

Microarchitectural study of the augmented bone following ridge preservation with a porcine xenograft and a collagen membrane: preliminary report of a prospective clinical, histological, and micro-computed tomography analysis

ABSTRACT

It is universally known that the loss of teeth results in the alveolar ridge resorption and atrophy. When the atrophy is severe, it creates unfavourable conditions for implant positioning, needing a proper ridge augmentation. Therefore, following tooth extraction, it is advisable to adopt one of the several techniques and biomaterials described in the literature so to preserve the alveolus. In literature there are reports of the successful application of several bone graft materials in ridge preservation. One of these materials is a xenograft of porcine origin that has recently been studied. It is a particulated, high-porosity, cortico-cancellous xenograft, maintaining the structure and composition of the natural collagen and hydroxyapatite. The aim of this prospective study was to investigate the integration of porcine xenografts used in ridge preservation by histological and micro-CT analysis, focusing on whether socket grafting interferes with natural bone healing. The patients enrolled in the study were categorized into two study groups: in the test group (group 1; nine patients) patients underwent socket preservation, while the sockets in the control group (group 2; eight patients) were left to heal without the use of socket preservation techniques. In group 1, the cortico-cancellous porcine bone graft (OsteoBiol® Gen-Os®, TecnoSS®, Giaveno, Italy) was packed into the socket and a porcine collagen membrane (OsteoBiol® Evolution) was used as occlusive barrier. After a 6-month healing period, bone core biopsy samples were obtained and implants were placed in all sites. Histological analysis of the bone core biopsy samples obtained from the augmented sites of group 1 revealed that particles of the bone substitute material were surrounded by newly formed trabecular bone in 8 out of the 12 cases. Histological analysis of the 12 bone core biopsy samples obtained from the non-augmented sites in group 2 revealed healthy bone formation in the extraction sockets. The findings of the micro-CT analysis were consistent with those of the histological analysis.

CONCLUSIONS

After a 6-month healing period, the bone volume was sufficient for implant placement in all sites. The analyses performed revealed that the particles of the xenograft interfere with bone healing in the augmented sites. However, socket preservation using a combination of porcine xenografts and collagen membrane successfully maintained the vertical and horizontal dimensions of the ridge. Therefore, the Authors concluded that *“in this study, socket preservation with the combination of a porcine xenograft and collagen membrane to maintain the bone volume of four-wall bone defects prior to implantation was utilized successfully”*.

ALVEOLAR REGENERATION

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ORIGINAL ARTICLE

Int. J. Oral Maxillofac. Surg.
2017; 46: 250–260

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