

Treatment for an Endosseous Implant Migrated into the Maxillary Sinus Not Causing Maxillary Sinusitis: Case Report

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Placement of endosseous implants in the maxilla has been proven to be a reliable treatment modality. If there is lack of supporting bone, the placed implant may not have enough primary stability and may migrate into the maxillary sinus. Displaced implants must be removed. If there are no signs of maxillary sinusitis, augmentation of the resulting alveolar defect can be performed during the same procedure. INT J ORAL MAXILLOFAC IMPLANTS 2003;18:745-749

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Various complications have been reported following the placement of endosseous implants. In the posterior maxilla, placement of implants is often complicated because of the low bone density. Insufficient bone height related to progressive resorption of the alveolar ridge and further pneumatization of the maxillary sinus can also result in complications. Bone grafting of the floor of the maxillary sinus for the placement of implants is a reliable treatment modality.^{1,2} However, if this technique is not used, the placement of short implants without sufficient primary stability in direct proximity to, or even extending into, the maxillary sinus can lead to complications. Displacement of an implant into the maxillary sinus can result in a foreign-body reaction and cause serious complications. This complication has been reported rarely in the literature.³⁻⁶ In this report, a case is presented of an

implant that was displaced into the maxillary sinus. Because there were no signs of maxillary sinusitis, removal of the implant and augmentation of the alveolar defect with autogenous bone were performed simultaneously.

CASE REPORT

A 56-year-old man was referred to the Department of Oral and Maxillofacial Surgery, University Hospital Groningen, for treatment of an implant displaced into the maxillary sinus. In a private practice, 3 Brånemark System implants (Nobel Biocare, Göteborg, Sweden) had been placed in the left central incisor area and the right canine and premolar area 5 months previously. The clinician reported that no complications had occurred during the surgery and that no augmentation procedures had been performed. The implants were considered to be stable at the time of placement.

Prior to second-stage surgery (abutment connection), the clinician obtained a panoramic radiograph and detected displacement of an implant into the right maxillary sinus (Figs 1a to 1c). The patient was in good medical health and had no sinus complaints. A thorough history and clinical and radiographic examination revealed neither history nor actual signs of sinus-related pathology (Fig 1c). The

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Figs 1a to 1c Images of a 56-year-old man referred because of displacement of an implant into the maxillary sinus.

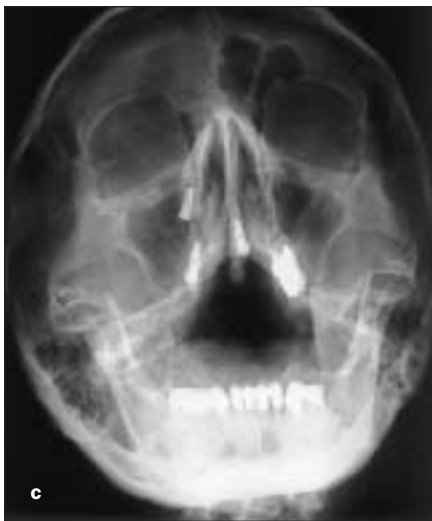


Fig 1a Clinical view of the patient showing 2 implants in the maxillary ridge.

Fig 1b Panoramic radiograph showing 1 implant in the maxillary sinus and 2 implants in the maxilla.

Fig 1c Water's radiograph showing an implant in the right maxillary sinus in the region of the ostium. There were no signs of maxillary sinusitis.

implant seemed to be located in the region of the ostium. The patient was scheduled for removal of the implant and maxillary sinus floor augmentation surgery with autologous bone from the chin.

The patient was treated under general anesthesia, and maxillary sites were infiltrated with a local anesthetic containing epinephrine as a vasoconstrictor. The palatal mucosa was incised just below and parallel to the alveolar ridge crest. After vertical releasing incisions had been made in the buccal mucosa, a mucoperiosteal flap was raised to expose the alveolar process and lateral wall of the maxilla (Fig 2a). The implant in the left central incisor area was mobile and was removed. The implant in the canine region was osseointegrated. To remove the implant in the right maxillary sinus, the lateral wall of this sinus was fenestrated with a round bur at high speed and adequately cooled with sterile saline. Care was taken to preserve the mucosal lining. Subsequently, the sinus membrane was raised, and the mobilized part of the lateral sinus wall, together with the raised sinus membrane, was rotated medi-

ally and upward. A 1-cm incision was made through the membrane, and inspection of the maxillary sinus was performed. Thereafter, the implant was visible and could be removed with a forceps (Fig 2b). The perforation in the sinus membrane was sutured with Vicryl (Ethicon, Norderstedt, Germany).

The chin area was exposed by a crevicular incision around the necks of the teeth and a vertical releasing incision in the canine region. A full-thickness mucosal flap was raised. Subsequently, the dimensions of the graft were determined, respecting a 5-mm safety margin below the apices and a 5-mm thickness of the lower border of the mandible and considering the size of the bone defect at the implantation site. The osseous cuts were made with a bur in a surgical handpiece under copious irrigation with saline (Fig 3). The procedure was limited to a monocortical bone graft, and the lingual cortex was left intact. After removal of the corticocancellous bone block with a bone chisel, additional bone was harvested with gouges and curettes. The harvested bone measured 3 cm.³

Figs 2a and 2b Maxillary sinus surgery for implant removal and augmentation.



Fig 2a After incision and reflection of the mucosa, the lateral maxillary sinus wall was inspected. The implant in the anterior region was mobile and was removed.



Fig 2b After osteotomy of the lateral maxillary sinus wall, the bone window was rotated upward. The displaced implant was removed after incision of the mucus membrane.

The volume of the bone graft was sufficient to augment the floor of the maxillary sinus and width of the alveolar crest. A thin corticocancellous graft was placed in the sinus with the cortical layer facing upward. The remaining space between the bone block and the alveolar crest was filled with particulate cancellous bone that was precompressed in a syringe and then injected into the sinus. After grafting, the height of the maxillary ridge was at least 13 mm. The wound was closed with Vicryl.

A pressure dressing (elastic tape) was applied to the chin and maintained for 5 days to minimize postoperative swelling and hematoma formation. The patient received a broad-spectrum antibiotic for 48 hours and a nasal decongestant and was instructed to use a 0.2% chlorhexidine mouth rinse for 2 weeks. No complications were observed postoperatively, and there was no change of sensibility in the chin and lower lip.

Three months after bone grafting of the sinus floor, bone consolidation seemed to be sufficient for the placement of 3 implants (Figs 4a and 4b). After 6 months, the prosthesis was fabricated. During a follow-up period of 5 years, no maxillary sinus complaints were noted, and no implants were lost (Fig 4b). The patient was very satisfied with the definitive restoration.

DISCUSSION

The placement of implants in the posterior maxilla with and without augmentation of the floor of the maxillary sinus with an autogenous bone graft is now generally accepted as a successful and biologically sound procedure with a reasonably good prog-



Fig 3 Harvesting of a graft from the mandibular symphysis.

nosis. The procedure is not always free of complications, however.^{5,7,8} Migration of a dental implant into the maxillary sinus may present a risk for the development of maxillary sinusitis. If the implant is not adequately stabilized and is thought to be mobile, it should be removed. To avoid complications if the bone volume is inadequate to support an implant with sufficient length, a bone reconstruction procedure of the maxilla should be performed. It is generally believed that the minimum length for implants placed in this region should be 10 mm, and wider-diameter implants should be considered.^{2,5}

The occurrence of minor iatrogenic sinus membrane perforations during surgery seems not to be related to the development of postoperative sinusitis in healthy patients,² while large perforations of the maxillary sinus membrane could result in the discharge of bony fragments into the maxillary sinus and thus cause maxillary sinusitis. It has been reported that large sinus membrane perforations should be repaired with collagen or a fibrin



Fig 4a Panoramic radiograph 3 months after grafting of the maxillary sinus floor. Note the augmentation in the canine/premolar region.



Fig 4b Panoramic radiograph 5 years after placement of the prosthesis.

adhesive.^{9,10} The patient under consideration did not develop maxillary sinusitis after surgery, probably because of adequate sealing of the large iatrogenic perforation in the sinus membrane. An advantage of placement of the cortical bone graft over the cancellous bone particles is that this will prevent migration of bone particles into the maxillary sinus when a perforation is not closed completely by suturing and/or folding of the membrane.² A second advantage of a bone graft with a cortical bone plate is that the bone graft is fixed when the implants are placed simultaneously, which provides optimal stability for both the bone graft and the implants. A third advantage is that the bone particles can be firmly packed into the created space.

The use of mandibular bone grafts for augmentation of the floor of the maxillary sinus avoids morbidity at distant donor sites. Other advantages of intraorally harvested bone grafts are the use of local anesthesia instead of general anesthesia, a relatively short operating time, no need for postoperative hospitalization, and lower costs.^{11,12} A disadvantage is that intraoral donor sites offer smaller volumes of bone than the iliac crest. In general, rather large amounts of

bone are needed to gain adequate augmentation of the maxillary sinus, particularly in bilaterally edentulous patients or in combination with a reconstruction of the width of the alveolar crest. In this particular case, chin bone was used, because the amount of bone needed was not large. There was no subjective change in sensibility in the chin region, although it has been reported that patients may complain about decreased sensibility in the harvesting area.¹²

The cases of implant displacement in the maxillary sinus reported in the literature thus far are mainly directed toward their removal to treat maxillary sinusitis.³⁻⁵ The only report of a symptom-free displaced implant described a case in which no further treatment was performed.⁶ The present authors concur with Iida and coworkers⁶ that augmentation of the antrum in cases with sinus pathology should be postponed until clinical and radiologic signs of maxillary sinusitis are absent. If the patient with such a displaced implant is completely symptom-free, however, removal of the implant can be combined with augmentation of the alveolar ridge. This saves the patient a surgical procedure and reduces overall treatment time.

CONCLUSION

If properly planned and performed, placement of implants in the atrophic posterior maxilla is a predictable and reliable technique. If migration of an implant into the maxillary sinus occurs without causing maxillary sinusitis, removal of the implant and sinus bone grafting can be performed simultaneously.

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