

Endoscopic Retrieval of Dental Implants From the Maxillary Sinus

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Endoscopic sinus surgery has been performed for various indications in maxillofacial surgical practices. It has been utilized for assessment of antral pathologies, removal of foreign bodies, orthognathic procedures, and treatment of facial fractures. In the cases presented, 3 dental implants which were displaced into maxillary sinuses were removed by endoscopic sinus surgery. Transantral endoscopic surgery is a reliable, minimally invasive method for retrieving displaced objects from the maxillary antrum with minimal complications. INT J ORAL MAXILLOFAC IMPLANTS 2006;21:801-804

Key words: dental implant, endoscopic surgery, implant displacement, maxillary sinus

Displacement of roots, teeth, endodontic materials, dental implants, and various objects into the maxillary sinus is a common complication of dental surgery.¹ Displaced objects should be removed from the antrum to prevent the development of maxillary sinusitis. Removal of such foreign items is accomplished using 1 of 3 methods: (1) suction from the socket of an extracted tooth, (2) the classical Caldwell-Luc operation, or (3) endoscopic sinus surgery.

Sinus endoscopy was first performed in 1901 using a modified cystoscope.² Modern sinus endoscopy was described in the 1960s by Messerklinger. It was introduced in the United States in 1985.³ It enables the evaluation of the maxillary sinus by direct observation.³ Endoscopic surgical techniques focus on minimizing removal of normal mucous membrane and critical paranasal sinus structures, thereby minimizing trauma and preserving

mucociliary function.⁴⁻⁶ In many surgical specialties, traditional surgical procedures have been replaced by minimally invasive ones and have become the appropriate state-of-the-art care.^{7,8}

Minimally invasive procedures such as endoscopically assisted techniques shorten the duration of a surgery and lower the rate of complications.⁸ The aim of this article is to demonstrate the endoscopic sinus surgical technique used for the removal of displaced dental implants from the maxillary antrum.

CLINICAL PRESENTATION

All endoscopic procedures reported in this article comply with the principles of the Declaration of Helsinki. Panoramic and Waters' view radiographs were obtained from all patients to localize the implants inside the maxillary sinuses (Figs 1 to 3). Three patients (2 men and 1 woman) ranging in age from 45 to 53 years were referred at different times to the Department of Oral and Maxillofacial Surgery, School of Dentistry, Marmara University, for the treatment of dental implant displacement into the maxillary sinus.

All of the displaced implants were located in the left sinus; all had occurred in the posterior region of the alveolar crest, where alveolar bone is insufficient and sinus grafting is often required. In 1 case, an implant and a connecting bar from the surgical kit had been displaced together into the maxillary sinus. In the other 2 cases, a single implant had been displaced.

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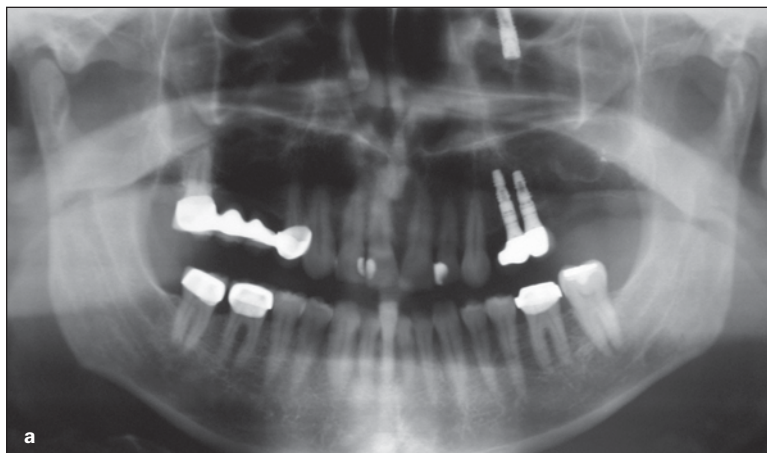
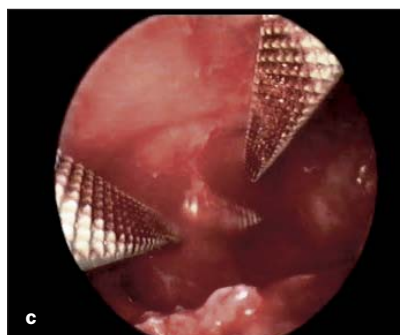


Fig 1a Panoramic radiograph of the displaced implant, which is located in the posterior slope of the maxillary sinus.

Fig 1b Minimal bone was removed from the lateral wall of the maxilla to allow for the entrance of the endoscope.

Fig 1c Localization of the implant inside the sinus.

Fig 1d Retrieval of the implant using a curved hemostat.



Local anesthesia (0.012 mg/mL articain HCl/epinephrine HCl; Sanofi-Aventis, Paris, France) was infiltrated to infraorbital regions, the pterygopalatine fossa, and the hard palate. After allowing adequate time for the onset of anesthesia, the sockets of all displaced implants were examined to identify whether it might be possible to retrieve the migrated implants from the sinuses without any further surgical intervention. However, none of the implants were amenable to removal by this method. Therefore, the endoscopic approach was used.

A deep Partsch incision was made in the anterior fornix, and a mucoperiosteal flap was elevated. Transantral endoscopic sinus surgery was carried out via a Caldwell-Luc access from the canine fossa, avoiding unnecessary enlargement of the bony aperture. An osseous window was opened in middle of the canine fossa, and an endoscope was pushed through the aperture (Fig 1a). In each case, the sinus was examined, and the displaced implants were located inside the antrum (Fig 1b, 2a, and 3a). Under direct visualization, the implant was retrieved from the sinus with the help of a curved clamp (Figs 1c, 2b, and 3b).

A 3.4-mm-diameter straight (angled 0 degrees) Hopkins endoscope (KarlStorz Endoskope, Tuttlingen, Germany) and xenon light source were used in all cases.

DISCUSSION

Displacement of dental implants during the surgical procedure is possible in the following circumstances: placement of dental implants in the posterior maxillary ridges without sinus lifting in greatly pneumatized sinuses; surgical inexperience with anatomical landmarks of the maxillary sinus; the existence of an untreated perforation of the antral base after the drilling sequence; excessive tapping of a dental implant during an internal sinus osteotomy procedure; or the application of heavy force during extraction of nonintegrated implants.

Searching for foreign objects within the antrum through an aperture from the alveolar socket is a blind procedure. Moreover, foreign bodies may move during the surgical procedure. A blind attempt to capture the moving object may cause unnecessary widening of an alveolar bony aperture and could damage the lining of the maxillary sinus.^{3,6,9}

Retrieval of displaced implants by endoscopic sinus surgery offers many advantages over other techniques.⁴⁻⁶ It requires only a small incision for access and allows better visualization of the pyramidal antrum.^{3-6,10-12} Endoscopic sinus surgery is a minimally invasive technique which respects the integrity of the maxillary antrum. Removal of unnecessary soft and hard tissue is prevented under direct visualization.⁵

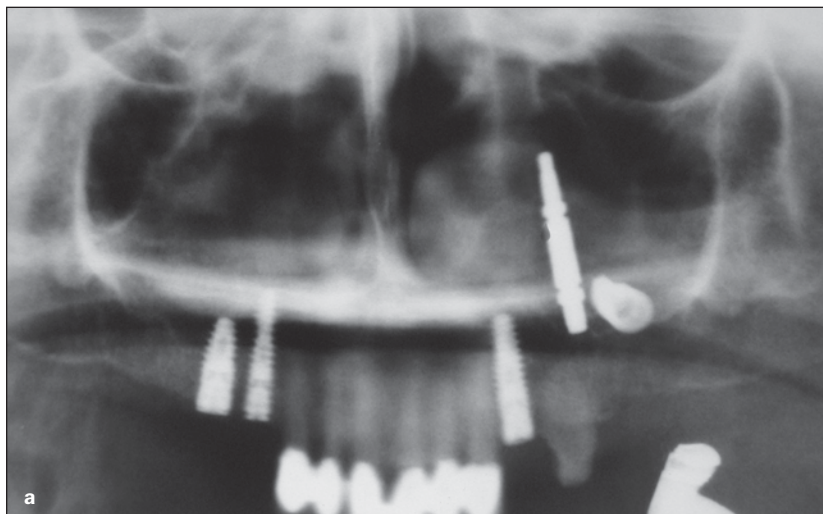


Fig 2a Panoramic radiograph showing the displacement of a dental implant and an implant driver for contra-angle.



b

Fig 2b Displacement of a dental implant into the left maxillary sinus through a drilled socket.



c

Fig 2c The use of serrated forceps to secure the implant before its removal through the bony window.



a

Fig 3a Displacement of an implant after placement in the left antrum.



b

Fig 3b An endoscopic sinus image of the displaced implant, which was located near the antral hiatus.

Minimal postoperative discomfort and more rapid recovery have been observed compared with other methods.^{3-6,10} Another advantage of the endoscopic technique is that it can be performed under local anesthesia.³ Minimal tissue dissection and manipulation during the endoscopic procedure results in less edema and morbidity.^{3,8} The short recovery period and faster return to daily activities seems to be the most important part of this technique.^{7,8,10,11} The risks associated with the procedure include temporary tooth pain and paresthesia of the infraorbital nerve.³

Pagella and colleagues removed implants from the maxillary sinus through the canine fossa entrance by

sinus endoscopy.⁴ Inferior meotomy and an endoscopic approach through the canine fossa were used by Suguirra and associates⁵ to withdraw a foreign object from the antrum. Nakamura and coworkers reported the removal of a displaced implant from the maxillary sinus using a self-expanding urological retrieval basket in an endoscopic procedure.⁶ Biglioli and coworkers described an alternative procedure in which a wider bony flap was raised, preserving its antral mucosal pedicle. Although the authors did not use the endoscopic approach for retrieving the displaced implant, they concluded that the endoscopy is a good alternative to the conventional techniques.¹³

REFERENCES

1. Barclay JK. Root in the maxillary sinus. *Oral Surg Oral Med Oral Pathol* 1987;64:162–164.
2. Hirschman A. Über endoskopie der Nase und deren Nebenhöhler. Eine neue Untersuchungsmethode. *Arch Langol Rhinol (Berlin)* 1903;14:195.
3. Sandler NA, Carrau RL, Ochs MW, Beatty R. The use of maxillary sinus endoscopy in the diagnosis of orbital floor fractures. *J Oral Maxillofac Surg* 1999;57:399–403.
4. Pagella F, Emanuelli E, Castelnuovo P. Endoscopic extraction of a metal foreign body from the maxillary sinus. *Laryngoscope* 1999;109:339–432.
5. Suguira N, Ochi K, Komatsuzaki Y. Endoscopic extraction of a foreign body from the maxillary sinus. *Otolaryngol Head Neck Surg* 2004;130:279–280.
6. Nakamura N, Mitsuyasu T, Ohishi M. Endoscopic removal of a dental implant displaced into the maxillary sinus: Technical note. *Int J Oral Maxillofac Surg* 2004;33:195–197.
7. Shumrick KA. Endoscopic management of facial fractures. *Fac Plast Surg Clin North Am* 1997;5:185.
8. Troulis MJ. Endoscopic open reduction and internal rigid fixation of subcondylar fractures. *J Oral Maxillofac Surg* 2004;62:1269–1271.
9. Hasegawa J, Watanabe K, Kunitomo M, et al. Foreign body in the maxillary sinus—Possible plastic tube: A case report. *Auris Nasus Larynx* 2003;30:299–301.
10. Akmansu H, Eryilmaz A, Dağlı M, Korkmaz H. Endoscopic removal of paranasal sinus osteoma: A case report. *J Oral Maxillofac Surg* 2002;60:230–232.
11. Wiltfang J, Kessler P. Endoscopically assisted Le Fort I osteotomy to correct transverse and sagittal discrepancies of the maxilla. *J Oral Maxillofac Surg* 2002;60:1142–1145.
12. Narkio-Makela M, Qvarnberg Y. Endoscopic sinus surgery or Caldwell-Luc operation in the treatment of chronic and recurrent maxillary sinusitis. *Acta Otolaryngol* 1997(suppl);529:177–180.
13. Biglioli F, Goisis M. Access to the maxillary sinus using a bone flap on a mucosal pedicle: Preliminary report. *J Craniomaxillofac Surg* 2002;30:255–259.