

Osteotome sinus floor elevation without grafting: a 10-year cone-beam CT evaluation

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Background: After tooth loss, alveolar bone resorption and pneumatization of the maxillary sinus occur. Consequently, the posterior maxilla often provides limited bone and implant rehabilitation in this region turns out to be a challenging procedure. Osteotome sinus floor elevation (OSFE) without grafting is a simple non-invasive and reliable approach for the rehabilitation of the edentulous atrophic posterior maxilla (Nedir et al. 2006, 2009, 2010, 2015). No long-term cone-beam CT (CBCT) evaluation has been found in the literature for implants placed using OSFE without grafting.

Aim/Hypothesis: The aims of this 10-year CBCT study are to evaluate bone height around implants and implant protrusion in the sinus and to compare the results obtained with measurements done on apical radiographs in our previous studies.

Material and Methods: The 10-year follow-up protocol was approved by the ethics committee for human research of Canton de Vaud (Switzerland; reference 393/12). Between April and December 2003, 17 patients (14 women and 3 men; mean age was 54.2 ± 9.6 years, range 38–69 years) were enrolled. Twenty-five implants (≤ 10 mm; Straumann AG) were placed in 17 patients using OSFE without grafting. The mean residual bone height was 5.4 ± 2.3 mm. Four patients showed membrane perforation detected before implant insertion, five had multiple implants inserted while one had bilateral sinus augmentation. CBCT examinations were performed using a CS 9300 unit (Carestream Health Inc.). Bone height around the implants and implant protrusion were measured on the mesial distal palatal and buccal sides of each implant. All measurements were done under identical conditions with the same magnification setting (700%).

Results: Fifteen patients (23 implants) attended the 10-year control but two of them (2 implants) refused the CBCT examination. CBCT images did not show sinus pathology, though three cases revealed membrane thickening around the implant with no clinical symptoms. Mean bone height around the implants was 7.85 ± 1.43 mm and mean implant protrusion in the sinus was 1.39 ± 1.04 mm.

Conclusions and clinical implications: This 10-year CBCT evaluation of implants placed with the OSFE without grafting technique confirms bone anchorage of implants especially on the buccal and palatal sides. Furthermore, it highlights the presence of endo-sinus bone gain through minimal implant protrusion in the sinus. Finally, this study confirms the measurements obtained on apical radiographs in our previous publications.