Histomorphometric analysis of the use of bone substitutes in maxillary sinus lift surgery

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Background: Pneumatized maxillary sinus and reabsorption of residual bone in the posterior maxilla after tooth extraction frequently require surgical procedures to restore bone tissue prior to the placement of dental implants. The use of reconstructive surgery aims at the increase of volume in the horizontal and vertical planes, making possible the future placement of dental implants. Currently, it has been widely disseminated to the diversification in the use of bone substitutes used in maxillary sinus floor augmentation (MSFA), strengthening comparative and randomized trials.

Aim/Hypothesis: In this context, the aim of the present study was to compare two grafting materials have been utilized for MSFA (Bio-Oss® and Lumina-Bone Porous®) through clinical, radiographic and histomorphometric data.

Material and Methods: In order to investigate, patients with edentulous design of the posterior maxilla, systemically healthy, with residual alveolar bone height ≤ 4 mm and that aimed at the future placement of dental implants, characterizing the two-stage therapy, were included in the study. These patients were submitted to MSFA bilaterally, using the bone substitute in a randomized way in relation to the surgical side and the biomaterial used (Bio-Oss® or Lumina-Bone Porous®).

Results: The results showed through cone beam computerized tomography (CBCT) a bone augmentation of the atrophic residual bone from 3.04 ± 0.84 mm to 11.36 ± 2.09 mm in Bio-Oss® and 2.39 ± 0.73 mm to 10.56 ± 1.87 mm in Lumina-Bone Porous®. The survival rate of implants placement after 6 months of repair in the grafting areas was (93.93%) + histomorphometric evaluation demonstrated 20.4 ± 5.4% and 22.8 ± 8.5% (P = 0.40) newly formed bone in the Bio-Oss® and Lumina-Bone Porous® respectively and 19.9 ± 8.6% and 14.6 ± 5.6% (P = 0.015) residual graft particles in the Bio-Oss® and Lumina-Bone Porous®, respectively.

Conclusions and Clinical Implications: Considering clinical applications, these results are relevant to guide the development and applicability of bone substitutes.