



ORAL SURGERY

Retrospective analysis of three different xenografts in maxillary sinus augmentation: histologic and three-dimensional radiologic study

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Objectives: Low bone density and lack of adequate vertical bone dimension as a result of maxillary sinus pneumatization present some of the most problematic cases for endosseous implant applications in posterior maxillary regions that hinder prosthetic rehabilitation. The overall objectives of the study were to assess the histologic, histomorphometric, and radiologic evaluation of biopsies gathered from maxillary sinuses that were grafted with three different bovine bone particles (Bio-Oss, Cerabone, and Ti-Oss) and analyze the volume of the bone graft and the quantity of new bone formation. **Method and materials:** Thirty-six patients with < 4 mm of residual ridge height unilaterally in the posterior maxilla were equally divided into three groups, each of which received different bovine bone particles for maxillary sinus augmentation. Six months later, biopsies were harvested for histologic and histomorphometric evaluations. Volumetric changes in maxillary sinus augmentation were

analyzed at 1-week and 6-month time-points following maxillary sinus augmentation surgery. **Results:** Histomorphometric and histologic analysis revealed a significant difference between the Ti-Oss group compared with the Bio-Oss and Cerabone groups ($P = .011$). In terms of residual graft particles and soft tissue, there were no significant differences between groups. 3D volumetric reductions between 1-week (baseline) and 6-month time-points recorded significant graft volume reduction in all groups ($P < .05$). Significantly greater bone resorption and lower new-bone formation were manifested in the Ti-Oss group in comparison to the other groups. **Conclusions:** Within the limits of this study, histologic and radiologic results indicated that Bio-Oss and Cerabone could be used efficiently in sinus augmentation procedures, while further prospective studies are needed to evaluate the Ti-Oss material in maxillary sinus augmentation. (*Quintessence Int* 2023;54:640–649; doi: 10.3290/j.qi.b4146671)

Key words: bone volume, bovine bone, endosseous implant, histomorphometry, maxillary sinus pneumatization, sinus augmentation