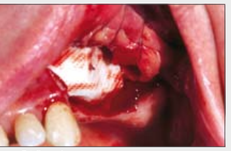
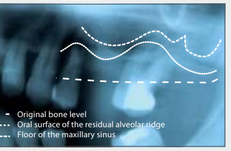
Postoperative care and follow-up

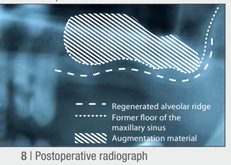


5 | Covering

6 | Wound closure



7 | Preoperative situation



8 | Postoperative radiograph

The neighbouring soft tissues have to be cooled using mild cooling agents [not ice because of the rebound effect when cooling ends!]. Non-steroidal or a single dose of steroidal anti-inflammatory drugs can reduce the development of post-operative oedema. The former can also be used for treating possible postsurgical pain. As a general rule extended antibiosis is not indicated!

The patients are urged

- not to blow their nose during the first 10 days,
- not to rinse their mouth [in order not to press any liquid into the wound],
- to only have liquid food during the first 5 days and only have soft food until the removal of the stitches and not to chew on operated side at all.

Decongestive rhino-spray and oral disinfectants for gentle cleaning of the wound areas using extremely soft small-headed toothbrushes are proven supportive measures.

The stitches are removed on the further healing process is controlled at intervals of 4 to 6 weeks and the subsequent treatment is initiated not earlier than after 3 months.

In case of single-stage procedures this is the exposure of the implants in case of the two-stage protocol the insertion of the implants will be performed then.

If you wish to control the process of bone generation a bone specimen can be taken by at rephine burr during the preparation of the implant layer and the degree of de novo bone formation easily be assessed. This provides additional certainty for scheduling the exposure and the subsequent functional loading of the implants.

Dr. Dr. Jens Meier, Bremerhaven I January 2008

5 | Covering the augmentation material with membrane
6 | Tension-free wound closure with close, atraumatic stitches [here: Ethilon™ blue 4-0]
7 | Preoperative situation: Periodontal defects around 26 and 24, residual bone height approx. 2 mm, antrum free of inflammation
8 | Postoperative radiograph: Horizontal and vertical augmentation of the alveolar ridge and augmented area in the lower maxillary sinus

NanoBone™

If you have any questions regarding the application and/or the product or require any further information or just want to order **NanoBone™**:
Do not hesitate to contact us!

MANUFACTURER
ARTOSS GmbH
Friedrich-Barnewitz-Straße 3
18119 Rostock I Germany
Tel.: +49 (0) 381 I 54345-701
Fax: +49 (0) 381 I 54345-702
e-mail: info@nanobone.de
Web: www.nanobone.de

PRESENTED BY:

artoss

nanobone.de

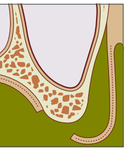
NanoBone™

Sinus Floor Elevation

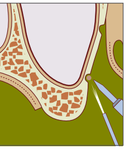
Instructions for open sinus floor elevation using **NanoBone™**

Window technique according to TATUM, BOYNE and JAMES

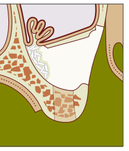
artoss



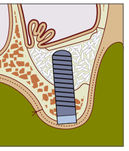
1 | Transverse section of the lateral maxilla. Incision at the alveolar crest and elevation of the mucoperiosteum to expose the facial wall of the maxillary sinus and the alveolar ridge.



2 | Preparation of the bony window in the canine fossa leaving the antral mucous membrane [SCHNEIDER's membrane] intact.



3 | Elevation of the antral mucoperiosteum and gently pushing the bony window upwards preserving the SCHNEIDERian membrane. The created space is filled with the mixture of **NanoBone™** and blood.



4 | In case of sufficient height and width of the alveolar processus, single-stage procedure is possible and the implantation takes place before wound closure. Then the mucoperiosteal flap gets fixed to the palatal margin. [Covering the facial window of the maxillary sinus with membrane or titanium mesh is optional].

Single- or two-stage protocol?

Generally a subantral residual bone height of less than 5 mm does not provide a reliable layer for primary stable implants of sufficient dimensions. In most cases the bone has only reduced density [D3 or D4 according to LEKHOLM and ZARB] requiring either satellite implants or stabilisation by autogenous bone blocks and osteosynthesis for single-stage implantations with simultaneous augmentation. Otherwise a two-stage procedure is indicated.

Indication

In case of insufficient bone dimension in the lateral upper jaw an improvement of the prospective implant layer by through augmentation and the creation of an alveolar ridge of sufficient vertical [and horizontal] dimension consisting of vital, sufficiently dense bone is necessary.

Preoperative diagnostics

As a rule, model analysis if required with wax-up and template and panoramic radiographs [with size indicator] are sufficient for planning the surgery. Particular attention has to be paid to a possible septation of the maxillary sinus. In complex cases three-dimensional diagnostics using [volume] CATs are recommended. This also allows the volumetric assessment of the space to be augmented and the direct reference to the desired implant positions.

Preoperative treatment

The treatment of florid inflammatory processes before a possible sinus floor elevation [SFE] is mandatory before the insertion of implants. Deposits of calculus and plaque, marginal and apical periodontitis, radicular cysts or cysts/mucoceles in the maxillary sinus have to be cured before SFE. An interval of at least 8 weeks after surgical interventions at/in the maxillary sinuses should be respected.

Preparation

Disinfection, incision, preparation of the maxillary sinus

1 Disinfection - anaesthesia - antibiosis

To reduce the number of microorganisms the mouth is rinsed well with a disinfective agent for mucous membranes or after disinfection of the perioral soft tissues by wiping the oral cavity using gauze sponges soaked in disinfectant. For reducing the number of germs in the oral cavity, the mouth is rinsed well using a disinfecting agent for mucous membranes, or the number of intraoral germs is eliminated/reduced after disinfection of the perioral soft parts by wiping using swabs soaked in copious amounts of disinfecting agent. Under normal circumstances local anaesthesia is sufficient, if necessary the patients can be sedated intravenously. The preoperative administration of antibiotics is justified by the aim of controlling the possible contamination of the wound during the operation. This should be performed by intravenous injection/infusion of a broad spectrum penicillin or cephalosporine shortly before the start of the operation. Clindamycine solution can be used as an alternative e.g. in case of intolerance of the former. Peroral antibiosis is also possible with one dose at least 2 hours before the start of the surgery and 3 repeated doses at intervals of 8 hours which includes the risk of underdosage e. g. in case of absorption disorders or not following the schedule of the medication. This why i.v. administration should be preferred. An antibiotic therapy for more than 24 hours is not indicated since this favours the selection of possibly resistant populations or an overgrowing of the normal flora by saprophytes, fungi or similar.

2 Incision

Since sinus floor elevation often requires a combination with horizontal/buccal or/and vertical augmentation the crestal incision is most useful. It can be extended to the palatal side up to 3 mm if vertical augmentations are necessary. This involves the risk of an insufficient blood supply in the margin of the palatal flap which may cause necrosis and dehiscence. If the buccal mucoperiosteal flap has to be lengthened due to augmentation at the alveolar ridge this should be carried out at the beginning of the surgery since this reduces the development of the postsurgical haematoma and reveals possible sources of bleeding that can not be detected initially because of the constriction of the blood vessels.

3 Preparation of the maxillary sinus

After exposure of the facial wall [CAVE: N. infraorbitalis] the bone window is created using a diamond or fine burr or piezo instrument. A perforation of SCHNEIDER's membrane must absolutely be avoided! Any septa have to be taken into account during preparation if necessary the bony window has to be divided over the septum. Then starting from the lower edge of the window the antral mucoperiosteum is dissected with sinus curettes first in latero-caudal direction then proceeding ventrally and gently pushing the bone cover medially and upwards – again: AVOID ANY PERFORATION 1 – and finally in dorsal and nasal direction until the desired height is gained. The amount of preparation in the posterior part is defined by the position of the most distal implant. Most of the septa in the alveolar recessus are found here! A small accidental perforation of SCHNEIDER's membrane is covered by an absorbable membrane. If a reliable separation from the rest of the maxillary sinus is not possible this way the operation has to be aborted.

Preparation and administration of the augmentation material

NanoBone™ is filled into a sterile bowl according to the required volume and is mixed with venous blood or blood taken from the operative field [CAVE: Danger of contamination!]. A NanoBone™-blood ratio of 3:2 is most suitable. That means:

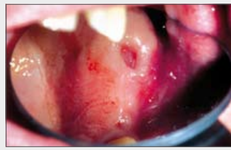
- 0.6 ml **NanoBone™** is mixed with 0.4 ml blood
- 1.2 ml **NanoBone™** is mixed with 0.8 ml blood
- 1.8 ml **NanoBone™** is mixed with 1.2 ml blood
- 2.4 ml **NanoBone™** is mixed with 1.6 ml blood

The maxillary sinus is filled with this freshly prepared mixture starting in the dorsal recessus and carefully plugging in the NanoBone™ into nasal direction until the created space is filled completely. [Implantions can be performed in one-stage procedures now!] Finally the remainder of the facial bone defect is filled and required buccal or vertical defects are augmented too.

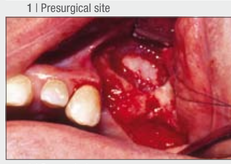
It is not mandatory required to cover the augmented area with a membrane or a titanium mesh. Since bone regeneration will set on from the periosteum as well a cover - in particular with titanium-reinforced membranes or titanium mesh - at best provides a protection of the augmentation material from mechanical irritations that might possibly result only in connective-tissue healing instead of the desired osseous regeneration and leads to a longer period for complete bone regeneration.

Autogenous bone chips which were collected when preparing the facial bone window or the implant layer can be added to the augmentation material. Particular care is required during the collection in a bone trap on account of the risk of contamination!

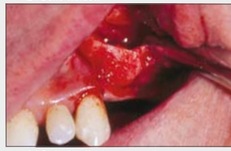
1 | Defect after the loss of the periodontally compromised 1st molar, vestibular bone deficiency, 23 as terminal tooth
2 | The bone window is prepared after exposure of the fossa canina.
3 | Bone window and SCHNEIDERian membrane have been displaced into the maxillary sinus
4 | The lumen = the former alveolar recessus of the maxillary sinus and the lateral and vertical bone defect is filled with **NanoBone™** (mixed with venous blood in a ratio of 3:2). Only a small overcompensation is made.



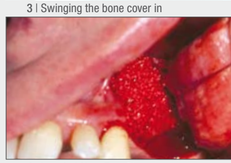
1 | Presurgical site



2 | Bone window



3 | Swinging the bone cover in



4 | Inserted **NanoBone™**