Int J Clin Exp Med 2015;8(10):19591-19595
www.ijcem.com /ISSN:1940-5901/IJCEM0013767

Case Report

Intraoral management of iatrogenically displaced lower third molar roots in the sublingual space: a report of 2 cases

Sufeng Zhao*, Zheng Huang*, Tengyu Geng, Lanzhu Huang

*Department of Oral and Maxillofacial Surgery, Nanjing Stomatological Hospital, Medical School of Nanjing University, Nanjing 210008, People's Republic of China. *Equal contributors.*

Received August 1, 2015; Accepted October 3, 2015; Epub October 15, 2015; Published October 30, 2015

Abstract: Surgical removal of the mandibular third molars is one of the most common procedures performed by dentists, as well as by oral and maxillofacial surgeons. Accidental displacement of teeth or roots into the fascial spaces, during surgical removal of the mandibular third molars, is a rare, but serious complication. Herein, we present 2 cases of iatrogenically displaced mandibular third molar roots into the sublingual space, which were successfully removed under local anesthesia intraorally. In addition to methods to minimize the risk of accidental tooth or root displacement, the importance of recognizing this complication and the methods of retrieval are also discussed.

Keywords: Mandibular third molar, cone-beam computer tomography (CBCT), tooth extraction, sublingual space, displacement

Introduction

Surgical removal of the mandibular third molars is one of the most common procedures performed by dentists, as well as by oral and maxillofacial surgeons. Complications associated with this procedure often involve pain, swelling, dry socket [1], paresthesia of the lingual [2] or inferior alveolar nerve, hemorrhage, and infection [3]. The accidental displacement of teeth or roots into the fascial spaces is a rare complication that causes significant physical and psychological suffering to patients. Studies reporting the occurrence and management of this condition are limited. We report 2 cases presenting with iatrogenically displaced mandibular third molars into the sublingual space that were successfully extracted under local anesthesia intraorally. We also discuss the causes and complications as well as the methods of prevention and removal of accidentally displaced teeth or roots into the fascial spaces. This study was approved by the institutional review board of the Affiliated Stomatological Hospital, Medical School, Nanjing University. Written informed consent was obtained from the patients involved.

Case report

Case 1

A 29-year-old female was referred to the Oral Maxillofacial Surgery Unit of our hospital by a local dentist. A detailed history revealed that the patient had undergone a traumatic experience during the surgical extraction of the mandibular right third molar, involving the use of a dental hammer. The patient complained of pain and limited mouth opening. No clinical symptoms of dysesthesia of the lip or tongue were found. Clinical examination showed swelling and tenderness in the right submandibular area, with a mouth opening of about 5 mm. The patient's medical history was non-contributory. A panoramic x-ray revealed the presence of a high density shadow below and behind the tooth socket of the inferior right third molar (**Figure 1A**). Cone-beam computer tomography (CBCT, New Tom VG, Italy) revealed the location of the third molar in the sublingual space, close to the socket of the mandibular third molar (**Figure 1B** and **1C**). The patient was recommended to undergo another surgical procedure under local anesthesia for the removal of the displaced root. An inferior alveolar nerve block

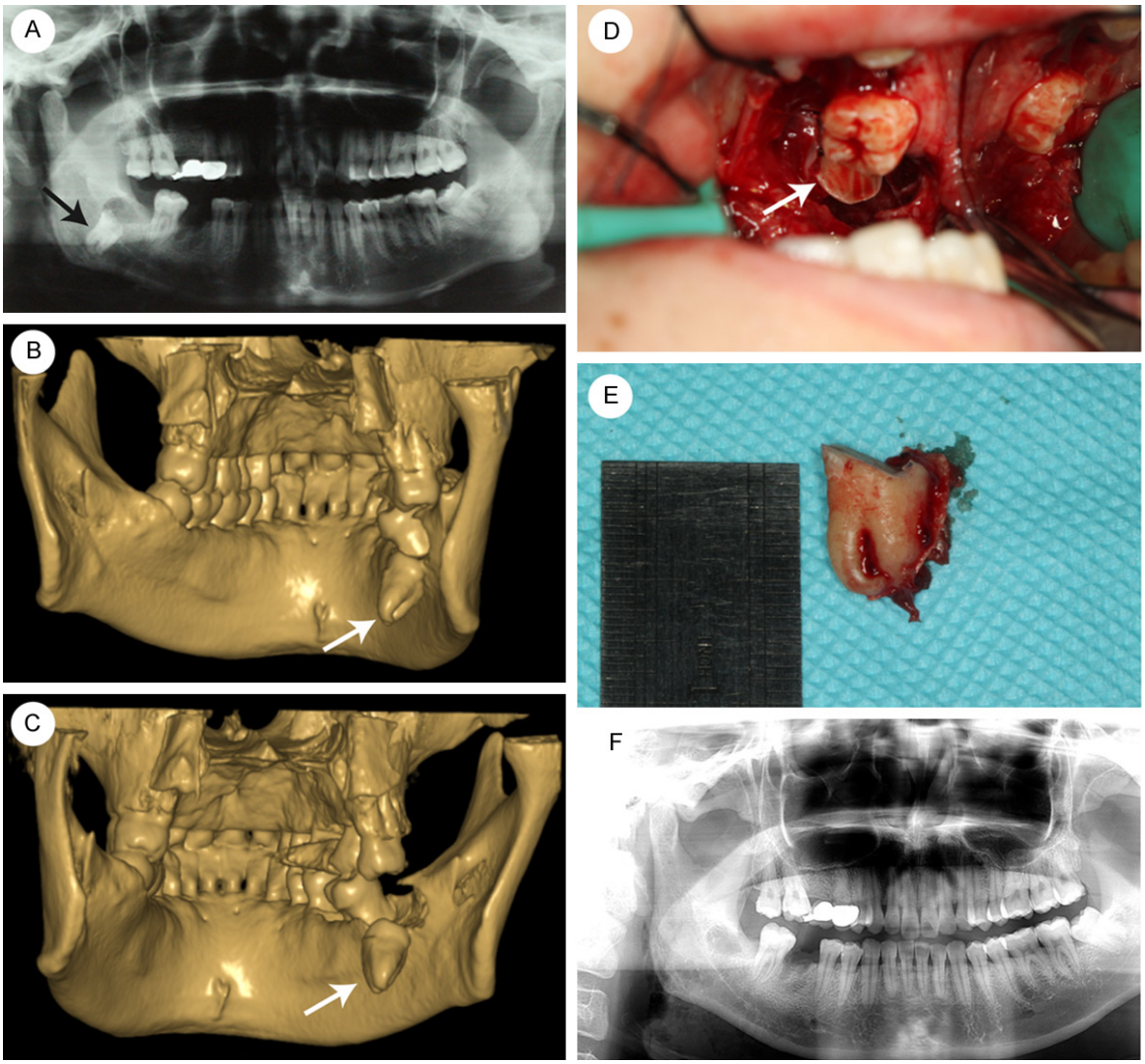

Figure 1. Case 1: A 29 year old female with displaced mandibular third molar root. A. Panoramic radiograph of the patient reveals the presence of a high density shadow below and behind the tooth socket of the mandibular right third molar. B and C. CBCT images showing the location of the displaced root in the sublingual space. D. Intraoral view illustrating exposure of the tooth fragment, after reflecting the flap. E. The displaced root was found to be adhered to the lingual plate. F. Postoperative panoramic x-ray of the patient.

along with long buccal nerve infiltration was performed by injecting 4% articaine supplemented with adrenaline (1:100,000). Under local anesthesia, the degree of mouth opening was manually increased to 25 mm. After bimanual examination, a lingual flap was raised from the second premolar to the anterior border of the ramus, and the sling was sutured with 4-0 Vicryl™ sutures, avoiding damage to the lingual nerve (**Figure 1D**). Subsequently, the mandibular third molar root was removed using artery forceps, followed by thorough irrigation, and suturing of the incision (**Figure 1E** and **1F**). The operation lasted about 20 minutes. Antibiotics and analgesics were prescribed for the following 5 days. The sutures were removed after 7 days, and the patient presented with no postoperative problems. After 1 month, the patient's mouth opening increased to 35 mm, and no postoperative problems were observed at the 1-year follow-up.

Case 2

A 33-year-old female patient presented at the Oral and Maxillofacial Surgery unit accompanied by her dentist, who described the occurrence of an accident during the surgical extrac-

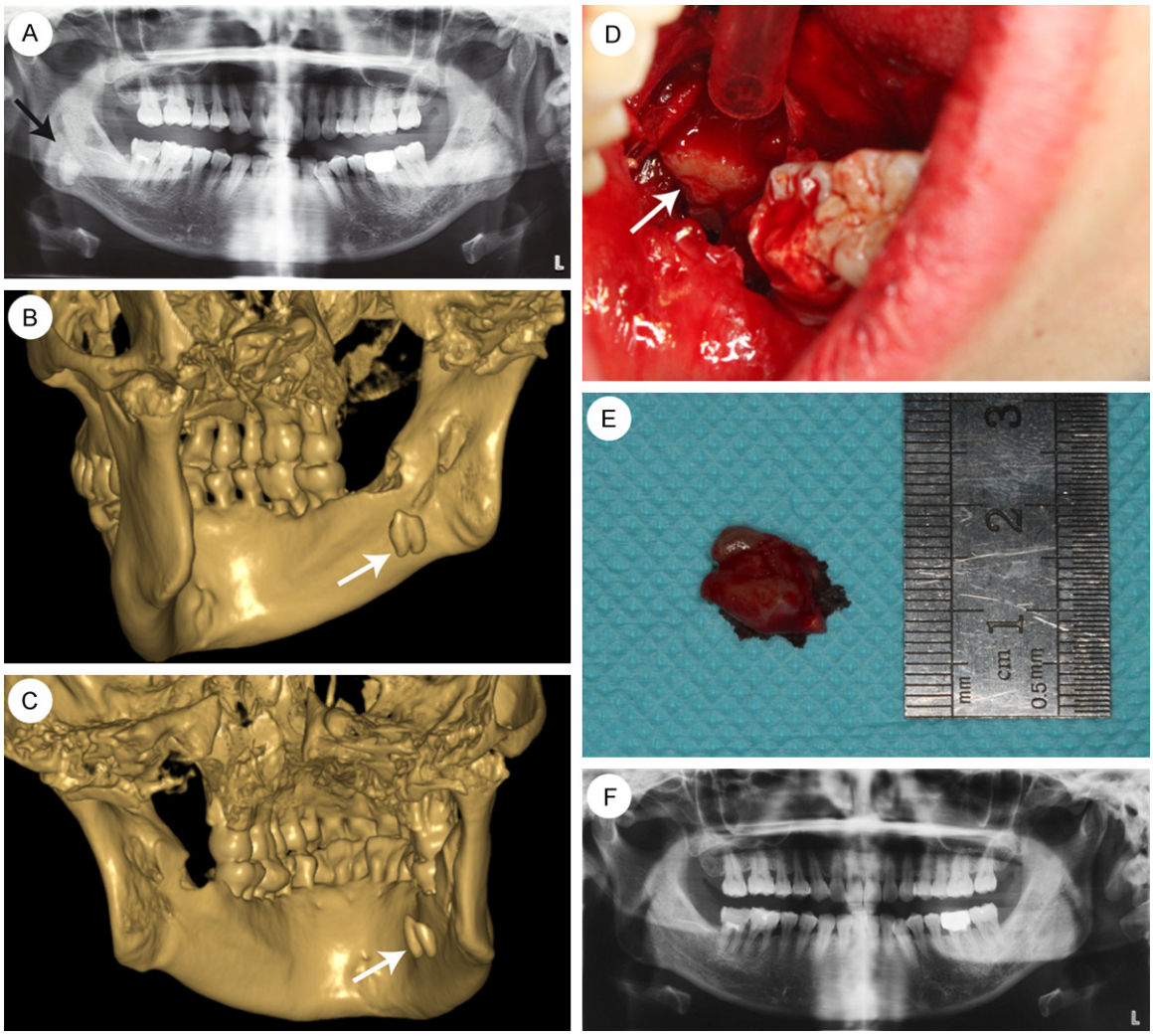

Figure 2. Case 2: A 33 year old female with displaced mandibular third molar root. A. Panoramic x-ray showed remnants of some fragments on the mesial side, below and behind the lingual tooth socket. B and C. CBCT images showing the location of the displaced root in the sublingual space. D. Intraoral view showing reflection of the flap to expose the area. The lingual nerve and the flap are in close proximity. E. The displaced tooth/root fragment was removed from the patient's mouth. F. Postoperative panoramic x-ray of the patient.

tion of a horizontally placed mandibular right third molar. Following the removal of the decayed crown, the dentist had attempted to expand the space around root using an air turbine. While attempting to luxate the tooth in the mesial direction, by placing a dental elevator into the space, the root had suddenly "disappeared", followed by active bleeding. The patient complained of limited mouth opening. Clinical examination showed a mouth opening of about 6 mm. Panoramic x-ray and CT revealed the presence of a few fragments in the mesial area of the socket. The root was located below and behind the lingual tooth socket, while bone defects were observed in the distal and lingual areas of the tooth socket (**Figure 2A-C**). Patient preparation, anesthesia and incision were performed as described for Case 1. Piezosurgery (Piezotome, France) was used to remove lingual bone to facilitate better tooth visualization. After raising the floor of the mouth, a periosteal elevator was used to locate the root within the area, with great caution. The root was found embedded in the mylohyoid muscle and removed with artery forceps (**Figure 2D** and **2E**). The whole procedure lasted 45 minutes. The patient received the same postsurgical treatment as described for Case 1 (**Figure 2F**). No postoperative problems were noted at the 6-month follow-up.

Discussion

Accidental displacement of teeth or roots into the fascial spaces during the surgical removal of mandibular third molars is a rare complication. Few studies have reported the accidental displacement of teeth or roots into the infratemporal fossa [4], pterygomandibular space [5], lateral pharyngeal space [6], submandibular space [7] and sublingual space [8]. A majority of the cases involved root displacement, which is attributed to the slanted orientation of the mandibular third molars, entailing the removal of the crown before the roots. Techniques to extract a displaced tooth or root, include intra-oral, extra-oral, or a combination of both approaches.

Displacement of the mandibular third molars leads to several potential risks as follows. 1. Mandibular third molars are generally located adjacent to the inner side of the ascending ramus. The lingual plate surrounding the tooth is typically thin, especially near the root, and absent occasionally. 2. On occasion, the lingual plate adheres to the tooth. 3. Repeated pericoronitis leads to inflammation of the mandibular distal bone of the third molar, resulting in a "bag" within the sublingual and pterygomandibular space. 4. A distolingual tooth inclination results in translation of force in an inferior or lingual direction, during tooth extraction. 5. A narrow operative field causes the elevator to push against the tooth instead of the periodontal gap. 6. Impacted mandibular third molar. 7. Application of uncontrolled force. 8. Excessive manipulation such as increased removal of bone tissue. 9. Soft tissue resistance is not adequately relieved. 10. Poor radiological assessment.

The sublingual area is a triangular virtual space, located at the floor of the mouth, above the mylohyoid muscle under the free portion of the tongue. There are no posterior fascial borders between the sublingual and submandibular spaces. In addition, there is no fascial border between the two spaces, and the inferior parapharyngeal space, resulting in free communication between these spaces. There are many important structures in the sublingual space, such as the duct of the submandibular salivary gland, branches of the lingual artery, and the lingual and hypoglossal neural bundles. Displacement of a tooth or root into the sublingual space may cause bleeding, pain and limited mouth opening. Furthermore, infection within the space may result in life-threatening complications, such as deep neck infections, thrombosis of the internal jugular vein, erosion of the carotid artery and its ramifications, interference with cranial nerves (IX to XII), mediastinitis, and airway compromise. Therefore, conditions involving tooth or root displacement within the fascial spaces must be managed with utmost care and diligence.

The timing of extraction of the displaced tooth or root is controversial. Some surgeons recommend its removal as early as possible [9], while others believe the surgical procedure should be performed 3 to 4 weeks after the displacement. However, delay in the removal of the displaced tooth or root, may result in fibrosis and stabilization of the fragment [10]. In the present study, the delay in treatment had caused more pain and discomfort to the patient. The symptoms of pain, swelling and limited mouth opening may lead to trismus, which is associated with a high risk of infection. The potential risk of root fracture, or further migration deeper into the spaces is serious. Although some surgeons suggest delaying the removal of the displaced tooth or root in conjunction with radiographic examination and periodic review, we recommend surgical removal as soon as possible.

It is very important to precisely localize the fragment with the aid of panoramic or occlusal radiographs, if necessary, before surgery. CBCT was used in the present study for better imaging of the region, overall evaluation of displaced fragment as well as adjacent anatomical structures, and low-radiation exposure. The surgeon can conveniently measure the length of the fragment and its distance to nearby structures, via bidimensional sectional views [7, 8]. Bimanual examination can be used to help localize the fragment. One hand can be used to push upwards from the inner side of the mandible. The resulting external pressure prevents deeper displacement of the fragment, while lifting the floor of the mouth at the same time. The other hand can be used to slide softly on to the lifted floor of the mouth and palpate the area. However, this method is not suitable for patients presenting with oral swelling, or obese patients.

No single technique is universally applicable, due to differences in the direction of displacement, the size of fragment, delay in retrieval, and tissue reactions [7]. In the present report, an intraoral approach was used under local anesthesia. It is simple and safe, and avoids complications caused by general anesthesia, which is expensive and requires admittance to the hospital. Under local anesthesia, the degree of mouth opening is considerably increased. The conventional method of retrieval entails raising of an extended lingual mucoperiosteal flap from the original incision to the premolar region. The lingual nerve should be protected from injury during the exploration. In the present study, piezosurgeries were used to remove partial mylohyoid ridges, and to enlarge the tooth socket, thereby providing the surgeon with a wider operative field and minimizing the risk of bleeding, nerve damage and emphysema caused by the air turbine. With the help of a curette or a periosteal elevator, the fragments were removed by pushing from the back to the front of the field. During this process, it is important to avoid the risk of pushing the fragment deeper into the fascial spaces, further complicating the situation.

In comparison to traditional chisels, minimally invasive tooth extraction methods such as air turbines are more widely used, resulting in lower chances of accidental displacement of the tooth or root into the adjacent fascial spaces. However, excessive bone removal should be avoided following the principle, “more teeth, less bone”. The risks involved with third molar removal must be explained to the patient, before surgery. Cases involving “risk factors” for the extraction of third molars must undergo detailed examination in order to optimize surgical outcomes. Adverse consequences such as nerve injury or displacement to deeper tissues must be considered during treatment planning. Adequate preoperative radiographic assessment can avoid the risk of accident. Removal of third molars before the roots are fully developed can reduce the risk of displacement [8]. During surgery, it is imperative to pay attention to details, protect the soft and hard tissues, and use appropriate force while using surgical instruments.

Acknowledgements

This work was supported by Technology Development Specialty of Medicine/Science, Nanjing (YKK12120), and Jiangsu Provincial Clinical Medicine of Science and Technology project (BL2012017, BL2013005).

Disclosure of conflict of interest

None.

Address correspondence to: Lanzhu Huang, Department of Oral and Maxillofacial Surgery, Affiliated Stomatological Hospital, Medical School, Nanjing University, No. 30 Zhong Yang Rd, Nanjing 210008, People’s Republic of China. Tel: +8602583620120; Fax: +8602583620200; E-mail: hlznjkq@163.com

References

[1] Sisk AL, Hammer WB, Shelton DW and Joy ED Jr. Complications following removal of impacted third molars: the role of the experience of the surgeon. J Oral Maxillofac Surg 1986; 44: 855-859.

[2] Rood JP. Permanent damage to inferior alveolar and lingual nerves during the removal of impacted mandibular third molars. Comparison of two methods of bone removal. Br Dent J 1992; 172: 108-110.

[3] Goldberg MH, Nemarich AN and Marco WP 2nd. Complications after mandibular third molar surgery: a statistical analysis of 500 consecutive procedures in private practice. J Am Dent Assoc 1985; 111: 277-279.

[4] Shahakbari R, Mortazavi H and Eshghpour M. First report of accidental displacement of mandibular third molar into infratemporal space. J Oral Maxillofac Surg 2011; 69: 1301-1303.

[5] Tumuluri V and Punnia-Moorthy A. Displacement of a mandibular third molar root fragment into the pterygomandibular space. Aust Dent J 2002; 47: 68-71.

[6] Medeiros N and Gaffree G. Accidental displacement of inferior third molar into the lateral pharyngeal space: case report. J Oral Maxillofac Surg 2008; 66: 578-580.

[7] Huang IY, Wu CW and Worthington P. The displaced lower third molar: A literature review and suggestions for management. J Oral Maxillofac Surg 2007; 65: 1186-1190.

[8] Aznar-Arasa L, Figueiredo R and Gay-Escoda C. Iatrogenic displacement of lower third molar roots into the sublingual space: report of 6 cases. J Oral Maxillofac Surg 2012; 70: e107-115.

[9] Khanna JN, Malik NA, Galinde JS and Andrade NN. Cervical infection due to an unusual displacement of teeth as a result of trauma. Int J Oral Maxillofac Surg 1987; 16: 630-633.

[10] Esen E, Aydogan LB and Akcali MC. Accidental displacement of an impacted mandibular third molar into the lateral pharyngeal space. J Oral Maxillofac Surg 2000; 58: 96-97.