

CASE REPORT

Maxillary tuberosity fracture and ophthalmologic complications following removal of maxillary third molar

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Abstract

Third molar removal is one of the most common procedures performed by dentists and oral surgeons. Removal of maxillary third molar is associated with a lower rate of complication compared to the mandible, and maxillary tuberosity fracture or ophthalmologic complications after removal of maxillary third molar are very rare. We report maxillary tuberosity fracture and ophthalmologic complications following removal of maxillary third molar. A 35-year-old female underwent removal of left maxillary third molar at private dental clinic. Following the complete extraction, excessive haemorrhage occurred and maxillary tuberosity fracture was seen and the patient was brought by ambulance to our hospital. The bleeding was controlled by vacuum-formed splint and nasal packing. Computed tomography revealed that lateral maxillary tuberosity and posterior wall of the maxillary sinus was defect and there was a slight intraorbital haematoma via the inferior orbital fissure as well as with extension in the maxillary sinus and adjacent spaces such as buccal, masticator, pterygomaxillary and infratemporal spaces. Because an ophthalmologist noted only slight diplopia in lateral gaze without abnormal signs in other examinations and nasal and oral bleeding were controlled, the surgical treatment was not required. The patient was immediately hospitalised for close observation. Intravenous antibiotics and steroids were administered. Because swelling of the cheek and buccal mucosa was gradually decreasing without further haemorrhage, the patient was discharged 4 days after the extraction. The diplopia was recovered completely 11 days after the extraction.

Introduction

Third molar removal is one of the most common procedures performed by dentists and oral surgeons. Although most complications are minor, major complications need further treatment. Common complications associated with third molar removal are well-recognised and frequently explained to patients during process of informed consent, but dentists and oral surgeons should be familiar with all possible complications. Removal of maxillary third molar is associated with a lower rate of complication compared to the mandible¹, and maxillary tuberosity

fracture or ophthalmologic complications after removal of maxillary third molar are very rare²⁻⁴. Therefore, we report here maxillary tuberosity fracture and ophthalmologic complications following removal of maxillary third molar.

Case report

A 35-year-old female underwent removal of left maxillary third molar at private dental clinic because pre-operative panoramic radiograph was unremarkable and left maxillary third molar was erupted partially (Fig. 1). A dentist attempted removal of the left

maxillary third molar with difficulty for ankylosis. Following the complete extraction, excessive haemorrhage occurred and maxillary tuberosity fracture was seen. Removed maxillary third molar with lateral part of the tuberosity had three roots (Fig. 2). Haemostatic agent was inserted in the extraction socket and the wound was sutured tightly. Once it was confirmed that the bleeding was almost controlled, the patient was brought by ambulance to our hospital because her left cheek was swelling gradually in spite of gauze pressure dressing on the wound. The patient was healthy with no medical history or bleeding disorders, and she was not on any medications. Her vital signs were unremarkable and the airway was patent. There were mild bleeding from the left nasal cavity and

swelling and ecchymosis of the left cheek and buccal mucosa. Nasal packing was first performed. Although she had trismus, a vacuum-formed splint could be applied to cover the surgical site for oozing. There was no nasal bleeding although the packing was removed 30 minutes after nasal packing. Panoramic radiograph showed defect of left maxillary tuberosity (Fig. 3). Computed tomography (CT) revealed that lateral maxillary tuberosity and posterior wall of the maxillary sinus was defect, and there was a slight intraorbital haematoma via the inferior orbital fissure as well as with extension in the maxillary sinus and adjacent spaces such as buccal, masticator, pterygomaxillary and infratemporal spaces (Figs. 4 and 5). Because an ophthalmologist noted only slight diplopia in lateral gaze without abnormal signs in other examinations and nasal and oral bleeding were controlled, the surgical treatment was not required. The patient was immediately hospitalised for close observation. The patient's head was kept elevated, and swelling and ecchymosis of the left cheek and buccal mucosa were not expanded. Intravenous antibiotics (Cefazolin 2 g/day) and steroids (Dexamethasone 6.6 mg/day) were administered for 4 days and 2 days, respectively. Because swelling of the cheek and buccal mucosa was gradually decreasing without further haemorrhage, the patient was discharged 4 days after the extraction.



Figure 1 Panoramic radiograph before left maxillary third molar removal.



Figure 2 Removed maxillary third molar with maxillary tuberosity.



Figure 3 Panoramic radiograph after left maxillary third molar removal showing defect of left maxillary tuberosity.

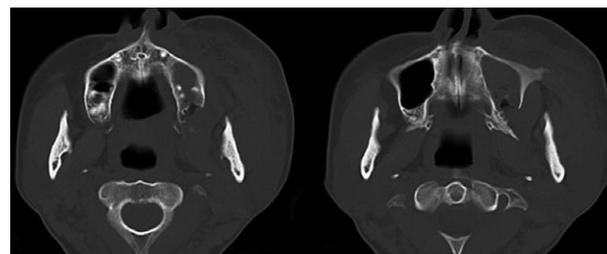


Figure 4 CT after left maxillary third molar removal showing defect of lateral maxillary tuberosity and posterior wall of the maxillary sinus.

The diplopia was recovered completely 11 days after the extraction. The patient was followed up after discharge, and panoramic radiograph 1 year after the extraction showed good bone healing in maxillary tuberosity region (Fig. 6).

Discussion

Complications related to third molar removal range from 4.6% to 30.9%, and may occur intraoperatively or develop in the post-operative period⁵. As complications of maxillary third molar removal, there are displacement of tooth or root into the maxillary sinus, oroantral communication, abscess of the orbit,

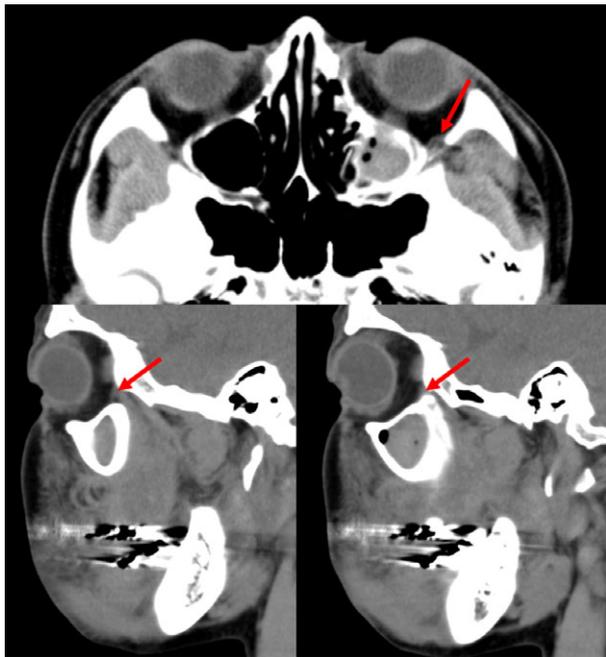


Figure 5 CT showing a slight intraorbital haematoma (arrows) via the inferior orbital fissure.



Figure 6 Panoramic radiograph 1 year after the extraction showing good bone healing in maxillary tuberosity region.

maxillary tuberosity fracture, excessive haemorrhage and extensive haematoma^{1,5}.

Excessive haemorrhage after maxillary third molar removal is extremely uncommon, and the incidence of post-operative excessive haemorrhage is 0.4% (2 of 500 cases)⁶. Fragile vessels in the region of the posterior maxilla and tuberosity are easily ruptured when bone is fractured and separated from its periosteum⁷. Haemorrhage during maxillary third molar removal is usually caused by injury of a branch of the posterior superior alveolar artery following maxillary tuberosity fracture⁷. In our case, it was considered that haemorrhage occurred similarly from the posterior superior alveolar artery after the tuberosity fracture. Massive haemorrhage must be managed appropriately with embolisation or surgical treatment^{8,9}, because it may sometimes be life-threatening for airway compromise or significant blood loss.

Maxillary tuberosity fracture can occur rarely during removal of maxillary first or second molar as well as third molar and the fracture is a clinically known occurrence^{7,10-14}, but the maxillary tuberosity is especially important for the stability of maxillary denture¹¹. The removal of the tuberosity will most likely increase the difficulty of future denture fittings and may also make later rehabilitation with dental implants more difficult¹². If a decision is made to remove the fractured tuberosity, the soft tissue attachments should be carefully dissected off the hard tissue fragment¹⁰. In such cases, the wound should be closed with tight sutures because there may not be an oroantral communication¹¹. In our case, the maxillary third molar with a large fractured tuberosity had been completely removed at private dental clinic and the wound had been closed tightly for haemostasis of haemorrhage.

In a study by Chiapasco *et al.*⁶, the extraction of 500 maxillary impacted third molars was accompanied by three fractures of the maxillary tuberosity, indicating an incidence of 0.6%. Two cases occurred with teeth classified as class C (crown to root position) by the Pell and Gregory classification scheme, whereas one was class B (crown to cervical position). In Winter's classification, each case was classified as vertical, mesio-angular and disto-angular respectively. Our case with maxillary tuberosity fracture was class B and mesio-angular. The aetiological factors responsible for maxillary tuberosity fracture during extraction of upper molars are: (1) large maxillary sinus with thin walls/sinus extension into the maxillary tuberosity and/or large projection lengths of root apices in the sinus cavity, (2) alveolar bone

resorption following early loss of a maxillary tooth (frequently the first molar), (3) tooth fusion, (4) isolated tooth, (5) tooth with large divergent roots, (6) tooth with abnormal number of roots, (7) tooth with prominent or curved roots, (8) tooth with dental anomalies, (9) tooth ankylosis, (10) hypercementosis, (11) chronic periapical infection, (12) radicular cyst, (13) multiple extractions and (14) malpractice by the dentists or oral surgeons such as excessive force^{2,10–12}. In present case, removed maxillary third molar with lateral part of the maxillary tuberosity had three roots and was ankylosis.

Ophthalmologic complications caused by haemorrhage after removal of maxillary third molar are extremely rare^{2–4}, and they include diplopia, inferior rectus dysfunction, subconjunctival haemorrhage and/or intraorbital/retrobulbar haematoma^{2–4}. To our knowledge, only three cases with ophthalmologic complications have been reported. Conservative treatment was selected in two cases, but one case underwent haemostasis and removal of the haematoma by opening and extending the incision made for extraction for high clinical suspicion of a retrobulbar haematoma. Maxillary third molar was extracted by removing as little bone as possible to retain the tuberosity with the periosteum after haemostasis in one case with maxillary tuberosity fracture, whereas two cases with intraorbital/retrobulbar haematoma had already underwent complete removal of the maxillary third molar. According to Warburton and Brahim³, post-operative haemorrhage after removal of maxillary third molar occurs from one of the tributary vessels of the pterygoid plexus such as the deep facial vein, the posterior superior alveolar vessels or even from the plexus itself. The result was bleeding into the pterygomaxillary and infratemporal spaces, which communicate with the intraorbital compartment via the inferior orbital fissure³. This provides a pathway through which the haematoma in the infratemporal fossa might have extended into the orbit.

Oedema and haemorrhage of the posterior-inferior portion of fat caused by contusion is the most common source of ocular motility imbalance and diplopia. Because the inferior rectus muscle lies adjacent to the orbital wall in the posterior orbit, it is particularly susceptible to the oedema and inflammatory response surrounding the haematoma. Any oedema, inflammation or haematoma resulting in ischaemia or compression of the oculomotor nerve supplying the inferior rectus muscle may cause inferior rectus dysfunction³. In our case, it was considered that transient diplopia in lateral gaze after maxillary third

molar removal occurred by a slight intraorbital haematoma and oedema which increased intraorbital pressure.

Conclusion

Although maxillary tuberosity fracture after removal of maxillary third molar are very rare, ophthalmologic complications may be caused by bleeding from the posterior superior alveolar artery or the pterygoid plexus. Upon discovering that a maxillary tuberosity has fractured during removal of maxillary molar, dentists or oral surgeons must perform appropriate intervention to prevent tuberosity bleeding. When the bleeding occurred, bleeding point should be detected and sufficient haemostasis is required to prevent ophthalmologic complications.

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Conflict of Interest

The authors confirm that there are no conflicts of interest.

Ethical adherence

None required.

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