

# Transnasal Endoscopy Removal of Dislodged Dental Implant: A Case Report

Daniel Lim, MCLinDent<sup>1\*</sup>

Rosliza Parumo, MCLinDent<sup>2</sup>

Ma Bee Chai, MSc<sup>2</sup>

Jothi Shanmuganathan, MBBS, MMed<sup>3</sup>

Displacement of dental implants into the maxillary sinus is a rare complication. This article presents a case of displaced dental implant into maxillary sinus. Retrieval of the dental implant from left maxillary sinus was performed via endoscopic sinus surgery. This case highlighted a delayed referral of a 53-year-old male by a general dental practitioner for management of a dislodged dental implant into the left maxillary antrum. The implant was dislodged during placement of a healing abutment 4 months after implant insertion to replace missing 25. Cone beam computerized tomography revealed the displaced implant was located at the ostium of the left nose. A sudden change in sinonasal pressure when the patient took a deep breath during the procedure may have created a negative pressure and suction effect causing the implant to be dislodged and embedded at the ostium. In view of its position, a referral to an otorhinolaryngologist was made for endoscopic removal of the displaced implant. This case also highlighted the need for inter disciplinary cooperation in the management of such a complication for the best interest of the patients.

**Key Words:** dental implant, maxillary sinus, transnasal endoscopy, sinonasal pressure

## INTRODUCTION

With implant-supported prostheses becoming more common, complications arising from implant placement are also increasing. One of the complications is the displacement of dental implants into the maxillary sinus. Dental implant within the sinus may be complicated by infections. Therefore, early removal of the displaced implant is necessary. Retrieval of the implant may be accomplished with one of 3 methods: aspiration with a suction tip, open surgery, or endoscopic approach. The aim of the following case report is to present the effect of changes in intrasinus nasal pressure in implant displacement and the role of endoscopic sinus surgery in removing displaced dental implant into the maxillary sinus.

## CASE REPORT

A 53-year-old male was referred for management of a displaced dental implant into the left maxillary sinus. The dental implant was placed 4 months earlier at the region of 25. Prior to that, the patient was advised to undergo a sinus floor elevation procedure in view of inadequate bone height, but the patient declined. Thus, the practitioner decided to insert a shorter

implant (7 mm). Upon exposing the implant for insertion of healing abutment, the practitioner noticed the implant was loose. The practitioner attempted to remove it, but the implant was immediately lost when the patient suddenly took a deep breath. Soon after, the patient complained of a blocked left side of his nose. A dental panoramic radiograph was taken immediately. The radiograph showed displacement of the dental implant into the left maxillary sinus (Figure 1). A cone beam computerized tomography (CBCT) was performed when the patient came to our office. The 3-dimensional imaging showed that the implant was located at the ostium adjacent to the middle meatus of the left nose (Figure 2). In view of its location, a referral was made to the otorhinolaryngologist for the possibility of using endoscopic approach to retrieve the implant. The patient was then scheduled for retrieval of the implant via transnasal endoscopic approach under general anesthesia.

After intubation, the patient was cleaned and draped. Decongestion of the left side of the nose was done using oxymetazoline (Oxynase). Following that local anesthesia (1% lidocaine with 1:100 000 epinephrine) was injected into the lateral nasal wall near the agger nasi area and the middle turbinate. The medial turbinate was then gently medialized using the curved portion of the Freer elevator to avoid mucosal injury to the turbinate and fracture of the turbinate as a result of forceful medialization. Uncinectomy was then performed using backbiter. Maxillary ostium was identified and widened. The displaced implant was visualized, located at the posterior wall of the left maxillary sinus (Figure 3). The implant was retrieved using a J-suction. The surgical site was packed with collagen hemostat.

Postoperatively, no complication was noted, and the

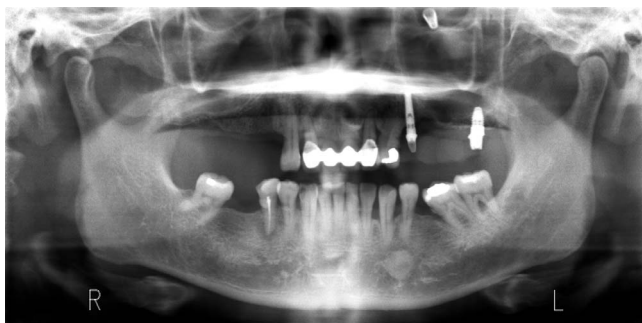
<sup>1</sup> Department of Oro-Maxillofacial Surgical and Medical Sciences, Faculty of Dentistry, University of Malaya, Kuala Lumpur, Malaysia.

<sup>2</sup> Oral Surgery Clinic, Hospital Sultanah Aminah, Johor Bahru, Malaysia.

<sup>3</sup> Otorhinolaryngology Clinic, Hospital Sultanah Aminah, Johor Bahru, Malaysia.

\* Corresponding author, e-mail: daniel\_khlim@hotmail.com

DOI: 10.1563/aaid-joi-D-16-00172



**FIGURE 1.** Dental panoramic radiograph showing the displaced implant in the left maxillary sinus.

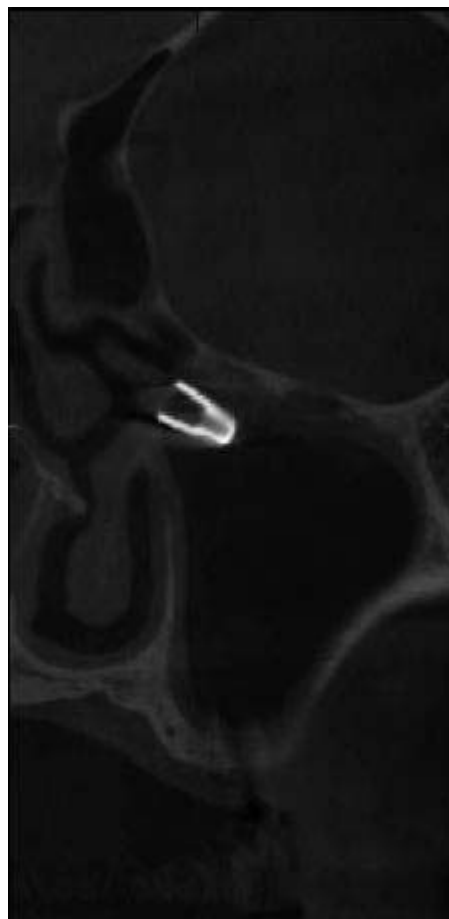
patient was discharged the next day. He was prescribed with 1 week's course of antibiotic (amoxicillin and clavulanic acid [Augmentin] 625 mg, twice a day) and analgesic (ibuprofen, 400 mg, three times a day) as well as nasal douching with alkaline powder. A postoperative dental panoramic radiograph was taken to ensure total removal of the implant. At 1 week postsurgery, the patient reported improvement of the left nose block, and the surgical site was healing uneventfully.

#### DISCUSSION

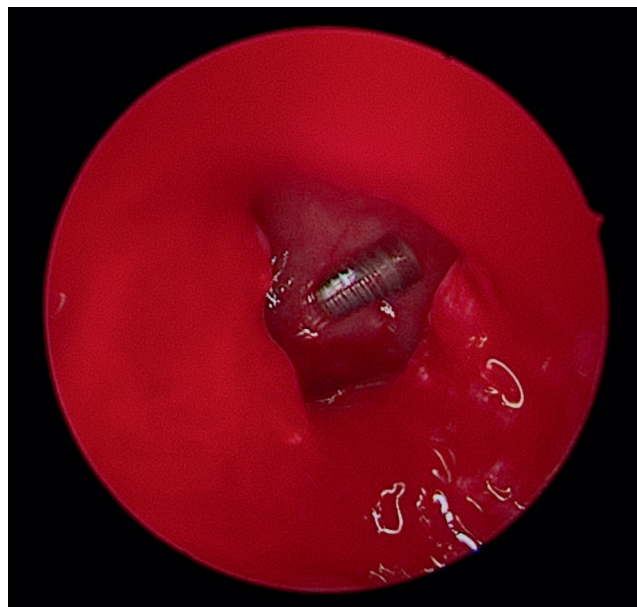
Although dental implants have been reported to be of a high success rate, the procedures are not complication free. Rare complication like displacement of implants into maxillary sinuses had been reported in various centers.<sup>1-6</sup> Displacement into a more distant site like ethmoid sinus,<sup>7</sup> sphenoid sinus,<sup>8</sup> and even anterior cranial fossa<sup>9</sup> also had been reported.

The actual pathogenesis of dental implant displacement is not known. However, various hypotheses have been suggested. These can be divided into early or late displacement. Early displacement could be due to low bone density, which leads to inadequate anchorage and adversely affects its primary stability. An implant that was stable during placement also may be displaced later as a result of changes in intrasinus and nasal pressures, which may produce a negative pressure and subsequently a suction effect, immune reaction causing peri-implant bone destruction, or bone resorption as a result of early loading.<sup>1</sup> In this case, we postulated that lack of osseointegration and changes in intrasinus and nasal pressures when the patient took a deep breath may have caused the implant to be displaced.

Three approaches had been described for retrieval of foreign bodies including dental implants from the maxillary sinus. Aspiration of the implants can be carried out via the alveolar process (extraction socket or osteotomy site). Flooding the maxillary sinus with normal saline may help retrieval of the foreign bodies; nevertheless, this is a blind technique. In most situations, the extraction sockets or osteotomy sites need to be enlarged to allow insertion of the suction tube and to ease retrieval. The bony defect created will further compromise future implant placement. However, this method may be the first choice if the foreign bodies are located at the maxillary sinus floor close to the extraction socket or prepared implant site. On the other hand, it should be avoided in an otherwise



**FIGURE 2.** Coronal view of cone beam computerized tomography showing the position of the displaced implant at the ostium.



**FIGURE 3.** Endoscopic image showing the actual location of the implant in the left maxillary sinus.

intact alveolar ridge as it carries the risk of oroantral communication.<sup>10</sup>

Still accessing through intraoral, the second approach is the open surgery. Various methods have been described, but they share the same aim that is to create a window on the maxillary sinus wall to allow visualization of the sinus. Visualization can either be direct or indirect via an endoscope. Surgically, it is more extensive than the first technique and therefore leads to more inflammatory sequelae. Despite it being more invasive, foreign bodies can be easily visualized and retrieved. In some instances, a simultaneous sinus floor elevation can be performed. Chiapasco et al suggested that intraoral approach is preferred if implants displaced into maxillary sinus are associated with or without oroantral communications but with no signs and symptoms of paranasal sinusitis and patent maxillary ostium.<sup>10</sup>

The third one, which was used in our case, is the transnasal endoscopic approach. This method was known as functional endoscopic sinus surgery (FESS), and is recommended for cases of displaced implants in maxillary sinus in association with or without signs and symptoms of paranasal sinusitis and or obstruction but with no oroantral communications.<sup>10</sup> It had been suggested that transnasal endoscopy is useful to visualize the upper part of the maxillary sinus. However, access to the bottom of the maxillary sinus is difficult as a result of the acute angle from the inferior meatus to the bottom of the sinus.<sup>2</sup> Authors who had used this technique claimed this was a fast and less invasive procedure yet allows good visualization of the maxillary sinus.<sup>1,3-6</sup> Compared with Caldwell-Luc, blood loss and operating time was significantly less with endoscopic sinus surgery.<sup>11</sup> As its name implied, FESS creates patency of the maxillary ostium and enlarges obstructed maxillary ostium to allow maxillary sinus to regain its function.<sup>10</sup> This approach is also good for preservation of the integrity of the alveolar bone as no bone removal is required. Uncinectomy and middle meatal antrostomy are performed to maneuver angled instruments for foreign body removal. These procedures are safe in the hands of a trained surgeon.<sup>4</sup>

Besides the bone quality, reduced vertical height as a result of severely resorbed alveolar ridge or extensive pneumatization of the maxillary sinus are among the issues faced by the practitioners in the placement of dental implants in posterior regions of the maxilla. Innovative surgical techniques such as the use of short implants,<sup>12</sup> intentional angulated implant placement to avoid the maxillary sinus,<sup>13</sup> and sinus floor elevation with bone grafting<sup>14</sup> had been introduced to overcome these anatomical limitations. In a 1-year follow up, Schincaglia et al reported that short implants and longer implants inserted together with sinus floor elevation provided similar outcomes.<sup>15</sup> Intentional angulated implant placement had been described to avoid pneumatized maxillary sinus. Implant was placed with palatal angulation guided by a tomographically determined surgical stent. An angled abutment was used during prostheses construction.<sup>13</sup> Although angled abutment was comparable with straight abutment clinically, one should keep in mind that stress generated through off-axis loading increases with the degree of angulation.<sup>16</sup> Sinus floor elevation can be performed either via the lateral wall of maxillary sinus or via the alveolar crest. In the

lateral sinus approach, a small bony window is created to gain access to the Schneiderian membrane. Schneiderian membrane is then gently elevated from the bony maxillary sinus floor. A less invasive way of elevating the sinus floor is via the crestal approach. Sequentially larger cylindrical osteotomes are used to raise the sinus floor followed by bone grafting.<sup>17</sup> Another technique employed for crestal approach is by using hydraulic pressure. Water is injected via the osteotomy site, and the hydraulic pressure generated internally causes the detachment of the Schneiderian membrane from the sinus floor.<sup>18</sup> Implants are usually inserted in the same surgery for crestal approach, whereas in the lateral sinus wall approach, implants can either be inserted in the same or separate surgery. Despite various innovative techniques mentioned, to achieve a more predictable implant outcome in posterior maxilla with reduced bone height, the practitioner should be competent to perform sinus floor elevation.

### CONCLUSION

Although it is a rare complication, patients undergoing dental implant on the posterior regions of the maxilla should always be informed of the possibility of implant displacement into the maxillary sinus. In the event when mishap happens, practitioners should be aware of its management. Transnasal endoscopy may be less invasive, but it may not be the preferred method in all cases. When deciding between methods used for retrieval of displaced dental implants, it is important to consider the implant's location, the patient's general condition, and the surgeon's competency.

### ABBREVIATION

CBCT: cone beam computerized tomography

FESS: functional endoscopic sinus surgery

### REFERENCES

1. Ramotar H, Jaberoo MC, Koo Ng NKF, Pulido MA, Saleh HA. Image-guided, endoscopic removal of migrated titanium dental implants from maxillary sinus: two cases. *J Laryng Otol*. 2010;124:433-436.
2. Nakamura N, Mitsuyasu T, Ohishi M. Endoscopic removal of a dental implant displaced into the maxillary sinus. *Int J Oral Maxillofac Surg*. 2004;33:195-197.
3. Kitamura A. Removal of a migrated dental implant from a maxillary sinus by transnasal endoscopy. *Br J Oral Maxillofac Surg*. 2007;45:410-411.
4. Lubbe DE, Aniruth S, Liebenberg S. Endoscopic transnasal removal of migrated dental implants. *Br Dent J*. 2008;204:435-438.
5. Kim JW, Lee CH, Kwon TK, Kim DK. Endoscopic removal of a dental implant through a middle meatal antrostomy. *Br J Oral Maxillofac Surg*. 2007;45:408-409.
6. Nazar R, Cabrera N, Martelo G, Machiavello C, Naser A. Unusual sinonasal foreign body: Presentation of three cases. *Acta Otorrinolaringol Esp*. 2014;65:109-113.
7. Schreiber A, Lombardi D. Dental implant in the ethmoid sinus. *N Engl J Med*. 2013;369:e23.
8. Felisati G, Lozza P, Chiapasco M, Borloni R. Endoscopic removal of an unusual foreign body in the sphenoid sinus: an oral implant. *Clin Oral Implants Res*. 2007;18:776-780.
9. Cascone P, Ungari C, Filiaci F, Gabriele G, Ramieri V. A dental implant in the anterior cranial fossae. *Int J Oral Maxillofac Surg*. 2010;39:92-93.

10. Chiapasco M, Felisati G, Maccari A, Borloni R, Gatti F, DiLeo F. The management of complications following displacement of oral implants in the paranasal sinuses: a multicenter clinical report and proposed treatment protocols. *Int J Oral Maxillofac Surg.* 2009;38:1273–1278.
11. Ikeda K, Hirano K, Oshima T, et al. Comparison of complications between endoscopic sinus surgery and Caldwell-Luc operation. *Tohoku J Exp Med.* 1996;180:27–31.
12. Deporter D, Todescan R, Caudry S. Simplifying management of the posterior maxilla using short, porous-surfaced dental implants and simultaneous indirect sinus elevation. *Int J Periodontics Restorative Dent.* 2000;20:476–485.
13. Lim TJ, Csillag A, Irinakis T, Nokiani A, Wiebe CB. Intentional angulation of an implant to avoid a pneumatized maxillary sinus: a case report. *J Can Dent Assoc.* 2004;70:164–168.
14. Chiapasco M, Ronchi P. Sinus lift and endosseous implants—preliminary surgical and prosthetic results. *Eur J Prosthodont Rest Dent.* 1994;3:15–21.
15. Schincaglia GP, Thoma DS, Haas R, et al. Randomized controlled multicentre study comparing short dental implants (6 mm) versus longer dental implants (11–15 mm) in combination with sinus floor elevation procedures. Part 2: clinical and radiographic outcomes at 1 year of loading. *J Clin Periodontol.* 2015;42:1042–1051.
16. Hsu ML, Chung TF, Kao HC. Clinical applications of angled abutments- a literature review. *Chin Dent J.* 2005;24:15–20.
17. Summers RB. A new concept in maxillary implant surgery, the osteotome technique. *Compend Contin Educ Dent.* 1994;15:152–156.
18. Sohn DS, Maupin P, Fayos RP, Lee K, Jun S, Hayashi Y. Minimally invasive sinus augmentation using ultrasonic piezoelectric vibration and hydraulic pressure. *J Implant Adv Clin Dent.* 2010;2:27–40.