

Management of Iatrogenically Exposed Maxillary Sinus with a Broken Periosteal Elevator Trapped Inside

Nureldeen Elhammali, Pratik Bipinkumar Kariya¹, Kirankumar Sudulakunta Vorse¹, Anit Singh²

Department of Oral Surgery, Sirte Dental College, Sirte University, Sirte, Libya, ¹Department of Paedodontics and Preventive Dentistry, KMSDCH, Sumandeep Vidyapeeth, Vadodara, Gujarat, ²Department of Prosthodontics, Darshan Dental College, Udaipur, Rajasthan, India

Abstract

Foreign bodies may be ingested after being inserted into an oral cavity or deposited in the body by traumatic or iatrogenic injury. Accidentally left out foreign materials are common complications of dental procedures including apical deposition of endodontic materials, sub-mucosal amalgam pieces, graphite tattoos and traumatically introduced dental materials and instruments. Once a foreign material is left behind within a soft and/or hard tissue, it promotes local inflammation and infection that may cause pain and/or destruction within the surrounding tissues. This article presents a case of retrieval of iatrogenically broken periosteal elevator trapped in the maxillary sinus.

Keywords: Foreign body, iatrogenic, maxillary sinus, periosteal elevator, trauma

INTRODUCTION

Foreign bodies may be ingested after being inserted into a body cavity or deposited in the body by traumatic or iatrogenic injury. Iatrogenic reasons may be accidentally left out foreign materials during procedures including apical deposition of endodontic materials, sub-mucosal amalgam pieces, graphite tattoos and traumatically introduced dental materials and instruments. Motor vehicle accidents, assaults and bullet wounds are reported to be the common causes of traumatic foreign bodies entrapment.^[1] Most foreign bodies can cause abscess formation, septicaemia or lead to severe haemorrhage. Once a foreign material is left behind within a soft and/or hard tissue, it may provoke local inflammation and infection that may cause pain and/or destruction within the surrounding tissues.^[2]

The accidental displacement of foreign bodies into the maxillary sinus is not an unusual complication in the dental clinical practice.^[3] Causes include the escape of teeth and dental impression material through an oroantral fistula, penetrating trauma and iatrogenic causes. Rare cases of displaced dental implant that migrated into the maxillary sinus have also been reported.^[4] Because antral perforation is frequently associated with dental procedures involving apical surgery of the maxillary molar teeth, these procedures often

create a pathway for foreign bodies to enter the maxillary sinus. The root apices of the maxillary posterior teeth, particularly those of the first molar, often lie in proximity to the floor of the antrum. In an analysis of 34 consecutive cases in which roots were displaced into the maxillary sinus, the palatal root of the maxillary first permanent molar was found to be most frequently involved. This is believed to be due to the poor surgical access of this root as well as its close anatomic relationship with the antrum.^[5] Fortunately, displaced dental instruments in the maxillary sinus are rare. A literature search revealed only two British and two Japanese published reports of dental burs displaced into the maxillary antrum. Patients with this complication would likely be referred to an otolaryngologist for the treatment. Therefore, it is important to be familiar with this complication and its management.^[6] Instrument breakage has to be managed with a successful search for the broken fragment and removal to avoid potential issues such as infection or other complications including swallowing or aspiration of the fragment.^[7]

Address for correspondence: Dr. Pratik Bipinkumar Kariya, Department of Paedodontics and Preventive Dentistry, KMSDCH, Sumandeep Vidyapeeth, Vadodara, Gujarat, India. E-mail: prateek.kariya@gmail.com

Access this article online

Quick Response Code:



Website:
www.aihbonline.com

DOI:
10.4103/AIHB.AIHB_44_16

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Elhammali N, Kariya PB, Vorse KS, Singh A. Management of iatrogenically exposed maxillary sinus with a broken periosteal elevator trapped inside. *Adv Hum Biol* 2017;7:92-4.

This article presents a case report of management of a broken surgical instrument trapped in the left maxillary sinus.

CASE REPORT

A 24-year-old male patient was brought to the Surgery Department of Ebinsena Hospital, Sirte, on by a local practicing dentist. His history revealed that the dentist had been trying to remove the fractured root of 26 with a periosteal elevator since 5 h under local anaesthesia. The elevator slipped tearing the buccal mucosa, fractured and got trapped in the maxillary bone. The wound was associated with severe bleeding. On local oral examination, it was seen that there was extensive buccal and palatal tissue laceration and the greater palatine artery had been ruptured due to multiple traumatic attempts to retrieve the fractured root piece. The on-duty oral surgeon did an oral examination and advised for radiographs which included lateral skull view and water's view.

Radiographic investigation revealed that the broken periosteal elevator was in the left maxillary sinus [Figure 1]. The on-duty oral surgeon decided that the case would be done under general anaesthesia as the patient had not eaten for more than 6 h. Medical clearance was obtained by the on-duty physician and anaesthetist. The patient was shifted to the operation theatre to be taken under general anaesthesia.

Vertical incisions were given mesial and distal to the wound, followed by relieving incisions to raise the full thickness mucoperiosteal flap. The bone on the buccal side of the socket was crushed and the socket was further widened using the bur and bone Rongeur to gain access to the maxillary sinus [Figure 2]. The sinus was irrigated with normal saline, and a high vacuum suction was used to remove blood and mucus from the sinus. A curved artery forceps was used to remove the broken fragment of the periosteal elevator [Figure 3]. The sinus was irrigated with otrivine for decongestion and the sutured using 3-0 silk sutures [Figure 4].

The patient was shifted to the ward and kept on intravenous antibiotics. The patient was discharged after 4 days once the oedema had subsided. The patient was treated with oral antibiotics and analgesics and recalled after 14 days for suture removal. On the follow-up visit, local examination revealed uneventful and healthy healing of the wound.

DISCUSSION

Burs, endodontic files and occasionally other dental instruments tend to break during surgical procedures owing to several reasons including defective manufacturing, stress, fatigue, rust or poor handling.^[8] Reported sequelae include chronic sinusitis, cutaneous fistula, rhinolith formation and chronic pain. Likewise, metallic foreign bodies have been associated with malignancy, and when the metal is lead, there is concern for an increased risk of lead poisoning, particularly in children. For these reasons, removal of metallic foreign bodies is indicated.^[9]



Figure 1: Pre-operative radiograph showing broken fragment of periosteal elevator in the maxillary sinus.



Figure 2: Surgical access to the maxillary sinus.



Figure 3: Retrieved fragment of the periosteal elevator.

Cone beam computed tomography is an excellent tool to identify metallic foreign objects. It has been proved to be a versatile technique in identifying the foreign objects in its near original



Figure 4: Post-operative.

structure and orientation.^[10] The classical surgical technique for removal of foreign bodies in the maxillary sinus is the Caldwell-Luc procedure, which involves opening the anterior wall of the maxillary sinus. Recently, technologic advances have made possible the use of an endoscopic approach for the removal of these foreign bodies. Reported advantages of the endoscopic approach, when compared with the Caldwell-Luc procedure, include less invasiveness, decreased associated morbidity, decreased risk of tooth root injury and the ability to fully visualise the sinus.^[11] Despite these advantages, open approaches are better suited for the removal of larger objects or those located anteriorly in the sinus.

It is to be emphasised that in most of the situations, elevator's fracture happened during permanent teeth extractions and was identified immediately. In our case, we chose the open approach because of the size of the fractured instrument fragment. Most cases of iatrogenic injuries because of instrument breakage are avoidable. As in the present case, the inexperienced dentist applied an inappropriate technique using a rusted instrument or one of the possible causes of elevator breakage during tooth extraction can be considered as metal fatigue of instruments due to excessive and/or incorrect sterilisation as well as traumatic applications. It has been reported that stainless steel instruments are resistant to the dry heat range between 65.6°C and 137.8°C (150°F–280°F). However, multiple sterilisations within the autoclave are known to have no negative effect on the integrity of the cutting edges of stainless steel instruments.^[11] Nevertheless, common and incorrect use of dry heat (180°C) for sterilisation can be the cause of the breakage of elevators in the present report instrument resulting in fatal sequelae.

Surgical removal of impacted third molars is associated with moderated incidence of complications (around 10%). However, less experienced surgeons are naturally expected to have significantly higher incidence of complications than trained, experienced surgeons. Post-operative complications associated with maxillary third molar extraction, the most commonly mentioned in oral surgery textbooks, are fractures of the maxillary tuberosity and accidental displacements into

the infratemporal fossa or maxillary sinus. Excessive apical force during use of elevators and incorrect surgical technique are quoted as the most usual causes of these accidents.^[12]

An implant can easily migrate into the sinus without apparent force in the posterior maxilla, clearly showing a lack of osseointegration. Various mechanisms have been proposed to explain the migration of an implant into the maxillary sinus, which falls under three main categories: changes in intrasinal and nasal pressures; autoimmune reaction to the implant, causing peri-implant bone destruction and compromising osseointegration; resorption produced by an incorrect distribution of occlusal forces.

The displacement of implants or graft materials into the maxillary sinus can result in a foreign body reaction and cause serious complications. Migration of a dental implant into the maxillary sinus may present a risk for the development of maxillary sinusitis.^[13]

Fracture of instruments can be avoided by:

- Using quality and reliable dental products
- Pre- and post-operative check-up of instruments
- Discard rusted instruments
- Appropriate technique and force.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Etoz O, Demetoglu U, Alkan A. Broken and forgotten Bein elevator remnant in three cases. *Clin Dent Res* 2012;36:45-8.
2. Killey HC, Kay LW. Possible sequelae when a tooth or a root is dislodged into the maxillary sinus. *Br Dent J* 1964;116:173-7.
3. Dimitrakopoulos I, Papadaki M. Foreign body in the maxillary sinus: Report of an unusual case. *Quintessence Int* 2008;39:698-701.
4. Iida S, Tanaka N, Kogo M, Matsuya T. Migration of a dental implant into the maxillary sinus. A case report. *Int J Oral Maxillofac Surg* 2000;29:358-9.
5. Lee FM. The displaced root in the maxillary sinus. *Oral Surg Oral Med Oral Pathol* 1970;29:491-504.
6. Balaji SM. Buried broken extraction instrument fragment. *Ann Maxillofac Surg* 2013;3:93-4.
7. Smith JL 2nd, Emko P. Management of a maxillary sinus foreign body (dental bur). *Ear Nose Throat J* 2007;86:677-8.
8. Pierro VS, de Moraes AP, Granado L, Maia LC. An unusual accident during a primary molar extraction. *J Clin Pediatr Dent* 2010;34:193-5.
9. Brinson GM, Senior BA, Yarbrough WG. Endoscopic management of retained airgun projectiles in the paranasal sinuses. *Otolaryngol Head Neck Surg* 2004;130:25-30.
10. Eggers G, Welzel T, Mukhamadiev D, Wörtche R, Hassfeld S, Mühling J. X-ray-based volumetric imaging of foreign bodies: A comparison of computed tomography and digital volume tomography. *J Oral Maxillofac Surg* 2007;65:1880-5.
11. Pagella F, Emanuelli E, Castelnovo P. Endoscopic extraction of a metal foreign body from the maxillary sinus. *Laryngoscope* 1999;109(2 Pt 1):339-42.
12. Sverzut CE, Trivellato AE, Lopes LM, Ferraz EP, Sverzut AT. Accidental displacement of impacted maxillary third molar: A case report. *Braz Dent J* 2005;16:167-70.
13. Su-Gwan K. Clinical complications of dental implants. In: Turkylmaz I, editor. *Implant Dentistry – A Rapidly Evolving Practice*. Croatia: Intech Open Access Publisher; 2011.