CASE REPORT

Intraoral management of displaced root into submandibular space under local anaesthesia – A case report and review of literature

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Abstract Accidental displacement of an impacted third molar, either a root fragment, crown, or the entire tooth, is a rare complication that occurs during exodontia. The most common sites of dislodgment of an impacted mandibular third molar fragment are the sublingual, submandibular, and pterygomandibular spaces. Removal of a displaced root tip from these spaces may be complex due to poor visualization and limited access. A thorough evaluation of all significant risk factors must be performed in advance to prevent complications. This paper reports the case of a patient who presented with a mandibular third molar root that was displaced into submandibular space. The case was managed intraorally under local anaesthesia and review of the literature.

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1. Introduction

Third molar surgery is the most common procedure performed by dentists as well as by oral and maxillofacial surgeons worldwide. Complications, such as pain, dry socket, swelling, paresthesia of the lingual or inferior alveolar nerve, bleeding, and infection, occur in about 1% of third molar operations (Susrala et al., 2003; Tumuluri and Punnia-Moorthy, 2002; De Biase et al., 2005; Kamburoglu et al., 2010). Accidental displacement of some portion of the third molar into the sublingual, submandibular, or pterygomandibular space is a rare complication (Nusrath and Banks, 2010; Gay-Escoda et al., 1993). The most common site of displacement of a molar root or root tip is the maxillary sinus. Excluding cases with atypical anatomical considerations, such as a distolingual tooth inclination or a thin lingual cortex, displacement can usually be attributed to the application of uncontrolled or excessive force, excessive manipulation, improper surgical planning, or poor clinical and/or radiological assessment (Arasa et al., 2012).

Because the incidence of third molar displacement is very low, there are only a few case reports of this condition in the literature and there is little information about it in general. Here, we report a case of an accidently displaced mandibular third molar root into submandibular space and the intraoral retrieval of the displaced root under local anaesthesia and

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provide a brief review of the relevant literature. The study was approved by our institutional review board and the patient provided written informed consent for publication and use for teaching purposes.

2. Case report

A 42-year-old female patient was referred by a private practitioner to the Oral and Maxillofacial Surgery unit of our institution with the chief complaint of pain and an inability to open her mouth one month after extraction of her wisdom teeth. Her mouth opening was reduced to ~15 mm. A panoramic radiograph revealed a deep-seated root fragment positioned distally, away from the root tip of mandibular second molar (Fig. A1). The patient reported that she had felt some hard swelling in the submandibular region immediately after the extraction, but that it had subsided slowly. A computed tomography (CT) scan performed to expose the precise position of the root fragment revealed a fracture in the patient’s lingual plate near the third molar region (Fig. A2) and a hyperdense fragment situated medial edge of the submandibular space (Fig. A3). We proposed surgical treatment under local anaesthesia and explained the procedure and potential complications to the patient, who agreed with our proposal.

In preparation for the procedure, an inferior alveolar, lingual nerve block with long buccal nerve infiltration was undertaken by injection with 4% articaine supplemented with adrenaline (1:100,000). The patient’s mouth opening angle was increased manually under local anaesthesia and the displaced root fragment was palpated with the operator’s index finger and confirmed to be situated deep in the submandibular region. A buccal flap was raised from the mandibular first molar to the external oblique ridge distally and a lingual flap was raised mesially up to the first premolar and distally adjoined with the buccal flap. The lingual flap was reflected up to the submandibular region with great care until the root fragment could be visualized with good illumination and support from an extra-orally placed finger. With the help of a curette, the root was pushed outward and removed (Fig. A4). The wound was irrigated with normal saline and the flaps were sutured with 3–0 vicryl sutures. An antibiotic and analgesic were prescribed for 5 days. On the 7th postoperative day, the patient reported that she was not experiencing any troubling complications, her healing appeared to be satisfactory, and the sutures were removed. After one month, the patient was able to open her mouth ~35 mm (Table A).

![Figure A.1](image1.png) Cropped Orthopantomogram OPG showing deeply situated third molar root.

![Figure A.2](image2.png) Axial CT scan showing a lingually displaced root fragment.

![Figure A.3](image3.png) Three-dimensional CT image showing a root deep in the submandibular fossa. Arrows showing displaced root piece.

![Figure A.4](image4.png) Retrieved root piece.
3. Discussion

Howe presented the first case of removal of a displaced tooth from the submandibular space in 1958. Since that time, there have been many case reports of displaced tooth fragments in the English literature, but displacement of a root fragment into the submandibular space has been described only rarely (Arasa et al., 2012).

The accidental displacement of a mandibular third molar root or root fragment during extraction is rare, nevertheless a well-recognized potential complication included in textbooks (Ertas et al., 2002; Huang et al., 2007). This complication is considered to be associated with various risk factors, including patient age, tooth position, the presence of a lingual plate fracture, abnormal thickness of the lingual plate, excessive or uncontrolled force, lack of operator expertise, and poor clinical and radiological assessment (Susrala et al., 2003; Tumuluri and Punnia-Moorthy, 2002; Ertas et al., 2002; Huang et al., 2007). Removal of third molars at a young age before the roots are fully developed can minimize the risk of displacement (Arasa et al., 2012).

The symptoms of a displaced root depend upon its size, location, and whether or not there is an associated infection. Some patients are symptom-free, whereas others experience pain, swelling, and trismus in the immediate postoperative period. According to a removal delay of >24 h may result in an inflammatory response that can lead to intense pain, swelling, trismus, infection and further migration of the root or root fracture into even deep spaces, producing a foreign body reaction.

A displaced root fragment should be removed promptly upon proper localization with radiographs or a CT scan. Manual palpation is also a useful localization method. CT scanning is considered to be the most appropriate technique with which to determine a displaced root fragment’s exact size and location. Cone-beam CT, if available, can provide the added advantage of low-radiation exposure and three-dimensional views (Tumuluri and Punnia-Moorthy, 2002; Kamburoglu et al., 2010; Arasa et al., 2012; Huang et al., 2007). If CT is not available, panoramic and occlusal radiographs can be used.

Several approaches have been described for the intraoral removal of displaced dental root fragments in the literature. The intraoral approach under local anaesthesia is the simplest and least invasive technique for removal of displaced root pieces in the soft tissue of the lingual pouch. Local anaesthesia is used commonly because it is considered to be simple and safe and it avoids complications related to the use general anaesthesia, which is relatively costly and may involve hospital admission. In the present case, adequate visualization was achieved by way of a lingual mucoperiosteal flap raised to the premolar site. However, this approach may not provide adequate visibility and access in other situations. When a fragment is displaced within deep spaces, an extraoral approach may be indicated (Ozalp et al., 2010; Yeh, 2002). Indeed, a combination of intraoral and extraoral approaches may be needed to retrieve tooth and root fragments (Yeh, 2002). Many complications, including paresthesia and haemorrhage, can occur following retrieval of a root fragment from the sublingual space due to its close proximity to the lingual nerve, inferior alveolar nerve, and blood vessels (Tumuluri and Punnia-Moorthy, 2002; Gay-Escoda et al., 1993; Ertas et al., 2002; Huang et al., 2007). To decrease the risk of complications, a thorough treatment plan should be developed before proceeding with removal.

In summary, the present case report describes the case of a displaced third molar root in the submandibular space. A CT scan provided accurate localization of the root, which was then removed successfully via an intraoral approach under local anaesthesia by carefully reflecting a deep lingual flap up to the submandibular region. There were no postoperative complications.

4. Conclusion

Adequate clinical and radiological assessment should be performed before proceeding with third molar surgery. If a dental fragment becomes displaced into a deep space, it is very important to determine the exact location by CT or high-quality radiography. An experienced surgeon should be consulted to avoid any inadvertent complications.

Conflict of interest and ethical statement

Authors do not have any conflict of interest and the study was approved by institute review board and written informed consent was taken from the patient for publication and teaching purpose.

References