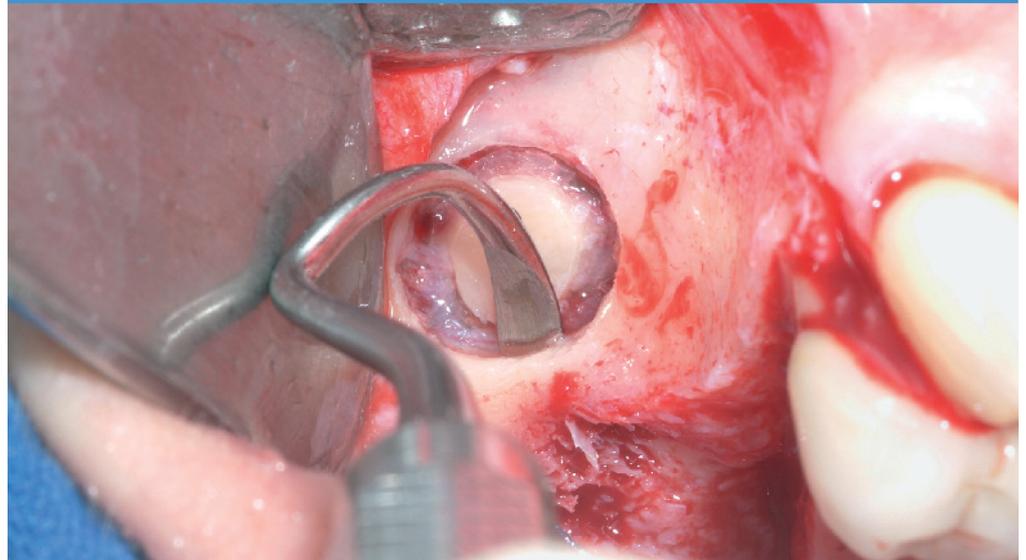


# Sinus Floor Augmentation



Treatment concept of Dr. Pascal Valentini,  
University of Corsica, France



- > Sinus floor augmentation with lateral access, simultaneous and staged
- > Avoiding autogenous bone grafts
- > Dealing with septa and perforations of the sinus membrane

## 1. Indication profile

Augmentation technique depending on residual bone height

- standard implantation without augmentation > 8 mm residual bone height
- osteotome technique: not applied
- one-stage procedure > 2 – 3 mm bone height
- two-stage procedure < 2 – 3 mm bone height

Addition of autogenous bone

- yes
- no

Membrane application

- over the lateral window
- in case of perforations of the sinus membrane to cover the tears

Implant loading

- 2 months after implantation for two-stage procedure
- 4 months after augmentation and implantation
- 6 months after augmentation and implantation for one-stage procedure

## Background information

### Avoiding autogenous bone

Dr. Pascal Valentini:

«I entirely dispense with using autogenous bone in sinus floor augmentation. Various clinical studies with histomorphometric analysis have demonstrated that using autogenous bone only, or in combination with bone substitutes, does not lead to an amelioration of the clinical outcome (1). Grafting of the bone, however, extends the operation time, creates a new surgical site and complicates the course of surgery. The successful use of Geistlich Bio-Oss® alone in sinus floor augmentation has been demonstrated in various publications (3,4,5). Hence I only use Geistlich Bio-Oss® for sinus floor augmentations without any addition of autogenous bone. Yet, I make sure I keep Geistlich Bio-Oss® in close contact with the bone walls. At these contact sites new bone will grow in. Therefore, I use small granules of Geistlich Bio-Oss® (0.25 – 1 mm particle size).»

## 2. Main emphasis of this case presentation

- › Clinical procedure for one- and two-stage procedure without use of autogenous bone. Tips and tricks for preparing the lateral window, dealing with perforations of the Schneiderian membrane or with septa.

## 3. The lateral window technique – Surgical procedure on the basis of a case with two-stage approach



Fig. 1 Clinical situation pre-operatively.

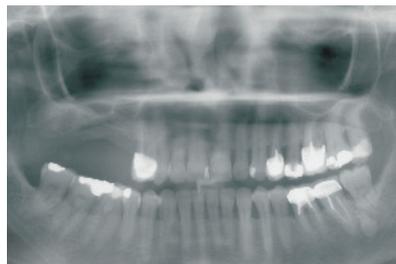


Fig. 2 Atrophied posterior maxilla with insufficient bone height (<2-3 mm).



Fig. 3 Alveolar ridge incision with releasing incisions along the sulcus of the adjacent tooth.



Fig. 4 Raising of the mucoperiosteal flap after mesial releasing incisions. Initially the detachment of the bony lid is performed either with a diamond bur or an ultrasonic end piece.



Fig. 5 For final detachment of the bony lid an ultrasonic instrument is used.



Fig. 6 Careful elevation of the Schneiderian membrane from the bone walls with a raspatorium.



Dr. Pascal Valentini: "In most of the cases I push the bony lid inside the subantral space. Geistlich Bio-Oss® granules, which are applied subsequently, are thereby stabilised. Moreover the complete removal of the bony lid would increase the risk of perforating the sinus membrane."

Fig. 7 The bony lid is left in the subantral space.



**Fig. 8** A perforation of the Schneiderian membrane that occurred during surgery is covered with Geistlich Bio-Gide®.



**Fig. 9** Geistlich Bio-Oss® completely fills the lateral window aligned with the buccal bone wall.



After application of Geistlich Bio-Oss®, Geistlich Bio-Gide® is positioned over the lateral window. Clinical investigations have demonstrated that application of membranes over the lateral window increases the implant survival rate significantly (2).

**Fig. 10** The lateral window is covered with a Geistlich Bio-Gide® membrane.



**Fig. 11** The incisions on the ridge and the releasing incisions are sutured with resorbable 4.0 suture material. Postoperatively patients are instructed to clean this region with a soft brush (Inava® post-op 7/100) and 0.12 % chlorhexidine.



**Fig. 12** Post-surgical radiograph shows the augmented region and the implants inserted.

## 4. Tips and tricks for the surgical procedure (with examples from different cases)

### 4.1 Implantation and bone augmentation – Simultaneously or staged?

Dr. Pascal Valentini: “Today’s modern implants possessing a micro-thread and conical form allow primary stability at a bone height of 2–3 mm. Thus simultaneous implantation and bone augmentation can be carried out more often than in the past. The simultaneous procedure should not be chosen if bone quality is particularly bad. This includes absent cortical bone or deep defects on the crest of the ridge. In this case a staged approach should be chosen.”

#### 4.1.1 The simultaneous approach

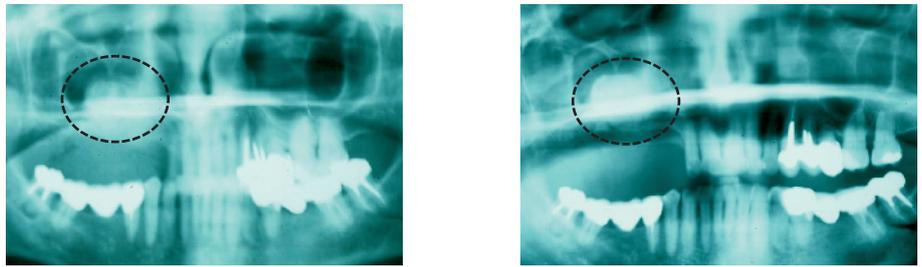
Dr. Pascal Valentini: “When implantation and augmentation are performed at the same time I generally load implants 6 months after implantation. Ongoing clinical investigations are analysing whether reduction of this healing process to 4 months is possible.”



After filling Geistlich Bio-Oss® into the subantral space the implant is slowly inserted.

## 4.1.2 Healing time for the staged approach

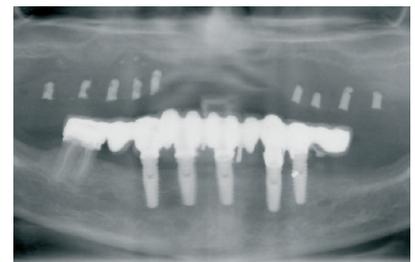
Dr. Pascal Valentini: “As a general rule implants may already be inserted after a healing period of 4 months as the bone formation takes place in the first 3 months after the augmentation surgery. This is confirmed by the radio-opacity in the radiograph 3 months after augmentation. Implants with rough surfaces can be loaded 2 months post-operatively.”



Radiographic picture shows low radio-opacity on the day of surgery (left picture). The radio-opacity of the augmented area 3 months postsurgically (right picture) reveals an advanced mineralisation process.

## 4.2 The window

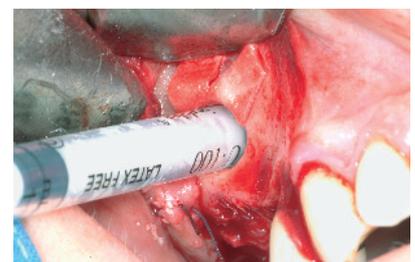
Dr. Pascal Valentini: “The position of the lateral window is generally chosen close to the mesial wall of the sinus at a distance of approximately 2 mm. The relative position of this wall to the apex of the tooth next to the edentulous area can be determined by using a panoramic radiograph. In the case of an edentulous maxilla, a surgical guide stent with radio-opaque marks may be used to visualise the position. In addition, the measurements of the sinus floor have to be transferred to the surgical site.”



Panoramic radiograph of an edentulous maxilla. The surgical guide stent allows the positioning of the lateral window to be determined relative to the mesial wall.

## 4.3 Size of the window

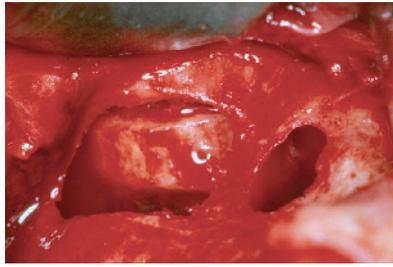
Dr. Pascal Valentini: “I am keeping the diameter of the lateral window as small as possible in order to allow the largest contact surface between Geistlich Bio-Oss® and the bone wall. In addition, it provides stability for the bone substitute. The window is therefore a little larger than the diameter of the syringe I use to insert Geistlich Bio-Oss® into the subantral cavity.”



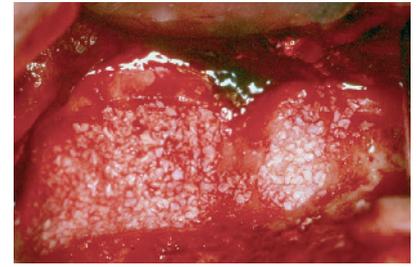
Geistlich Bio-Oss® granules are inserted in the subantral space. In this case a disposable syringe was used (tuberculin sterile syringe, 1 ml). The tip of the syringe is cut in order to fill it with Geistlich Bio-Oss®.

## 4.4 Septa

Dr. Pascal Valentini: «When a septum is detected by the radiograph and the insertion of the bony lid is impossible, two separate lateral windows have to be established, one mesial and the other distal to the septum. The bony lid has to be removed completely and the sinus membrane is detached with caution.»



In the case of a septum, two separate lateral windows have been prepared.



Application of Geistlich Bio-Oss® from both windows.

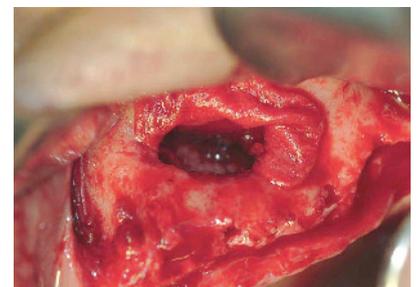
## 4.5 Avoiding perforations of the sinus membrane

Dr. Pascal Valentini:

1. At the beginning of the osteotomy, in the case of a thin bony wall, I recommend blunt diamond burs or, even better, ultrasonic instruments.
2. Initially, when the first 2 mm of the bony lid is detached, it is advantageous to use a disc-shaped ultrasonic end piece.
3. The presence of septa or osseous irregularities (e.g. extraction sites, tooth roots that extend into the antrum) increase the risk of perforations of the sinus membrane. Scar tissue is strongly adherent. Therefore, I use an ultrasonic end piece in order to release the bone without damaging the sinus membrane.”

## 4.6 What to do when perforations of the sinus membrane occur?

Dr. Pascal Valentini: “The sinus membrane should be carefully detached from the bone wall at a reasonable distance from the perforation, thus loosening tension from the membrane and reducing the size of the perforation. According to my experience a dry Geistlich Bio-Gide® should be subsequently placed over the perforation. Only after the Geistlich Bio-Gide® is positioned a flat instrument can be used to moisten Geistlich Bio-Gide®.”



Geistlich Bio-Gide® in situ, covering a perforation of the Schneiderian membrane.

## Literature references

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