

Minimally invasive crestal approach sinus floor elevation using Densah burs, and Hydraulic lift utilising putty graft in cartridge delivery

Baron Tarun Kumar¹; Venkatraman Narayan²

¹Department of Periodontics, Babuji Dental College & Hospital, India; ²India

Background: Pneumatization of the maxillary sinus poses a great challenge for implant placement & restoration in the posterior maxilla. Direct sinus augmentation techniques have shown very good success rates, but the major drawback with this technique is patient satisfaction with regard to morbidity and waiting period for restoration. Today with innovative osseodensification burs and an innovative graft delivery system, crestal sinus augmentation can be used to achieve significant antral membrane elevation and enhanced stability of the implants even in low residual bone height (RBH).

Aim/Hypothesis: The aim of the study was to evaluate the efficacy of novel Densah™ drills to breach the sinus floor keeping the membrane intact and to use calcium phosphosilicate (CPS) putty™ for atraumatic, hydraulic sinus floor elevation with simultaneous implant installation and to evaluate their insertion torque values with reference to the RBH

Material and Methods: Twenty patients with a minimum of 2 mm of bone height from the crest of the ridge to the floor of the sinus, and 5 mm of minimum bone width were included as a part of the group. Residual bone height was measured preoperatively using CBCT scans. Periapical radiographs were used to evaluate the augmented height. All the patients were subjected to crestal sinus elevation using special densah burs to breach the sinus floor. Pilot drill was used to the depth determined within an approximate safety zone of 1.0 mm from the sinus floor. 2 mm densah bur was used in Densifying Mode. Gentle pumping motion was used to advance past the sinus floor as the haptic feedback of the bur was felt when reaching the dense sinus floor. After the use of 3.0 mm densah bur, the bone substitute was directly injected into the prepared sinus cavity via the cartridge delivery system. The hydrostatic pressure exerted by the CPS putty resulted in an atraumatic elevation of the sinus membrane. An appropriately sized implant was placed simultaneously.

Results: A total of 22 implants were placed in 20 patients. The residual bone height to the gained bone height at the time of sinus lift and 5 months post operatively were compared. The mean pre-operative bone height was 4.18 ± 1.25 mm, post-operative bone height after 6 months healing was 13.58 ± 1.06 mm. There were no maxillary sinus membrane perforations and osseointegration failures. All the implants were placed with good insertion torque even in cases where RBH was 2 mm. All the implants were loaded after 5–6 months of healing and followed up post-loading for a period of 6 months. All the implants were clinically stable and had no signs of peri-implant disease during a follow-up period of at least 1 year post-placement.

Conclusions and Clinical Implications: The use of Densah burs in densifying mode can breach the sinus floor with autografting without causing any perforation. The simplified minimally invasive antral membrane elevation technique is based on the application of hydraulic pressure by a viscous bone graft that acts as an incompressible fluid to atraumatically elevate the schneiderian membrane. Increased implant stability is achieved due to osseous densification of the Residual Bone by Densah bur. Thus, the proposed technique could be recommended for sites with minimal residual height.