

Case Report

Maxillary Molar Root Displacement Into The Maxillary Sinus

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Abstract— A 57-year-old gentleman with history of angioplasty currently on Ezetimibe/Atorvastatin, Rabepazole sodium and Clopidogrel attended the Oral and Maxillofacial Surgery Specialist Clinic at Universiti Sains Islam Malaysia. He was referred for removal of iatrogenic displacement of mesiobuccal root of maxillary right first permanent molar (16) into the right maxillary sinus. This case report highlights the necessity of early referral to Oral and Maxillofacial surgeons for proper investigation and surgical planning to retrieve the displaced root from the maxillary sinus.

Keywords— Oro-antral communication; Oro-antral fistula; Root displacement; Maxillary sinus; Lateral window approach; Buccal advancement flap.

I. INTRODUCTION

Dental extraction is one of the most common procedures in dental clinic. Overall complications are relatively low after dental extractions [1]. However, displacement of teeth or roots into the maxillary sinus could occur as a result of iatrogenic dental manipulation, congenital development defect, and motor vehicle accident [2]-[4]. Inadvertently the displacement of teeth or roots can occur into the maxillary sinus or other fascial spaces such as buccal spaces, infratemporal spaces, pterygomandibular spaces, submandibular spaces and lateral pharyngeal spaces [5]. Several authors have reported that dental instruments such

as surgical burs and drills [6], root canal materials [7] and dental implant fixtures [8] can also be displaced into the fascial spaces or the maxillary sinuses.

The maxillary sinuses are one of the largest paranasal sinuses in the head and neck region. These sinuses are located at the midfacial region of the maxilla and in shape of a pyramid [9]. Maxillary first and third molar are reported to be among the teeth that are relatively at a higher risk of being displaced into the maxillary sinus during dental extraction with the prevalence of 0.6% to 3.8% [10], [11]. Foreign body that displaced into the maxillary sinuses might trigger a series of complications from mild to serious life-threatening consequences such as acute or chronic

sinusitis and formation of mucosal cysts [12]. Meanwhile, persisted untreated sinus infection might proceed to a life-threatening condition known as septic thrombosis of the cavernous sinus with a high mortality rate of 20% to 30% [13].

II. CASE REPORT

A 57-year-old Malay gentleman was referred from a private dental practitioner to the Oral and Maxillofacial Surgery (OMFS) Specialist Clinic at Universiti Sains Islam Malaysia (USIM) following a failed routine extraction of a maxillary right first permanent molar (16) with oro-antral communication (OAC) and a displacement of mesiobuccal tooth root (MBR16) into the maxillary sinus. The patient has hypercholesterolemia, gastroesophageal reflux disease and coronary artery blockage that was treated with angioplasty a few years ago. Patient attended OMFS specialist clinic at USIM one week after the failed extraction. Patient denied any discomfort of his upper right maxilla and feeling of any 'wet' sensation on his right nostril during drinking or mouth rinsing.

Dental panoramic tomography (DPT) was taken by his private dental practitioner to assess condition of the socket and to locate the position of the missing fractured MBR16 (Fig. 1). DPT showed evidence of an OAC, and the MBR16 was displaced into the right maxillary sinus apical to the socket of 16. At the private dental clinic, a cone beam computed tomography (CBCT) was ordered to precisely locate the displaced MBR16. The CBCT scan confirmed the breach of the right maxillary sinus floor with the MBR16 displaced 5mm above the apical position of the original mesiobuccal tooth root extraction socket of 16. The right maxillary sinus mucosa lining appeared thickened on the lateral and inferior right maxillary sinus walls (Fig. 2).

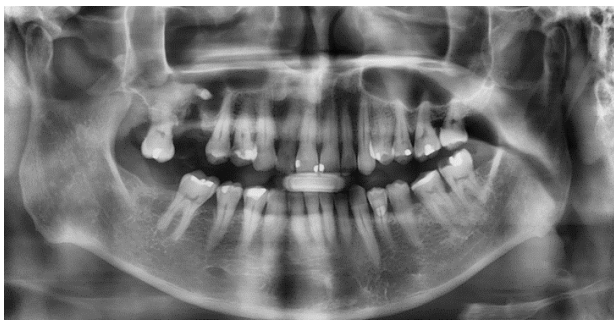


Fig. 1 DPT shows that there is a break in continuity of the right maxillary sinus floor suggestive of an OAC with a radiopaque foreign body resembling a root displaced subperiapically to the extraction socket of 16.



Fig. 2 CBCT scan in coronal and sagittal views confirming an OAC with the displaced MBR16 in the right maxillary sinus. Thickened sinus mucosa lining is seen on lateral and inferior aspects of the maxillary sinus.

Following the CBCT scan, the private dental practitioner attempted to retrieve the displaced MBR16 with a lateral window approach. Subsequently, the surgery was abandoned, and the patient was then referred to OMFS specialist clinic at USIM one week after the failed extraction.

The patient underwent another CBCT scan at USIM to confirm the current position of the fractured MBR16 prior to the surgery. The CBCT confirmed the diagnosis of OAC on 16 socket and presence of radiopacity foreign body within the right maxillary sinus suggestive of MBR16. However, the fractured of MBR16 had migrated further anteriorly.

A 3-sided flap incision was performed with two vertical relieving incisions on distal of 15 and mesial of 14. Full mucoperiosteal flap was raised and the previous surgical site (lateral bony window) was seen in the bone, 1cm above the root apices of the maxillary right first permanent molar (16). A lateral window approach was adopted on the bony defect that was previously created. The bony window was enlarged with a sterile surgical round bur and copious saline irrigation. Sterile saline was then flushed into the right maxillary sinus and followed by a high-volume surgical suction tip placed at the opening of the lateral bony window in attempt to flush out the displaced MBR16. Finally, after continuous antral lavage, MBR16 was dislodged and retrieved by high-volume suction (Fig. 3). The wound margins were approximated and closed with watertight simple interrupted 4-0 polyglactin absorbable (Vicryl) sutures.

The fistulous tract on the extraction socket of 16 was excised and a buccal advancement flap was performed to repair the OAC that already epithelialized to form oro-antral fistula (OAF). Patient was discharged with Tablet Augmentin, Tablet Paracetamol, Tablet Prednisolone, Chlorhexidine gluconate 0.12% mouthwash, GENGIGEL® Gel 1ml sachets and menthol crystals (vapour inhalation). On 1-week post-operative review, removal of sutures was performed (Fig. 4). Patient was asymptomatic, and delighted with his surgical result.



Fig. 3 Retrieval of fractured MBR16.

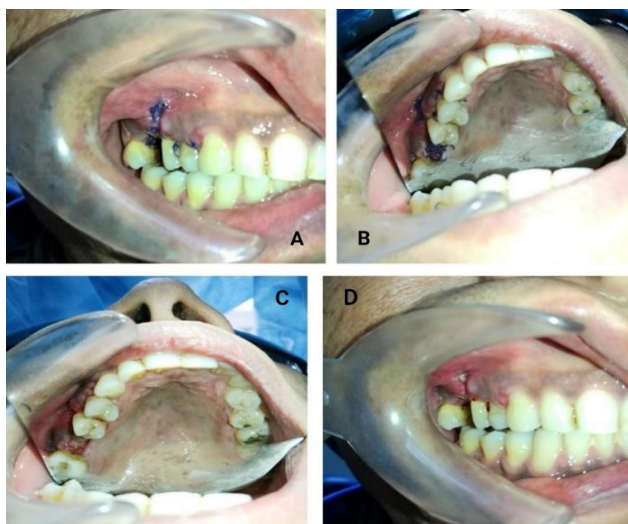


Fig. 4 Wound healing of 16 socket is progressing well. A. Buccal advancement flap is healing well with sutures in-situ over the extraction socket of 16. B. No OAF is visible on the crestal surface of the repaired buccal advancement flap. C. Upon suture removal (day-7), good wound healing progression is noted and no visible OAF. D. Removal of sutures on buccal flap. Minimal tissue scarring is noted on the buccal gingival.

III. DISCUSSION

This case report demonstrates the importance of determining the location of the displaced root with appropriate imaging and the importance of early referral. In this case report, the referring private dental practitioner has conducted a proper imaging to locate the displaced tooth. However, the referral was delayed due to some patient's factors. Simple management may be adopted to remove the displaced root from the maxillary sinus before proceeding to more complex surgical intervention. A simple crestal approach through the extraction socket is usually recommended as the first-line treatment procedure because it allows clinician to immediately retrieve the displaced root beneath the socket through the oroantral opening [14].

Risk of perforation of maxillary sinuses increases when there is a periapical lesion in relation to maxillary posterior teeth, utilization of excessive forces and incorrect extraction technique by inexperienced dental clinicians as well as improper clinical and radiological assessments [15]-[16]. Displacement of maxillary tooth or root into the maxillary sinus is not uncommon as the thickness of the maxillary sinus is merely 1mm to 7mm [17]. Excessive forces used without proper finger rest while removing the tooth may breach the sinus floor, creating an OAC. Generally, buccal root of maxillary posterior teeth was protruded into the maxillary sinus and study by Fry (2016) showed that MBR16 has the closest proximity to the floor of maxillary sinus. This can predispose the displacement of the MBR16 into the maxillary sinus if the dental clinician is impatient or inexperienced when encounter the difficult extraction [18].

A recent systematic review recommends removal of the displaced tooth or root into the maxillary sinus as early as possible before any pathological changes occur on the maxillary sinus lining that can lead to serious maxillary sinus and lung complications such as lung infection and/or abscess and pneumonia [14],[19]-[20].

The location of the displaced tooth or root must be reaffirmed with an imaging prior to the surgery. This is because the displaced tooth or root is very likely to migrate within the maxillary sinus due to frequent head posture movement of the patient and constant ciliary epithelial cells movement in the maxillary sinus [14],[20]. In this case report, the authors highlighted the importance of the second CBCT imaging at USIM to verify its precise location and to minimize the invasive surgery. The CBCT scan showed the anterior migration of the displaced root within the right maxillary sinus to a new position in between the apex of maxillary right first and second premolars. The whole right maxillary sinus showed complete opacification by mucosal thickening and mucus filling, suggestive of either inflammatory or infective response to the displaced root. Periapical radiograph is reported to be sufficient to confirm the location of displaced tooth or root [21]. However, other authors advised the use of two-plane radiograph is the minimum requirement to ascertain the position of the displaced tooth or root [22]. However, 3-dimensional imaging with a CBCT scan is considered as a gold standard because it can precisely locate the displaced tooth or root and detect any changes in the maxillary sinus [21].

Lateral bony window approach and combination of copious irrigation with 0.9% sterile normal saline and usage of a high-volume suction are the simplest surgical technique to retrieve any displaced fracture tooth or root into the maxillary sinus before proceed to a complex surgical procedure [22]. We performed the lateral window approach that is a modification technique of Caldwell-Luc in this case because the presence of the bony defect on the buccal plate. It is a preferable option in order to avoid further bone dehiscence or resorption at the edentulous 16 region.

IV. CONCLUSION

Unfortunate complications can be avoided by comprehensive clinical examination, radiological assessment and surgical planning. We would like to strongly recommend early referrals for displaced root removal from the maxillary sinus for both symptomatic and asymptomatic patients to avoid any potential sinus pathology formation.

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ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Written informed consent was obtained from the patient for the anonymised information to be published in this article. [CLIN-CONSENT (BM) 1/2015].

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest.

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