Sinus Floor Augmentation with Guided Bone Regeneration (GBR)

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Clinical case by Dr. Andres Stricker

The most important evidence for the suitability of a osteoconducive bone substitute for Guided Bone Regeneration (GBR) can be found in a histological analysis. It is the measuring criteria for any results pertaining to bone regeneration. Apart from the osteoconductive properties of bone substitute materials, good volume stability and exceptional handling are of equal importance when discussing sinus floor augmentation. The choice of a procedure as well as the healing period is, to a large degree, dependent upon the residual bone height and the addition of autogenous bone.

Aim of the procedure

Elevation of the schneiderian membrane for bone augmentation at the primary stabile implant located in the posterior maxilla.

Figure 1: Lateral approach after detaching the bony lid. The Scheiderian membrane is easily visible.

Figure 2: Straumann® BoneCeramic is applied through the lateral window mesialy distally and palatally to the implant in the subantral space. The implant is placed primary stabile.

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Figure 3: Particles of bone harvested from the Tuber region are covering the implant surface.

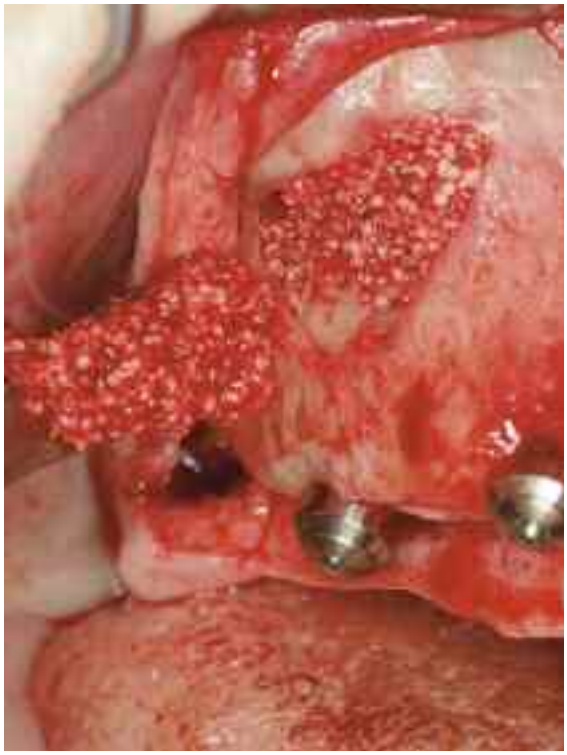

Figure 4: The remaining space to be augmented is filled to the bone wall with Straumann® BoneCeramic. The excellent adhesive properties of the granulate facilitates easy handling.

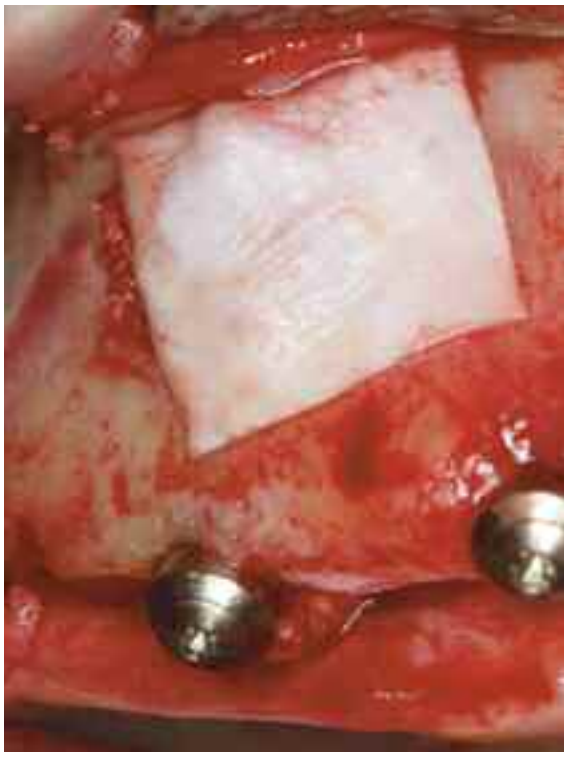

Figure 5: The lateral window is covered with a membrane to protect the grafted defect from soft tissue ingrowth, and to prevent dissemination of graft material. The soft tissue flap can now be repositioned.

Figure 6: The postoperative radiograph shows the augmented sinus floor and the inserted Straumann implants.

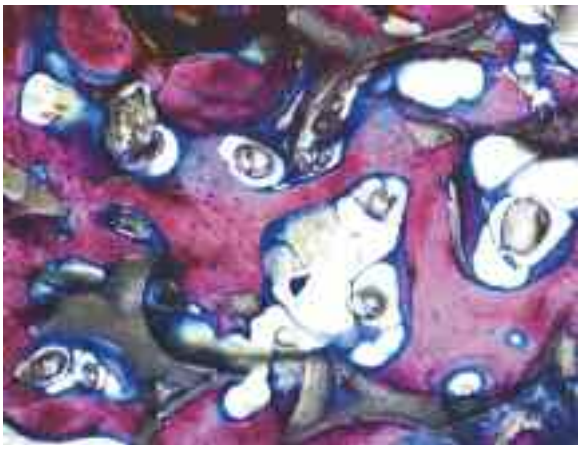

Figure 7: Histological specimen of another clinical case of a sinus floor augmentation, where implant placement was done six months after the augmentation procedure. Straumann® BoneCeramic (dark colouring shown in the corresponding Fig) is well integrated into the bone structure. The trabecular architecture of the bone corresponds to the natural structure of the native bone. Clear signs of bone maturity with lamellar bone are evident (*).

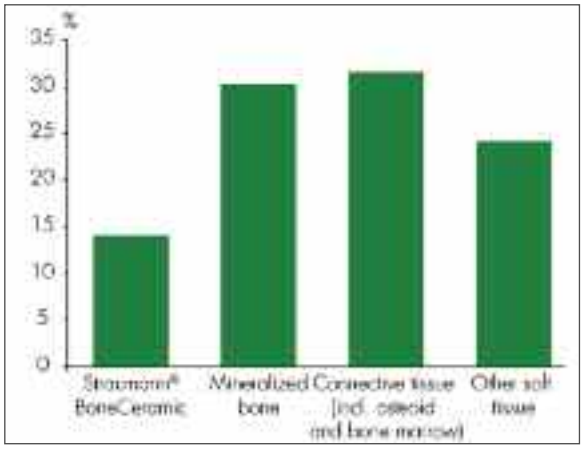

Figure 8: Histomorphometrical analysis six months after augmentation shows a high ratio of mineralized bone tissue.

Practical considerations based on Dr. Stricker's Case

Residual bone height determines the operative procedure

Variable approach

- Residual bone height is less than 3 mm: Primary stability can not be guaranteed. there is danger of micromotion of the implant with the resulting inadequate osseointegration.
- Residual bone height is between 4 and 8 mm: simultaneous implant placement.
- Residual bone height is more than 8 mm: An internal sinus lift using an osteome technique can also be employed.

Mixture with autogenous bone

"I prefer a 50/50 mixture of Straumann® BoneCeramic with autogenous bone, when dealing with minimal residual bone height. For the most part I use an autogenous bone graft from the retromolar or the tuber region. When dealing with larger residual bone height I reduce the amount of autogenous bone to approximately 20 % to cover the implant surface" (Dr. Stricker).

Healing period with the two-stage approach

"Depending on the residual bone height and mixture with Straumann® BoneCeramic and autogenous bone, I adhere to a healing period frame of four to six months prior to implant placement" (Dr. Stricker).

Elevation of the Schneiderian membrane

After mobilization of the soft tissue flap with a palatal cutting technique and a mesial relief incision the lateral wall of the sinus floor is reflected. Afterwards, removal of the bony lid to prepare for a lateral approach starts by using a cutter and drill. Careful detachment of the schneiderian membrane palatal with a sinus lift instrument is the next step. the bony lid is then mobilized apically into the intact schneiderian membrane. On the one hand, it provides the source of the bone cells, which will grow into the augmented space via the osteoconductive surface. on the one hand, the bony lid eases the stabilization of the autogenous material.

Straumann® BoneCeramic has excellent absorption properties for blood and is very simple to apply. It is delivered in a unique double blister packaging. This allows the granules to be moistened within the package. the particular triangular shape facilitates removal of the wetted granules. In this regard, using Straumann® BoneCeramic is very user-friendly.

Prosthetic Restoration

Implant loading will usually take place four to six months after implant insertion.