

Dr. Dale M. Gallagher, Oral and Maxillofacial Surgeon, presents

Practical Practice Pearls

For Dental and Medical Professionals

This newsletter is published monthly and contains useful information about current pharmacology and therapeutics, pathology, techniques, and procedures used for the management of diseases and conditions of the hard and soft tissues of the face and mouth. Please contact us to be added or removed from our fax list, and/or with your comments and suggestions for "Pearl Topics". Copyright 2003 by Dale M. Gallagher, DDS, PA, 12210 Pecan Street, Austin, Texas 78727 phone: 512 258-1636; fax: 512 258-6352; email: dgallagher@jawpain.com

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Sinus Lifts and Maxillary Healing

Did you know that if the entire maxilla (including the teeth) is fractured away from the upper skull *and* both the descending palatine neurovascular bundles are severed, then the maxilla will heal and vitality of the teeth will be unchanged? Oral surgeons have been performing LeFort I maxillary osteotomies to reposition the maxilla (often in multiple segments) for decades. Maxillary repositioning includes downfracturing the maxilla, passively mobilizing it, separating it into pieces, and stabilizing the bones (and teeth) into their new location. During this process the maxillary sinus mucosa (pseudostratified squamous ciliated epithelium...remember?) is removed from the maxillary sinuses. Bone grafts (autogenous and/or banked bone) are often placed in the sinuses and along the lateral maxillary walls. The bone heals because of blood flow through the collateral vascularization via the muscular and mucoperiosteal attachments, not because of the descending palatine or posterior superior alveolar arteries. The sinus membrane will regenerate with restored ciliary migration towards the semilunar hiatus opening into the nasopharynx below the middle turbinate.

What does mean regarding sinus lift grafts? First, the blood supply. The lateral maxillary and palatal mucoperiosteal tissues provide the blood supply to healing sinus lift grafts, not the maxillary sinus mucosa. Point 1: Respect the mucoperiosteum.

Second, the sinus mucosa (Schneiderian membrane) at best is 1-1.5mm thick and very fragile, but more often than not its texture is like wet Kleenex. If the patient has lived in central Texas for very long, then the mucosa is erythematous, thickened and interspersed with seropurulent islands (mucocèles). It is often difficult if not impossible to elevate ("lift") the mucosa. Point 2: If the mucosa cannot be elevated, scrape all of it off the bone inside the area of the sinus that requires augmentation.

Third, the maxillary bone. Whereas the bony wall of the sinus is vascularized by the lateral and palatal mucoperiosteum and is often thin, this does not mean that the internal bony surface (where the graft will be placed) has a very good blood supply. Point 3: Multiple tiny perforations through the maxillary wall aid blood flow into the graft on the other side of the bone.

Fourth, the graft. Banked or autologous cancellous bone is the graft substrate of choice. Autologous platelet rich plasma accelerates healing and acceptance of the graft, particularly when it is lightly packed along the sinus floor. (See Pearl Topics October 2003 for more about PRP). Point 4: Use PRP mixed with the bone graft.

Here is a sinus lift technique, presented both with and without simultaneous implant placement. Local anesthetic is generously infiltrated throughout the posterior buccal mucosa, but only a small amount of it is injected at the junction of the soft and hard palate. A #15 blade is used to make an incision at the depth of the buccal vestibule in the first through second molar region. Subperiosteal dissection reveals the lateral maxillary wall. A horizontal 1cm x 2cm oval window is made into the sinus with a large round

bur, taking care to remove bone without damaging the sinus mucosa. A broad, flat elevator elevates the mucosa from the bone while the patient is instructed to "sniff". This causes a slight vacuum in the sinus which helps elevate the mucosa. It is important to elevate the mucosa from the medial and posterior sinus walls, as well as the floor of the sinus. A 701 bur is used to make multiple holes in the lateral maxilla, perforating the sinus where the graft is to be placed. The graft (PRP with bone) is lightly packed into the sinus, commencing from the posterior-medial to the anterior-lateral dimensions. The wound is sutured, then it is sprayed with PRP. Bone is solid enough to accept an implant after the graft has healed 6 months. Certainly, bony maturation continues for many more months, and even years, after the graft has been placed.

If there is sufficient alveolar bone between the alveolar ridge and the floor of the sinus, then we prefer to place an implant through a "cookie-cutter" hole in the gingival crest after the sinus membrane is elevated. The PRP-bone graft is packed around the implant as the sinus is filled. The gingiva is not elevated and no sutures are placed around the implant. The implant is ready to be loaded in 6 months.

About 15 years ago a patient requested an implant to replace #14. Both #13 and #15 were present and very healthy, but the maxillary sinus dipped between them to reveal about 6mm of alveolar bone. I placed a 12mm x 5mm threaded titanium fixture into the alveolus. I also packed banked bone granules into the sinus and around the implant fixture that was exposed within the sinus. I do not remember if I "lifted" the sinus membrane, but as it was my first simultaneous implant-sinus grafting procedure I probably shredded the membrane. Well, it worked. She still has the implant and chews on it every day. The bone definitely solidified around the implant. To avoid challenging good fortune I try not to ponder too much about why the bone healed. However, as blood flow to a graft is the foundation for healing, my compulsive scraping of the sinus floor probably perforated the bone and stirred up bleeding and, hence, good blood flow nourished the wound. We still perform small sinus lifts without PRP, and sometimes use bone clips from the maxillary tuberosity.

These are some points about sinus lift grafting that we hope will help you as you consider treatment options for your patients that are missing posterior maxillary teeth. Of course, there are many other related patient care tidbits (medications, postoperative instructions, *etc.*), but there is no more room to discuss that here. As with all surgical techniques, there are modifications that may yield excellent results (like alveolar crestal incisions with superior elevation of buccal flaps). If it makes biological sense, give it a try.

One quality that makes our job fun is no two patients are alike, and treatment plans must be formulated for individuals. This means there is no substitution for exemplary communication between the surgeon and the restorative dentist during all phases of planning and treatment.

Please call us if you would like to talk about sinus grafts, dental implants, or other oral surgical care.