

Maxillary Antroplasty with Augmentation Bone Grafting and Immediate Implant Placement

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Sinus elevations are an accepted treatment modality to provide sufficient vital bone for the fixation of dental implants. Many edentulous posterior maxillas are subject to alveolar ridge resorption and increased pneumatization of the sinus. The classical sinus elevation with simultaneous implant placement is indicated where there is adequate ridge height and volume to achieve primary stability of the implants.



FIGURE 1
Resorbed maxillary ridge

A 58 year old male patient presented requesting implants as a treatment modality for several missing posterior teeth in the upper quadrant after the loss of tooth #13. His natural teeth (#14, #15, #16) had been lost due to periodontal disease many years earlier resulting in a resorbed alveolar ridge (FIGURE 1).



FIGURE 2
Crestal incision



FIGURE 3
Sinus window expansion

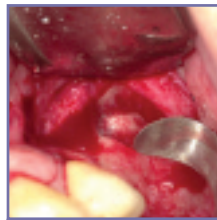


FIGURE 4
Sinus membrane exposure

Under local anesthesia, a crestal incision is made extending the length of the edentulous area and a full thickness mucoperiosteal flap is elevated and reflected (FIGURE 2). After the position of the sinus is determined with radiographs, an osteotomy of the buccal bone is

performed with a #6 round diamond bur. With the sinus membrane preserved, the bony fenestration is gently pressed inward carrying the underlying membrane along with it. The sinus window access is expanded with a Kerrison side cutting rongeur (FIGURE 3). Buccal bone fragments are preserved for additional autogenous graft material. Dissection and elevation of the

antral floor is performed with a Freer elevator (FIGURE 4).



FIGURE 5
Implant osteotomies



FIGURE 6
Dense HA — Radiographic marker

Three implant osteotomies were prepared with the assistance of an acrylic surgical template after performing an alveoplasty with a #6 round diamond bur (FIGURE 5). A synthetic, dense hydroxylapatite bone graft material was deposited along the perimeter of the elevated sinus membrane (FIGURE 6). The HA material adds a mineralized, slowly-resorbing

component to the composite bone graft materials and aids in the radiographic visualization of the total sinus augmentation fill.

DynaGraft-D™ DBM Putty (Keystone Dental, Inc., Burlington, MA) was used to augment the sinus void. DynaGraft-D™ is an osteoinduc-

(continued)



FIGURE 7
DynaGraft-D™ DBM

tive DFDBA offering the benefits of a bio-assayed human allograft combined with a reverse phase polymer carrier that assists in binding the bone particles and exogenous graft materials together in a cohesive mass (FIGURE 7). Additional graft materials were added, including a bovine HA, harvested, particulated autogenous bone and Ampicillin as a prophylactic antibiotic. This composite bone augmentation mixture contains materials that will quickly induce angiogenesis and vital new bone growth while the slowly resorbing materials aid in the mineralization, space maintenance and bulk fill of the grafted site.



FIGURE 8
Implant placement

Two BioHorizon® Maestro D4 - 4x12mm and one BioHorizon® Maestro D4 - 6x12mm wide platform implants (BioHorizons Implant Systems, Birmingham, AL) were placed into the prepared osteotomy sites (FIGURE 8). Ideal three-dimensional angulations and interproximal spacing was confirmed visually. Cover screws were inserted with a coating of Polysporin® antibiotic ointment. Once the implants are positioned, the graft material is checked to verify that the cavity fill is devoid of air pockets and extended to the lateral aspect of the maxillary bone.

An Inion® (Citagenix Inc., Montreal, Quebec) 30x40mm rigid resorbable synthetic membrane was trimmed and prepared for placement prior to surgery (FIGURE 9). The Inion® membrane is the only synthetic dental membrane that is soft and pliable for trimming, after



FIGURE 9
Prepared and trimmed Inion® membrane

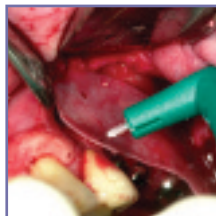


FIGURE 10
Fixated with Inion® resorbable tacks



FIGURE 11
Flap closure with Vicryl® sutures

being prepared in a plasticizer bath, and then becomes rigid in-situ from the absorption of moisture in the oral environment. The membrane provides a rigid, space-maintaining cavity for an ideal volume of bone regeneration for 8-12 weeks. It then begins to resorb naturally through the Krebs cycle into natural hydroxyl acids and is eliminated as CO₂ and water. The

softened Inion® membrane is positioned over the lateral wall window and fixated into place with the Inion® resorbable press-fit membrane tacks and tack applicator kit (FIGURE 10). The membrane will achieve 70% of maximum rigidity within 2-3 minutes of placement and will reach maximum rigidity within 30 minutes after the flap is sutured. Tension free primary flap closure was achieved with Vicryl® resorbable sutures (FIGURE 11).

A two stage submerged protocol was indicated. The patient did not wish a transitional appliance. Healing continues uneventfully. Ultimately, the prosthetic reconstruction will be completed within 7-9 months after implant placement.



Pre-surgical radiograph



Post-surgical radiograph