

Maxillary sinus lift with or without biomaterials in humans: radiographic and histomorphometric evaluation

Daniela Carmagnola - Antonius Khalil - Marilisa Toma - Laura Dal Pozzo - Guia Guenza - Nataliya Khomchyna - Daniel Karang - Claudia Dellavia

Università degli Studi di Milano, Dipartimento di Scienze Biomediche, Chirurgiche e Odontoiatriche, Milano, Italia

Biomaterials are frequently used for sinus lift procedures at the time of implant installation in the posterior upper jaw. Nevertheless, some authors have reported the possibility of leaving an empty space, in order to exploit the regenerative potential of the residual periosteal and bony walls following the Schneiderian membrane elevation. The aim of this study was to compare the radiographic changes and histological characteristics of newly formed bone following sinus lift without any biomaterials or Bio-Oss®. Fifteen patients with edentulousness of the maxillary molar-premolar area and a residual crest thickness < 6 mm, were randomly allocated to a test group (sinus lift without biomaterial) or a control group (with Bio-Oss®). Two submerged Astra Tech implants were placed in the most mesial and distal portion of the augmented area. Six months later, a bone biopsy was harvested in the area between the 2 previously placed fixtures, where a third central implant was placed. Standard radiographies were taken before sinus lift and 6 months later in order to measure and compare the vertical bone changes. The biopsies were processed for ground sectioning. All implants but one case were successful. Radiographically, the basic level of bone tissue in the test group (n=5) was 5 ± 0.86 mm and 3.5 ± 0.57 mm in the control group (n=10); in the test group the bone tissue was increased vertically of 10 ± 2.53 (range 7-13), in the control group 13 ± 1.41 (range 12-14). At histological observation, all samples showed new bone formation without signs of inflammation. Bone remodeling was observed in the apical portion of both groups. Residual particles of biomaterial were embedded in mineralized new bone. Histometric results for the control group were: LB 38.8% \pm 8.1, WB 9.2% \pm 2.4, BM 30.2% \pm 7.5, BO 21.7% \pm 8.9; for the test group: LB 54.5% \pm 2.1, WB 115.5% \pm 6.1 and BM 33.5% \pm 6.4. A clinically significant bone increase was achieved both with and without the use of biomaterials. The implants showed similar performances when inserted at sites augmented with or without biomaterials. The success of such procedure might depend on the anatomical conformation of the crest and on the level of surgical experience of the surgeon.

References

- [1] Thor et al. 2007 J Oral Maxillofac Surg; 65(7 Suppl 1):64-72.
- [2] Mordenfeld et al. 2010 Clin Oral Implants Res. May 24.

Keywords

Dental implants; sinus lift.