.

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