A simplified, minimally invasive sinuslift technique using autogenous bone

By Drs. Samuel Lee and Grace Lee, DDS

Implant dentistry in posterior maxilla has often been a challenge due to pneumatised sinus. Bone-grafting in sinus cavity is known to be very unpredictable with good long-term success.

There have been several surgical techniques suggested for sinuslift such as lateral window (Cald-Well Luc), osteotome (Summer’s) technique, Hydrobo sinus lift, etc. However, lateral window techniques some what invasive with many complications and postoperative pain involved. In contrast, Summer’s and Hydrobo Sinus procedures are less invasive, but more technique sensitive.

This author developed a very simple and predictable way to lift Schneiderian membrane and at the same time collect autogenous bone. This procedure can be done with or without flap with minimal postoperative discomfort. The author named the procedure ‘The WaterLESS technique’ and was awarded the table clinic award at 2007 American Academy of Implant Dentistry’s annual meeting at Las Vegas.

Conventional implant osteotomy technique utilises ample amount of irrigation at 800-1600 rpm in order to prevent overheating a bone. However, utilisation of water washes out bone particles collected at implant drills. In contrast, WaterLESS technique is drilling at 40 rpm at 50 Ncm without irrigation. This low speed prevents bone heating, allows bone collection, and increases tactile sensitivity.

Using the right shape burs and without water at low speed, implant clinicians can collect autogenous bone as much as 0.5 cc per osteotomy site in 2 bone (Figs. 1a and 1b).

With conventional osteotomy technique at high speed, the surgeon can’t feel anatomical structure of bone as well as in slow WaterLESS technique. Utilisation of WaterLESS technique allows clinician to feel the cortical layer of bone.

This is helpful in determining angulation of implant to avoid perforating lingual structure of posterior mandible (Fig. 2a), buccal plate of anterior maxilla (Fig. 2b), avoid hitting distally angulated roots (Fig. 2c), and by passing 1A nerve (Fig. 2d and e). Due to slow speed of this technique, even direct contact with artery, nerve and Schneiderian membrane are more forgiving.

WaterLESS technique allows dental surgeons to differentiate the sinus floor, which is more highly dense cortical bone, by tactile sensitivity. With aid of radiograph, approximate length to the floor is calculated and implant drill is used to

Fig. 1a: Collection of autogenous bone from osteotomy site.

Fig. 1b: Approximately 1 cc of autogenous bone collected from two 1X10 mm D3 bone osteotomy sites.

Fig. 2a: WaterLESS technique allows surgeon to feel the lingual plate, therefore preventing perforation at lingual of posterior mandible.

Fig. 2b: WaterLESS technique allows surgeon to feel the buccal plate, therefore preventing perforation of facial plate at anterior maxilla or mandible.

Figs. 2d and e: 1A nerve at #18 area is located buccally and superiorly. With careful planning 3X10 mm implant placed lingually by passing 1A nerve.

Fig. 3a and b: (Pre-op panoramic and cross section, note only about 3 mm of bone height available.)
reach just before the sinus floor with WaterLESS technique. While making the osteotomy, autogenous bone is collected for later use (Fig. 1).

Use series of tapping drill to condense the bone laterally if the bone is too soft (Fig. 4a), then elevate the floor with larger tapping drill going just 1mm deeper (Fig. 4b).

Sinus membrane has some flexibility, so often it allows 1mm of elevation without perforation. Once floor is fractured, this author packs gauze into the sinus to elevate the Schneiderian membrane, then remove the gauze and adds resorbable membrane. This author also invented ‘roll technique’ to introduce resorbable membrane into the sinus cavity to better maintain grafts (Figs. 5a, b).

Figs. 3a and b: Resorbable membrane is inserted under elevated sinus membrane. This author prefers to use Lambone from Pacific Tissue Bank, Calif.

After membrane placement, bonegraft is added slowly using a non-end cutting bur in reverse direction. This pack technique packs bone laterally (Fig. 6).

Fig. 6: Packing bone in reverse direction to distribute bone laterally within sinus cavity after packing and removing sterile gauze.

Wide diameter or implant with larger platform than body is ideal for internal sinus lift, since larger platform will resist the implant accidently going into the sinus in case of low primary stability. The author
prefers palatal incision when doing this procedure. However, in severely resorbed ridge, greater palatine artery can be quite close to incision line, so caution is recommended.

The reason for palatal incision is that if the perforation of sinus membrane is occurred, simply we can close up the flap and avoid chances of getting oral antral fistula. Placement of non-resorbable membranes is recommended for thin gingival type and thin sinus floor. Then simply reattempts the same procedure in 2-3 months depending on the size of perforation.

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*Posture problems: Risk or Checked? DPF Medical, October 2007, Author: Professor Ove Holmberg

About the authors

Samuel Lee, DDS, is a UCLA graduate in both Dentistry and Microbiology. He is in private practice in Buena Park, Calif, with his wife, Grace Kang-Lee, DDS, who is also a UCLA graduate in Dentistry and Psychology. He lectures nationally about dental implants, orthodontics using implants and practice management. This case study was originally presented at the American Academy of Implant Dentistry’s 2007 Annual Meeting. Dr. Lee is the recipient of 2007 American Orthodontic Society Annual Meeting’s Rest Table Clinic Award, and also the 2007 American Academy of Implant Dentistry’s Annual Meeting’s Table Clinic Award. For more detailed description on the Waterless technique, please contact Dr. Samuel Lee’s office for future educational events. For more information, call (714) 759-7175 or check out his Web site online at www.firstchoiceentalgroup.com

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Planning for success: the restorative/surgical interface
By Dr David R Bloom, Dr Jay Padayachy and Dr Guy McLellan

Historically, the surgical placement of dental implants (especially in the anterior maxilla) has relied solely on where the surgeon felt he or she was able to place them, depending on the location of the bone itself, rather than on where the restoring dentist would ideally like them to go. The longevity of implants is now so assured that just having an implant in function is no longer regarded as a success, unless it fits in with the rest of the dentition, both in terms of position, soft-tissue health and aesthetics. The management of the soft tissue has become crucial to the overall success or otherwise of a case.

Preparing for treatment
It doesn’t matter whether the dentist is placing and restoring or just restoring and referring for placement. What is paramount is correct diagnosis and treatment planning. This all begins with a comprehensive examination, digital radiographs and digital photography, study models, and understanding or managing the patient’s expectations.

If we look at the placement of a single implant in the anterior region (this is demonstrated in the case studies), we need to consider:

1. When was the tooth lost? This is relevant to whether there is enough bone in both the vertical and horizontal planes. Whilst vertical defects may require a bone graft a horizontal (bucco-lingual) defect may be amenable to a connective tissue graft as long as the ridge is not too knife-edged thus contra-indicating ridge expansion. Thus bone sounding and a sectional CT scan may be appropriate.

2. If the tooth is present, is there infection and how much bone has been lost? This could necessitate a period of healing prior to implant placement and thus require tempromisation. Immediate placement (at time of extraction) and immediate loading (using an abutment, temporary or permanent, to connect a temporary crown at implant placement) are becoming more commonplace, which we shall discuss below. There are even prefabricated permanent abutments available and some of these actively encourage tissue maturation – Nobel Biocry.

Consider final positioning
When planning, it is important to consider the final positioning of the restored implant itself. For example, work backwards from positioning to placement, rather than placement to positioning. Thus, a wax-up may be required as you would do for a smile-design case or a large class-four composite build-up. This will demonstrate where the abutment needs to emerge from the soft tissue and hence where the implant requires to be placed and if there is a need for an angled abutment fixture head. From this, a surgical stent is made to allow accurate placement of the implant.

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Immediate placement can be contra-indicated if infection is present, but some authors advocate thoroughly curtailing the socket and using tetracycline paste to limit post-operative infection, allowing immediate placement even in cases with peri-apical granulomas. It is the author’s preference, however, to delay placement in these cases by six to eight weeks.

If good insertion torque (55 Ncm+) can be achieved, one can consider immediate loading. Some palatal inclination of the apical one-third of the implant can make this more easily achieved and some newer implant systems, such as the Nobel Active, also facilitate good insertion torque.

If it is possible to immediately load, one can use a laboratory-constructed provisional cemented onto a temporary metal abutment post and temporary coping, but ensuring that the provisional is not in occlusion. Alternatively, if required, temporary can be achieved with a Roche bridge if the implant is not to be immediately loaded. Roche bridge is favoured over a Maryland as this is easier to remove and re-cement as necessary.

Some authors will only make this lab-made temporary crown and use it as above if it immediately loading OR convert this crown into a pontic and use fibre technology to cement it as a temporary bridge if the correct insertion torque cannot be achieved. This allows a ‘get out of jail card’ if the implant cannot be immediately loaded. One of the stated advantages of not repeatedly unscrewing healing caps or temporary abutments is that there is less disturbance of the bony desmosome soft tissue attachment.

Bulking soft tissue
At the time of implant placement the soft tissue can be bulked out if required with a connective tissue graft (free or pedicled) or using guided bone regeneration. A more simple technique is to pack Bio-oss particles into the buccal tissues without a membrane. Although it is unlikely that much functional bone will be formed, the particles are stable over the long term and act as a ‘filler’. Larger defects are treated with bio-oss and double layer Bio-gide technique. The importance here is to achieve tension free closure with advancement techniques and periosteal release. This will require a two-stage approach.

If the implant is left for three to six months to integrate, a further appointment will be required to expose the fixture head and to place a healing cap. At this stage, a further graft or taking a roll of palatal tissue can be used. This enables the surgeon to refine the soft tissue contour and give a root form appearance to the soft tissues. The surface is de-epithelialised and a reverse ‘D’

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