

ONE-STAGE MAXILLARY SINUS GRAFTING USING A MODIFIED SURGICAL CONCEPT

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Summary: This modified surgical procedure that permits an implantation simultaneously with sinus floor elevation procedure even when the original bone is very thin. The surgical technique and its benefits were described and discussed.

Key words: Maxillary sinus; Graft

Introduction

Maxillary sinus mucosa elevation (sinus lift procedure) is a recommended procedure to increase the insufficient vertical dimension in the posterior maxillary site in order to place implant of sufficient length there (1,4). This procedure can be performed as a one-stage procedure (simultaneous sinus grafting and implant placement) when the original bone height is sufficient (more than 3 mm) to stabilize the implants during the healing period; otherwise a two-stage procedure should be used (implant placement is performed later, 6–9 months after sinus grafting) (Fig. 1). By this way, the implant can be loaded approximately after 9 months using one-stage procedure and nearly after 15 months with two-stage procedure (2,3).

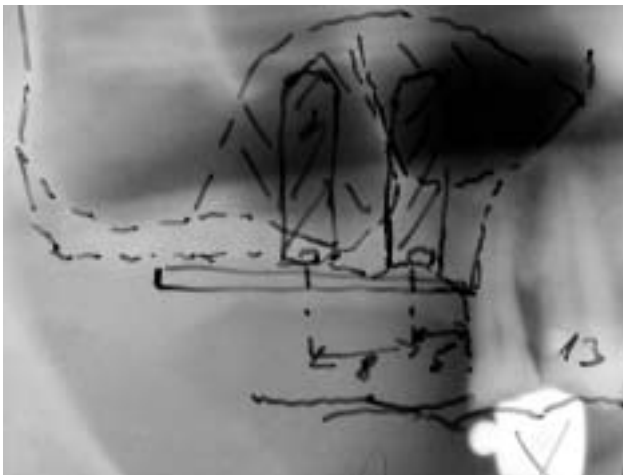


Fig. 1: In the case of a remaining maxillary alveolar bone thickness less than 2 mm, the risk of an implant drifting into the maxillary sinus can occur.

In this report the authors present how the one-stage procedure can be performed when a portion of the sinus floor is thin and the remainder is thick enough to enable the usage of Sinus-Implant Stabilizer (SIS) that serves as a transitional modified stabilizing device to the implants until maturation of the graft material creates sufficient implant osseointegration.

The SIS system consists of

- A thin titanium plate with holes of two different diameters: Relatively big holes are designed for the implant cover screws and smaller holes for the stabilizing screws (Fig. 2).
- Stabilizing screws and their related preparing bur are the same that are used in traumatology (Fig. 2).
- Pilot-bur guide to facilitate the implant osteotomy preparing accurately in the hole centers (Fig. 2).

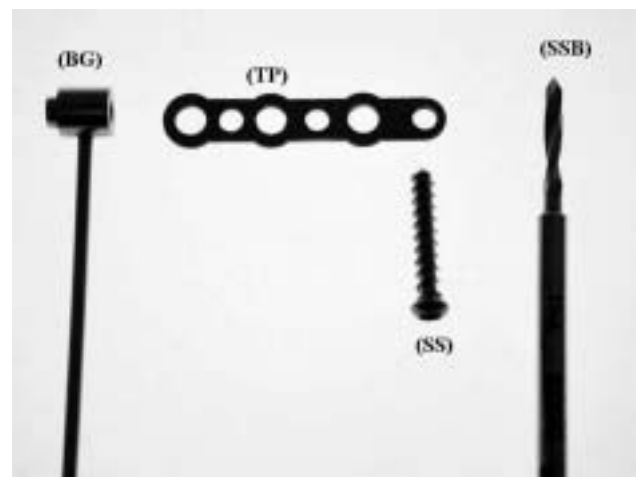


Fig. 2: Bur guide (BG), the titanium plate (TP), stabilizing screw (SS) and its related drilling bur (SSB).



Fig. 3: The bone window preparation and the sinus mucosa elevation are performed that will create a cavity under the elevated mucosa. The titanium plate is fixed in the desired position by a stabilizing screw.



Fig. 4: The use of bur guide to tap the accurate implant position.

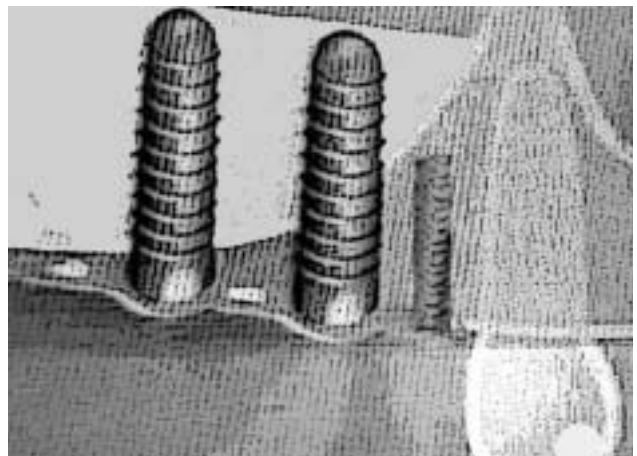
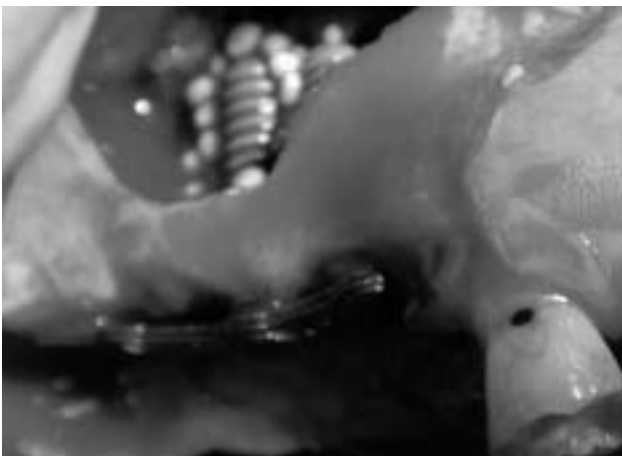


Fig 5a,b: Using SIS, a one-stage sinus lift is possible to be performed in most of the cases. The SIS stabilizes the implants that prevents their drifting into the sinus.



Fig. 6: A case in which it could be enough to connect the implant with the plate without stabilizing screw.

The surgical procedure

The surgical procedure is similar to the sinus floor elevation procedure. Crestal incision opposing the maxillary sinus is performed in combination with others anterior and posterior vertical releasing incisions to enhance the exposure of the lateral sinus wall. Once the exposure is performed, a rotary round bur under copious irrigation with sterilize saline is used to outline an oval or semi-circular bony window in the lateral sinus wall carefully to keep the sinus mucosa intact. Using special elevators, the sinus mucosa is dissected from the underlying bone that will create a cavity underneath.

The SIS titanium plate is selected and bent to fit the length and configuration of the alveolar ridge from a point just distal to the last tooth in position extending posteriorly to the maxillary tuberosity. With maintaining the plate in position, the stabilizing screw holes are tapped by the related bur at appropriate posterior and/or anterior site where a sufficient bone is available and then self-tapping stabilizing screws are placed to fix the plate into the position (Fig. 3).

Using the pilot-bur guide, the selected bone sites for implantation are prepared using the pilot bur in the center of the big holes of the plate. The plate is then taken out by removing the stabilizing screws (Fig. 4).

Each implant osteotomy is developed and enlarged by use of the generic technique. Just part of the augmentation material is first placed in the created sinus cavity.

The implants are placed in their respective osteotomies and the plate is fixed to the alveolar crest by the stabilizing screws and to the implants by the cover screws. In case of very thin alveolar bone, the implants are first fixed to the plate and both are then placed in the selected places and fixed by the stabilizing screws (Fig. 5a,b). In some cases, implants-plate connecting can be enough to stabilize the plate without the necessity of stabilizing screws (Fig 6).

With the implants now securely affixed to the ridge and protruding into the created cavity, the grafting material is placed around the implants to fill the cavity. After 9 months maturation period, during second-stage surgery, the cover and fixation screws are backed out and the plate is removed. The requisite prosthetic steps can be undertaken and completed.

Conclusion

The use of SIS can offer several advantages:

1. Patients do not have to undergo a second surgical procedure (the implantation after sinus grafting).
2. Shorter healing time so implant loading can be initiated earlier.
3. Decreased risk of inadvertently implants extending into the sinus.

However, some disadvantages should be taken in considered:

1. More difficult surgical procedure.
2. Increased treatment cost.
3. Increase risk of buccal flap dehiscence.
4. If the alveolar crest is not flat, the adapted titanium plate will not be flat as well, and the fixed implants can be nonparallel finally.

The authors recommend this surgical technique just after a proper study of the case and the acquirement of sufficient surgical skills and experience in sinus lift surgery.

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