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Case Series

Tooth accidental displacement in extraction manoeuvres: a series of two cases

G. Barbera[1], G. Lobbia[1], E. Zatta[1], M. Beccherle[1], P. Montagna[1], F. Balliu[1], F. Melloni[1], M. Caroprese[2], P. Faccioni[1] and R. Nocini[3]

[1]Head and Neck Department, Department of Surgery, Dentistry, Pediatrics and Gynecology, University of Verona, Verona, Italy; [2]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy; [3]Unit of Otorhinolaryngology, Head & Neck Department, University of Verona, Verona, Italy

Corresponding author:
Zatta Esmeralda, DDS
Head and Neck Department, Department of Surgery,
Dentistry, Pediatrics and Gynecology,
University of Verona,
Verona, Italy
e-mail: esmeraldazatta@gmail.com

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ABSTRACT

Tooth displacement in bordering anatomical areas is a rare and challenging complication that might occur in the attempt at tooth extraction. Displacement may be attributed to multiple factors, including inadequate clinical evaluation before surgery, an inappropriate extraction plan, the application of excessive force, the use of an incorrect surgical technique, or a lack of experience on the part of the operator. Additionally, anatomical characteristics of the patient must be considered. In this report, we present two examples of tooth displacement and describe the surgical approach adopted to achieve tooth removal.

INTRODUCTION

Exodontia - or more generally, tooth extractions - is not a risk-free procedure and might sometimes cause a series of unpleasant complications, such as uncountable bleeding, tooth root fracture, soft tissue alterations, fracture of maxillary bone tuberosity, prolapse of Bichat fat pad and perforation of Schneiderian sinus membrane (1). Partial or complete tooth displacement, both due to iatrogenic action or trauma, in bordering anatomical areas is a rare and challenging complication (2, 3). Cases of displacement in the maxillary sinus (4), infra-temporal fossa (5, 6), pterygoid-mandibular space (7), lateral pharyngeal space (8), and buccal space (9, 10) have been reported.

PATIENTS AND METHODS

In this report, two cases of maxillary and mandibular teeth that were displaced accidentally during extraction maneuvers are described. This complication was diagnosed by clinical examination and computed tomography (CT). Patients were treated in the Department of Maxillofacial Surgery at the Azienda Ospedaliera Universitaria Integrata of Verona, Italy, from 2018 to 2023. Declaration of Helsinki guidelines were followed.

Case 1

A 32-year-old male patient was referred to our department after his dentist had attempted to extract the right mandibular third molar and a cystic lesion. The tooth was accidentally displaced in the left infratemporal fossa during the procedure. Tooth displacement caused the patient paresthesia of the left border of the tongue, pain, and discomfort during swallowing (11). The tooth could not be identified by intraoral examination or palpatory maneuvers. CT scan was performed to detect tooth position and revealed that the dental element was dislocated medially to the mandibular ramus, between masticatory and lateral pharyngeal space (Fig. 1). Surgery was performed under general anesthesia. The pre-existing mucosal incision was enlarged, the subperiosteal flap was reflected carefully on the lingual side from the second premolar to the anterior border of the ramus region, the lingual nerve was identified and preserved (Fig. 2). The dislocated tooth was identified onto the pterygoid muscle and reached by blunt dissection of peri-mandibular soft tissues on the lingual right side of the mandible and removed using Pean forceps. Irrigation and suture of the surgical site was performed. The patient was discharged the following. Follow-up after 2 weeks showed improvement of lingual nerve paraesthesia.

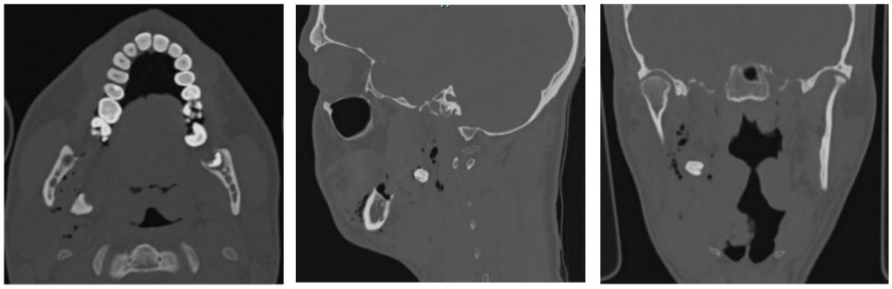

Fig. 1. *CT scan showing the displaced tooth in ITF (axial, sagittal, and coronal projections).*

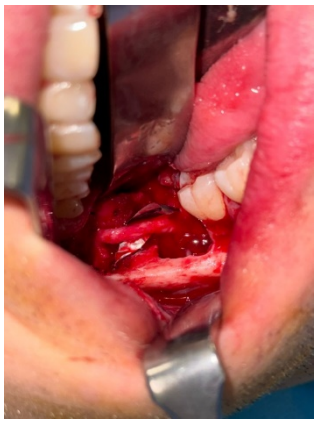

Fig. 2. *Preservation of lingual nerve.*

Case 2

A 54-year-old female patient with a history of extraction of dental element 2.7 and apicectomy of 2.6 was referred to our department for chronic maxillary sinusitis refractory to antibiotic therapy. CT scan showed an obliterated left maxillary sinus with a high-density foreign body (Fig. 3). Intra-oral examination showed an oral-antral fistula secreting pus. Two surgical approaches were performed: with an intraoral approach, we extracted element 2.6 and removed the fistula. With endoscopic sinus surgery, the apex of element 2.6 was visualized after wide maxillary antrostomy and was removed from the sinus (Fig. 4).

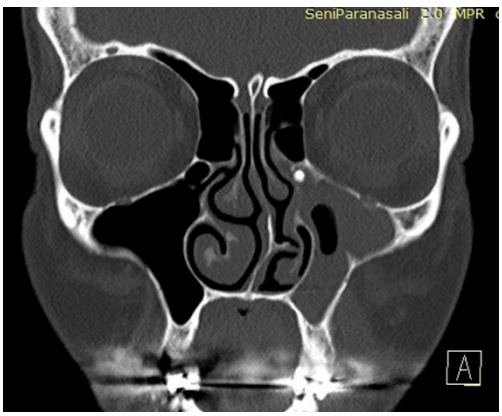

Fig. 3. *Foreign body in the left maxillary sinus.*

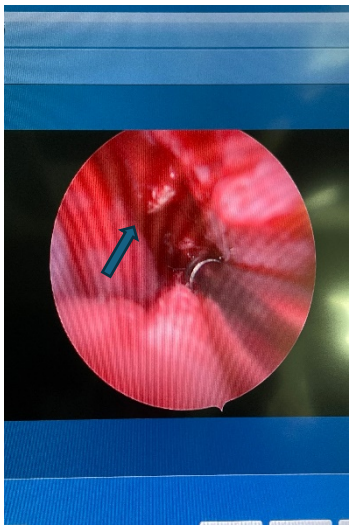

Fig. 4. *Endoscopic sinus surgery; apex of element 2.6 (blue arrow).*

DISCUSSION

Complications associated with surgical teeth extraction have been widely described in the literature: osteitis, alveolar bone fracture, tooth fracture, tuberosity fracture, bleeding, oro-nasal communication, injury of adjacent teeth, infection, and accidentally displaced teeth. In most cases, the tooth is displaced in the infratemporal fossa, followed by the maxillary sinus. Displacement may be attributed to inadequate clinical and radiological evaluation before surgery, inappropriate extraction planning, application of wrong and excessive force, poor selection of surgical technique, or lack of operator experience. In addition, anatomical characteristics of the patient must also be considered. This may cause perforation of the maxillary sinus floor and Schneiderian membrane, lingual alveolar bone, or soft tissues of the mouth (12).

The retrieval of the displaced teeth can be challenging, and their exact position must be assessed precisely with radiological exams (CT scan or CBCT scan are the gold standard). The surgical approach depends on the localization of the displaced tooth, patient anatomical characteristics, and surgeon experience. Regarding the optimal timing for surgical intervention, some authors advocate for a delay of at least two weeks to allow for the formation of fibrous tissue that can immobilize the teeth, preventing further dislocation during the retrieval process. However, a comprehensive review of the literature reveals that postponing surgery may increase the risk of infection (13-15).

A variety of surgical approaches are available to remove a displaced tooth: intraoral, extraoral, and combined approaches are used to access the submandibular space, buccal space, and lateral pharyngeal space (12). Bozkurt et al. used an extended lingual mucoperiosteal flap for the treatment of mandibular displacements. The lingual pouch approach was supported by extraoral compression to raise and stabilize the displaced fragment successfully (7).

Different approaches to the maxillary sinus are described in the literature: endoscopic retrieval and the Caldwell-Luc approach are the two most frequently described surgical methods (16, 17), even if other open approaches may be employed (18). A study by Huang et al. (19) reported 24 patients with accidentally displaced root fragments in the maxillary sinus. All patients underwent the Caldwell-Luc procedure with no complications. The most involved tooth was the first upper molar. The authors asserted that the Caldwell-Luc procedure is a safe, simple, and fast option for the retrieval of foreign bodies from the maxillary sinus. The

Caldwell-Luc approach has been the treatment of choice for a long period due to its simplicity of execution, low complication rate, and the advantage of facilitating the closure of the oroantral fistula (20).

A common complication of tooth displacement into the maxillary sinus is maxillary sinusitis, produced by the presence of oroantral communication or the infection caused by the displaced teeth (16). Management of displaced teeth in the maxillary sinus associated with sinusitis includes the removal of the tooth and removal of the infected sinus mucosa (21). In this case, an endoscopic approach may be used. Endoscopy might be either transnasal, through a bone window in the canine fossa, or the socket. This technique allows visualization of the maxillary sinus and a simple way to remove the displaced tooth non-invasively (22).

The infratemporal fossa is an anatomical space containing significant structures such as the third branch of the mandibular nerve, the maxillary artery with its branches, and the pterygoid venous plexus; this is why the infratemporal fossa represents a challenging area to operate in (23). Approaches to infratemporal fossa described in the literature include intraoral access with extended buccal sulcus incision, trans-sinusoidal approach, and extraoral approach. Wide incision in the maxillary sulcus and blunt dissection are reported to have lower success rates and a risk of recurrence of hemorrhage during the exploration of the infratemporal fossa (24). Due to poor visibility of the region, to avoid blind exploration of ITF proposed the use of active navigation image guidance system to facilitate continuing monitoring of the position (15, 24, 25). It is evident that a navigation system can be a valuable tool in determining the position of an object within the body while operating. However, it is essential to note that surgery is still conducted without directly visualizing the tooth and the surrounding structures. A trans-sinusoidal approach can be a good option, thus quite traumatic, the removal of displaced teeth from the infratemporal fossa (15).

CONCLUSIONS

The displacement of a tooth into the surrounding tissues is a rare but potentially serious complication that requires prompt diagnosis and management to reduce morbidity. Suppose the tooth is inadvertently displaced into adjacent anatomical spaces during the attempted extraction. In that case, it is the responsibility of the treating surgeon to verify the exact location of the tooth fragment through clinical examination and imaging and to formulate a treatment plan based on clinical characteristics, size, location, and adjacent structures.

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