Bone grafting techniques:

A tunnel approach reduces exposure of vertical grafted bone

Bone grafting procedures prior to implant placement have become more and more routine and can be performed using a variety of different techniques. The use of autogenous bone is still the most common method. By observing biological concepts and performing atraumatic surgery, consistent results and long-term stability can be obtained.

Wound dehiscence, with exposure and infection of the augmented bone, is the main complication of bone grafting procedures, especially when a vertical onlay block graft is used. The incidence of this complication is clearly increased in patients who smoke. Using a tunnel preparation, with just a vertical incision mesial of the bony defect, preserves the blood supply of the soft tissue cover and reduces the risk of flap necrosis.

This process, which was originally described for absolute augmentations of the edentulous mandible, has been developed to provide excellent protection of the augmented bone during healing. For access, just one (or in some cases two) vertical incisions are performed, and the flap is raised by a periosteal elevator to provide space in the form of a tunnel. Through this tunnel, bone blocks can be fixed with mini screws, either as a lateral graft or using a 3D reconstruction. A periosteal dissection is not usually necessary to maintain enough space, and there is no disturbance of blood flow during or after surgery. The flap can be easily sutured with 6/0 resorbable material without creating much tension.

Using this technique, the incidence of soft tissue dehiscence or tissue necrosis compromising the grafted bone is reduced to a minimum of less than 2% in the postoperative healing period. This is due to the absence of any crestal incision compromising the vascularisation, and ultimately the regeneration of the bone graft. The resulting flat vestibule can be corrected by the Kazanjian vestibuloplasty during implant insertion in the mandible, and during second-stage surgery by an apically repositioned flap in the maxilla.

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Figure 1. Tunnel preparation with exposure of the vertical bone defect in the right maxilla.

Figure 2. The first thin block is screwed in at 9mm over the bony defect, parallel to the sinus floor preparation.

Figure 3. Vertical 3D reconstruction and sinus lifting (the sinus window is closed with a titanium membrane) using a tunnel approach without a crestal incision.

Figure 4. Clinical situation after wound closure without any crestal incision.

Figure 5.

Figure 6. Clinical appearance 3 months post-operative.

Figure 7. Two implants inserted in the well-regenerated alveolar crest.

Figure 8.