CASE REPORT

SURGICAL RETRIEVAL OF AN ORTHODONTIC TEMPORARY ANCHORAGE DEVICE FROM THE MAXILLARY SINUS: A CASE REPORT

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ABSTRACT

There is an increasing incidence of foreign objects of dental iatrogenic origin in the maxillary sinus. Such objects include root fragments, dental implants, endodontic filling material, dental bur, impression material etc. The use of temporary anchorage devices in orthodontics is gaining increasing popularity owing to its ability to reduce anchorage loss. In this case report we describe the surgical retrieval of a displaced orthodontic mini-implant from the maxillary sinus through the Caldwell-Luc approach.

KEY WORDS

mini screw, temporary anchorage device, maxillary sinus, foreign body, antrostomy

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INTRODUCTION

There has been a recent explosion in the use of temporary anchorage devices during orthodontic treatment. Temporary anchorage devices, also called TADs, include screws and/or plates placed in bone for a short period of time to provide direct/indirect anchorage to achieve desired tooth movements. Temporary anchorage devices include mini screws that are generally placed at inter-radicular sites, orthodontic bone screws that are generally placed at extra-radicular sites such as the infrazygomatic crest, and miniplates[1].

In the present paper, we describe the surgical removal of a temporary anchorage device displaced into the maxillary sinus utilizing the Caldwell-Luc procedure.

CASE REPORT

An 18-year-old female undergoing fixed orthodontic mechanotherapy was referred to our institution by a private clinic after accidental displacement of an orthodontic mini implant during its insertion. The patient did not present with any clinical complaints such as pain or swelling, however, the patient was anxious regarding the fate of the displaced mini screw and its possible sequelae. Clinical examination of the patient was unremarkable except the presence of an orthodontic mini implant placed between the roots of the upper left central and lateral incisors. A cone beam computed tomographic evaluation of the patient revealed the presence of a dislodged orthodontic mini implant in the antero-medial aspect of the left maxillary sinus, superior to the edentulous space of the region of the left maxillary first premolar, and at the level of the inferior turbinate (Figure 1).

The medical history of the patient was non contributory and the patient was medically fit to undergo surgical procedure under local anaesthesia. A joint consultation between the department of oral and maxillofacial surgery and the department of orthodontics led to the decision to proceed with the surgical retrieval of the displaced orthodontic mini implant from the maxillary sinus through the Caldwell Luc procedure under local anaesthesia.

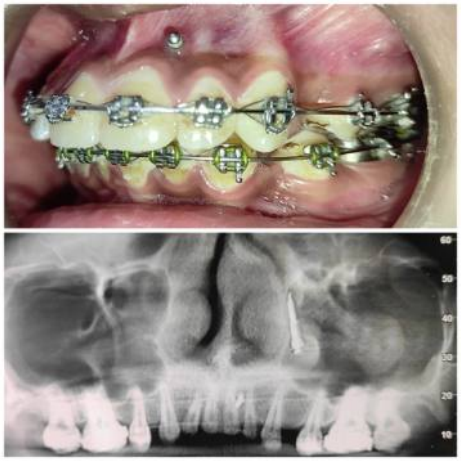

Figure 1: Pre-operative clinical examination and radiographic evaluation.

Figure 3: Post-operative radiograph demonstrating clearance of the orthodontic TAD from the maxillary sinus, and postoperative clinical examination revealing uneventful healing.

Figure 2: Surgical steps including flap design, exposure of the anterior wall of the maxillary sinus, bone window preparation, and the retrieved orthodontic TAD.

The patient agreed to the treatment plan and provided informed consent to proceed with the surgery.

On the day of the surgery, the patient was scrubbed with povidone iodine and drapped for isolation and asepsis. Infraorbital nerve, posterior superior alveolar nerve, and greater palatine nerve blocks were administered on the left side using two percent lignocaine solution containing adrenaline at a concentration of 1:100000. Crevicular incision was placed from distal aspect of the left maxillary lateral incisor to the mesial aspect of the left maxillary first molar. Two oblique release incisions were placed, one on each end of the initial crevicular incision, and a full thickness trapezoidal mucoperiosteal flap was raised to expose the anterior wall of the maxilla. Bone removal over the canine fossa was performed using a surgical micromotor handpiece and a number eight tungsten carbide round surgical bur under constant irrigation with copious amounts of cold normal saline solution. After bone removal, a part of the maxillary sinus membrane was excised using a surgical blade. A curved haemostat was inserted into the maxillary sinus to explore the anteromedial portion and floor of the maxillary sinus. Upon contact with a mobile metallic foreign body, the haemostat was used to grasp and retrieve the displaced mini screw (Figure 2).

The maxillary sinus was packed with a Bismuth Iodoform Paraffin paste (BIPP) impregnated roller gauze to prevent haematoma formation and primary soft tissue closure of the flap was done using silk suture. The patient was recalled after three days for BIPP pack removal. The patient had an uneventful healing (Figure 3).

DISCUSSION

With an increase in the use of temporary anchorage devices, clinicians also encounter a plethora of complications associated with its application. Complications commonly associated with the use of TADs include pain at insertion site, infection, screw loosening, screw fracture, root damage, overgrowth of soft tissue over the implant etc.

Literature describes a plethora of common /uncommon complications associated with TAD use and its management. Ebenezer et al. published a case series describing surgical retrieval of fractured

orthodontic mini-implants[2]. Ida et al. published a case report describing the use of diode laser for excision of hypertrophic gingival tissue surrounding an orthodontic mini-implant[3]. Kumar et al. published a case report describing displacement of a temporary anchorage device into the infratemporal fossa and its surgical retrieval[4]. Seif et al. reported a case of surgical retrieval of an orthodontic mini screw in the lateral pharyngeal space[5].

An oral and maxillofacial surgeon may often be called upon for the removal of foreign objects from the maxillary sinus. There is an increase in the incidence of foreign body presence within the maxillary sinus. It has been suggested that 60% of foreign bodies within the maxillary sinus are of iatrogenic origin and related to dental treatment and include root fragments, dental implants, endodontic filling material, dental bur, and impression material[6]. Surgical approaches to removal of maxillary sinus foreign body include the Caldwell-Luc approach, the alveolar approach, the endoscopic sinus surgery, and the intraoral endoscopic approach[7]. The endoscopic sinus surgery, though minimally invasive, cannot approach foreign bodies lodged in the anterior and inferior aspect of the maxillary sinus[8]. In our patient, the orthodontic mini-implant was lodged in the antero-medial aspect of the maxillary sinus. Hence it was decided to proceed with the Caldwell-Luc procedure, instead of referral to an otorhinolaryngologist for endoscopic surgery.

CONCLUSION

The present case highlights the fact that with increasing popularity of advanced treatment modalities such as the use of dental and orthodontic implants, there is a concomitant increase in the complications associated with them. Iatrogenic displacement of objects into the maxillary sinus, can lead to sinusitis, and hence necessitate early removal. Once identified, the location of the foreign body within the maxillary sinus must be ascertained utilizing computed tomography, and an appropriate surgical approach for its removal must be selected. The importance of thorough treatment planning and meticulous surgical technique, for placement of dental or orthodontic implants, cannot be overemphasized, and failure to comply can lead to disastrous consequences to seemingly simple procedures.

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