

Displacement of a mandibular third molar root fragment into the pterygomandibular space

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Abstract

Displacement of root fragments into adjacent anatomical areas is an uncommon complication of the removal of teeth. This paper describes the management of a mandibular third molar root fragment that was forced into the antero-inferior aspect of the pterygomandibular space. The importance of tomographical radiographs in the visualization of the displaced root is also discussed.

Key words: Complications, pterygomandibular space, computed tomography (CT) scan, fenestration.

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INTRODUCTION

The removal of mandibular third molars is a common surgical procedure performed by oral surgeons and dentists alike. As expected with any surgical operation, there are a number of intra- and post-operative complications associated with this procedure. These include alveolar osteitis,^{1,4} dysaesthesia of the inferior alveolar⁵ and lingual nerves,⁶ haemorrhage⁷ and infection.³ Other less common complications are damage to adjacent teeth, fracture of the mandible and periodontal pocket formation distal to the adjacent teeth. Accidental displacement of fractured roots into the sublingual, submandibular, pterygomandibular spaces and the inferior alveolar canal is an uncommon occurrence.

A review of the literature revealed very limited information about the incidence, causes and the management of displaced tooth/root fragments. Grandini *et al.*⁸ reported four cases of tooth/root fragments displacement into adjacent anatomical areas, namely the submandibular fossa. Two of these cases were of mandibular third molar teeth, both of which were displaced into the submandibular fossa. The authors reported that these displaced teeth were removed through an intra-oral approach. They

reasoned that the displacement of teeth/root fragments is due to improper diagnosis, poor selection of surgical technique and incorrect use of surgical instruments.

This paper describes the diagnosis and management of a case of accidental displacement of a fractured mandibular third molar root fragment into the pterygomandibular space.

CASE REPORT

A 28-year-old female patient was referred by a general dentist for the management of a displaced root of a lower right third molar (48). The patient gave a history of having the 48 surgically extracted by a general dentist nine days previously. She had been informed of the difficulty with the extraction, the possible lingual displacement of a root fragment and was advised to have the root fragment removed at a later appointment. However, the patient decided to consult another general dentist who, following clinical and radiographic assessment (orthopantomogram-OPG), referred the patient to an oral and maxillofacial surgeon for management.

On clinical examination the patient had a tender indurated swelling on the lingual aspect of the right angle of the mandible. The patient's mouth opening was limited to about 2cm interincisal width. The patient's medical history was non-contributory. There were no clinical symptoms of dysaesthesia of the lip or tongue. The root tip was not palpable on the lingual aspect of the 48 socket.

An OPG confirmed the displacement of a root tip of approximately 3mm in length, close to the lower border of the mandible in the 48 region (Fig 1). Management options of either removal or retention of the displaced root fragment were discussed with the patient, and she decided in favour of retrieval of the root. A computed tomography (CT) scan (Fig 2, 3) was taken to determine the precise position of the root fragment in its three dimensions. It confirmed the position of the root on the lateral aspect of the medial pterygoid muscle, close to its inferior attachment in the 48 region.

Removal of the root fragment was attempted under local anaesthesia nine days after the initial operation.

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Fig 1. An OPG showing the displaced root of 48 lying approximately 3mm below the most apical part of the socket.

Buccal and lingual mucoperiosteal flaps were raised in the 48 region. The granulation tissue was curetted from the socket. The lingual wall of the socket was sectioned with burs and removed. The inferior attachment of the medial pterygoid muscle was exposed following further removal of bone with burs. With blunt dissection using fine curved mosquito artery forceps the root fragment was retrieved from the medial pterygoid muscle, close to its attachment to the lower border of the mandible. Primary closure was achieved and the patient was placed on a week course of Amoxicillin. Post-operative recovery was uneventful.

DISCUSSION

This paper describes the management of an uncommon displacement of a root fragment into the antero-inferior aspect of the pterygomandibular space. This space, which is between the pterygoid musculature (lateral and medial pterygoid muscles) and the medial surface of the ramus of the mandible, is very familiar to dentists, as this is where local anaesthetic is deposited for a mandibular block to anaesthetize both the inferior alveolar and lingual nerves.

The pterygomandibular space is bound superiorly by the inferior head of the lateral pterygoid muscle, laterally by the medial aspect of the ramus of the mandible and anteriorly it is continuous with the recess formed by the lateral pterygoid and temporalis muscles. It is bound medially and posteriorly by the interpterygoid fascia, which is attached superiorly to the base of the skull, and inferiorly to the medial aspect of the ramus of the mandible above the insertion of the medial pterygoid muscle to the mandible. Posteriorly this fascia extends from the angle of the mandible to the neck of the condyle. The interpterygoid fascia thus, forms the medial and posterior boundaries of the pterygomandibular space.⁹

In the case reported the root fragment was pushed into the pterygomandibular space and was found embedded in the medial pterygoid muscle. The root fragment was prevented from being displaced inferiorly into the deep tissue spaces of the neck by the medial pterygoid muscle.

Fenestrations of the alveolar bone could be a factor in the accidental displacement of roots or root fragments into adjacent anatomical spaces. Kay¹⁰ in a study on dried jaw specimens in a mixed population of African, Egyptian, British, Australasian and Mexican mandibles, noted fenestrations, although rare, on the medial aspect of the mandible in the third molar region. Of the 2496 lower third molar sites studied, only six sites (0.24 per cent) had fenestrations on the lingual aspect of the mandibular third molar teeth. In contrast, a more recent study¹¹ of 85 dried mandibles, in a north western Croatian population, found no osseous defects on the lingual plate of the mandibles. Kay¹⁰ considered conventional radiography to be unpredictable in the diagnosis of fenestrations as the density of tooth structure masks these defects. It is likely that these fenestrations may be due to some pathological resorptive process, such as a periapical infection leading to resorption of the bone in the apical area of the roots, or they may have been present as a variation of the normal anatomy.

Various conventional radiographic views can be taken to visualize a displaced root from the socket. A panoramic view, such as an OPG, will probably provide the most useful information as shown in this case (Fig 1). The loss of continuity of the bony features around the displaced root suggests that it is not located in the deeper bony part of the mandible, but lying in the soft tissues outside. Another intra-oral view that may assist in the visualization of the displaced root is a mandibular occlusal projection. However, conventional

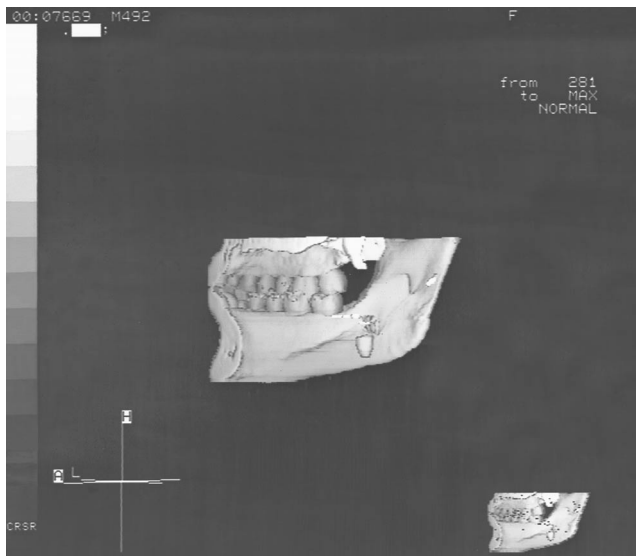


Fig 2. A 3-dimensional CT scan reconstruction of the medial aspect of the mandible showing the mylohyoid ridge and the mandibular foramen. Slightly superior to the displaced root an osseous defect (fenestration) is visible.

radiographic techniques were inadequate in precisely locating the root in the adjacent soft tissues.

Tomography is a process by which a clear image of a body layer is produced by blurring the layers above and below the body layer of interest.¹² This differs from conventional radiography where all the body layers are overlapped resulting in superimposition of the object in question. Therefore, tomographical views, such as CT are useful when undesirable overlap needs to be eliminated to view the object of interest.¹²

A CT scan reconstruction of the mandible (Fig 2) revealed the displaced root on the lingual side of the 48 socket (Fig 3). Slightly above the root on the medial aspect of the mandible, a bony defect can be seen (Fig 2). This bony defect is either a dehiscence or a breach in the lingual plate created during the attempted removal of the fractured root. As the lingual plate is quite thin near the roots of the lower third molars, incorrect use of elevators resulting in an unfavourable direction of force can quite easily push the root into adjacent anatomical spaces.

When there is a risk that the tooth/root fragments maybe displaced, applying finger pressure over the lingual periosteum can prevent their displacement into adjacent anatomical spaces. However, the most reliable way of preventing this complication is to cease the use of elevators when the movement of the tooth/root fragment in an unfavourable direction is recognized and then to perform an open surgical procedure. This would involve the lifting of a buccal mucoperiosteal flap, bone removal to adequately expose the root fragment and creation of application points for the use of fine elevators and the delivery of the root fragment under direct vision. This kind of open surgical procedure is certainly preferred to blind elevation of the root fragment when the access is poor and there is a risk of displacement into adjacent anatomical sites.



Fig 3a. A CT scan image of a transverse view of the mandible. The 48 socket can be seen as well as an osseous defect of the lingual wall of the socket.



Fig 3b. A more inferior view to Fig 3a. The displaced root lying on the lingual side of the 48 socket is clearly visible.

Surgical access to the antero-inferior aspect of the pterygomandibular space can be achieved without much difficulty via an intra-oral approach and for this reason an extra-oral approach is rarely considered. However, if the displacement is deeper into the substance of the medial pterygoid muscle or inferiorly into the submandibular space, an extra-oral approach may provide better access. Also the lingual nerve should be identified and protected from injury during the exploration.

Retention of foreign bodies, such as root fragments, in tissues and tissue spaces could run the risk of

possible infection and foreign body reaction. Whereas, surgical retrieval could sometimes result in complications such as nerve damage and even further displacement into deeper tissues. These possible outcomes should be taken into consideration when making a decision about the management of a displaced root into an adjacent tissue or anatomical space.

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