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Case Report

Surgery Section

Management of Impacted Permanent First Molar and Associated Mandibular Body Fracture- A Case Report

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ABSTRACT

Impaction of permanent teeth is a common clinical scenario, but certain permanent teeth like the mandibular first molars are rarely impacted. In cases, where the mandibular first molars are deeply impacted the extraction demands fine technique as well as cautious management to reduce the risk of injury to the adjacent teeth, the surrounding hard tissue, as well as the vicinal neurovascular bundle. Here, a rare case of impacted mandibular right first molar associated with right side mandibular body fracture in a 57-year-old male patient is reported, along with a brief review of the literature. The patient reported an alleged history of domestic fall due to slipping approximately one week back and complained of pain and difficulty in chewing on the right side of lower jaw since then. There was no significant medical history. The fracture was clinically faintly palpable near inferior border of mandible on right side, approximately 2 cm anterior to the angle of the mandible. Radiographic examination confirmed the fracture and revealed its association with an impacted tooth. This case was treated with open reduction and internal fixation of the fracture, followed by transalveolar extraction of the impacted tooth under general anesthesia to achieve a stable and successful result. Regular follow-ups were done for six months.

Keywords: Ectopic, Extraction, Impaction, Surgical removal, Transalveolar, Unerupted

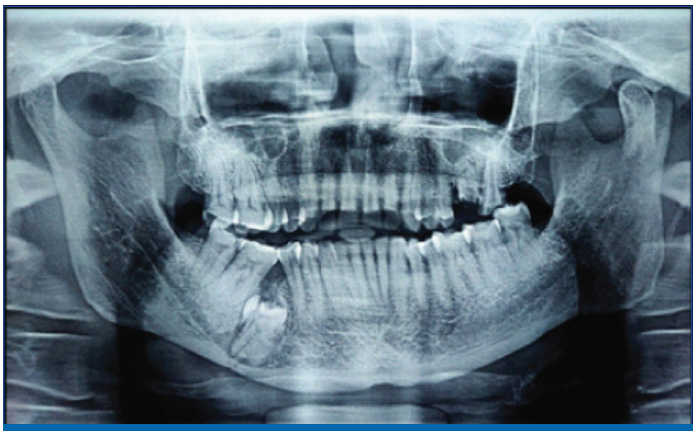
CASE REPORT

A 57-year-old male patient reported to Department of Oral and Maxillofacial Surgery with an alleged history of fall due to slipping at home about 6-7 days back and chief complaint of pain on the right side of lower jaw. Since then, the patient gave a history of dull and throbbing pain at rest position and during chewing, associated with mild swelling over lower right first molar region, which remained unchanged since the incident. There was no history of any decayed or painful tooth/teeth in that region. There was no significant medical or family history. The patient had tobacco chewing habit of 2-3 times a day since past 20 years.

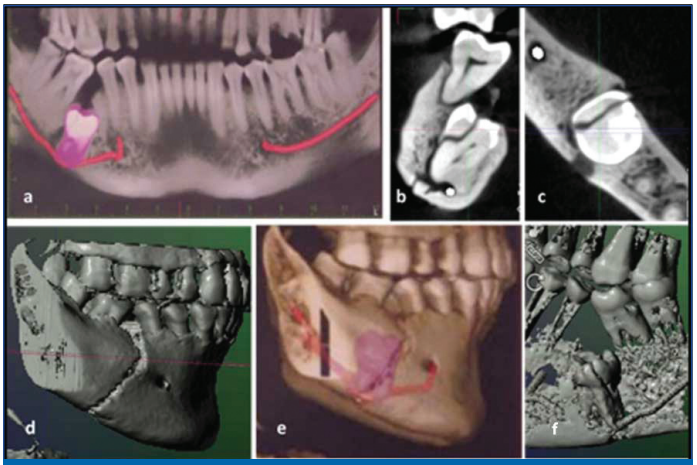
The patient was of average built and well-nourished. Vitals were within normal limits and afebrile. On extraoral examination, there was a mild swelling of approximately 8 x 15 mm along the lower border of the mandible about 2 cm anterior to the mandibular angle. The region was tender and slight step-deformity could be palpated. Intraorally, the lower right first molar (46) was found missing, and the second molar (47) and the second premolar (45) were converging, thereby occupying the space for first molar. Clinical examination and history did not reveal any systemic and embryologic diseases or dysplastic syndromes. On radiographic examination with Orthopantomogram (OPG), it was found that 46 was impacted near the inferior border of the mandible and a radiolucent line was passing from alveolar crest in 46-region through the tooth to the inferior border of the mandible, depicting minimally displaced mandibular body fracture and fracture of distal crown portion of 46 [Table/Fig-1].

Since the impacted tooth was closer to the lower border of the mandible and suspected proximity of mandibular canal to the impacted tooth, Cone Beam Computed Tomography (CBCT) was advised to the patient. CBCT revealed the position of the impacted tooth, which was impinging on the mandibular canal [Table/Fig-2].

The planned line of treatment was transalveolar surgical removal of the impacted tooth via buccal approach along with open



[Table/Fig-1]: Preoperative OPG showing impacted 46 and associated mandibular body fracture bundle.



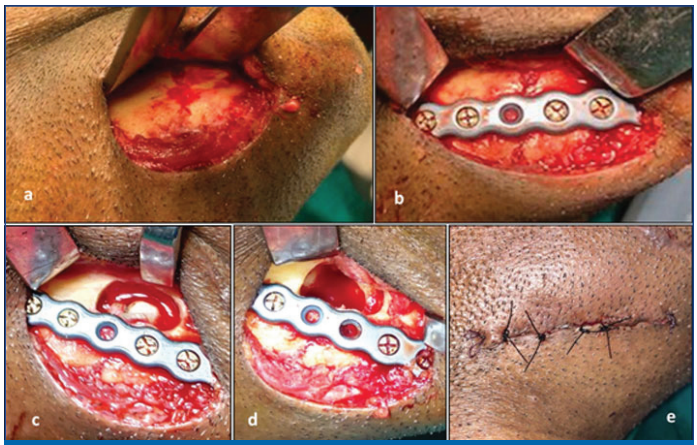
[Table/Fig-2]: Pre-operative Cone Beam Computed Tomography (CBCT) images: (a) 2-D Panoramic view with impacted tooth and inferior alveolar neurovascular bundle highlighted. Axial (b) and sagittal (c) Sections showing impacted and fractured 46 and right mandibular body fracture. (d) 3-D view of fracture with (e) Superimposed position of tooth and neurovascular bundle. (f) Lingual view of sectioned 3-D image showing the roots of 46 in close contact with the underlying neurovascular bundle.

reduction and internal fixation of the fracture under general anaesthesia. Prior to surgical procedure, all routine blood investigations were carried out, which were within normal limits. After thorough preanesthetic assessment, the patient was taken up for surgery.

General anaesthesia was induced and patient was intubated nasally via left nostril. Painting (with 10% povidone-iodine solution) and sterile fabric draping was done. Upper and lower Erich arch bar fixation was done and primary reduction was achieved by Intermaxillary Fixation (IMF). An extraoral submandibular incision measuring approximately 3.5 cm was made with No.15 surgical blade after administrating local infiltration with 2% Lignocaine containing (1:200000) adrenaline for haemostasis, with reference to the step deformity palpated on the lower border of the mandible, so as to keep the fracture line in the middle of the incision line. Platysma muscle was undermined bluntly with dissecting scissors and then divided with scalpel 2-3 cm below the mandibular border, in order to protect the marginal mandibular branch of facial nerve. The underlying pterygomasseteric sling was then divided and periosteum was incised to expose the fracture site [Table/Fig-3a]. Rigid fixation was done using a 7-hole continuous titanium reconstruction plate (load bearing) and five (2.5 x 12 mm) (bicortical) screws at inferior border of mandible, anticipating the hard tissue defect that will result after removal of impacted tooth [Table/Fig-3b].

With a surgical carbide round bur (HP10), attached to a high-speed micromotor handpiece along with copious flow of normal saline, the bone above the impacted tooth was removed [Table/Fig-3c]. After the crown was exposed, irrigation was done with normal saline to remove any bony debris. Haemorrhage was arrested using a saline soaked gauze pressure pack. Horizontal (decapitation) sectioning was done with tapered fissure (No.703) surgical carbide bur to avoid pressure on adjacent teeth and neurovascular bundle. Then, coronal followed by radicular portion of the tooth was removed using a straight (Coupland's) elevator. Thorough irrigation was done with normal saline to remove bony spicules as well as bone and tooth debris [Table/Fig-3d].

Polyglactin 910 (3-0) absorbable suture material was used for approximating deep layers and non-absorbable Polyamide 6,6 (4-0) suture material for skin closure. Wound closure was done and haemostasis achieved [Table/Fig-3e].



[Table/Fig-3]: Intraoperative images: (a) Exposure of the fracture site using Risdon submandibular approach; (b) Plating of the fracture site with 7-hole titanium reconstruction plate and five (2.5 x 12 mm) screws at inferior border of mandible; (c) Window created to expose impacted 46; (d) Site after removal of impacted 46; (e) Closure of the incision.

Extraoral compression/pressure dressing was given with an elastic adhesive bandage over povidine iodine ointment based gauze dressing to minimise postoperative swelling. IMF was released. Patient was extubated uneventfully and advised liquid diet and intravenous antibiotics and analgesics till discharge on the third postoperative day. Compression dressing was removed after 48 hours of surgery.

Occlusion was checked intraorally on discharge and was found to be satisfactory. The patient was advised discharge medications (oral antibiotics, analgesics and antacids for seven days and povidone iodine ointment and multivitamin capsules for 15 days) and asked to maintain proper oral hygiene. For plaque control, chlorhexidine mouth rinse was prescribed for 15 days. Follow-up was made after one week for suture removal. Arch bar removal was done on the 7th week after surgery. On two months follow-up appointment, there was good healing of the wound with no clinical signs of paraesthesia, such as numbness of lower lip and loss of sensation in the dentition on the concerned side (by pin-prick test). Six months postoperative OPG showed good healing with healthy bone [Table/Fig-4]. The reconstruction plate and screws were seen in their desired position. A written informed consent was obtained for case report and disclosure of photographs, radiographs for scientific purposes.

[Table/Fig-4]: Six months postoperative OPG showing good healing with healthy bone. The reconstruction plate and screws seen in their desired position.

DISCUSSION

According to reports by Dachi SF and Howell FV, out of 4,745 examined patients there were 1,218 impacted teeth (in 684 patients), and among those there were no cases of the maxillary first molar impactions and only three mandibular first molars impactions [1]. Grover PS and Lorton L reported only one case of impacted maxillary first molar and no instances of impacted mandibular first molar in their survey of 5,000 panoramic radiographs of Army recruits [2]. Therefore, impaction of permanent first molar is rare, with a prevalence rate of 0.02% for the maxillary first molar and of less than 0.01% for the mandibular first molar [3]. Thus, the case scenario presented in this article certainly is not a common one.

The causes for impaction can be systemic as well as local. Systemic factors include endocrine deficiency (hypothyroidism and hypopituitarism), febrile diseases, cleidocranial dysostosis, Down syndrome, irradiation, etc., where generally multiple teeth are involved [4]. The local factors which may be the cause for permanent molar impaction include premature loss of deciduous molars, prolonged retention of deciduous molars, ankylosis of deciduous molars, abnormal eruption path or pattern, arch-length deficiency, malposed tooth germ, presence of supernumerary tooth, cleft lip and palate, dentigerous cyst, odontogenic tumours and trauma [5].

The treatment options for impacted tooth include: removal of the tooth, eruption of the tooth assisted by surgery and orthodontic treatment, opening of follicle that impedes its normal eruption, tooth transplantation and long-term observation under certain circumstances [6,7].

In this case, orthodontic traction was not opted because the tooth was fractured and was impacted for more than 40 years and associated with a mandibular body fracture. So it was decided to go for open reduction and internal fixation of mandibular body fracture with surgical extraction of tooth as soon as possible.

When force is applied to a wide area, the bone fractures at its weakest point [8]. Weakness is related to the number of sustained fractures and the state of dentition. For example, the recent extraction of a molar tooth will weaken the molar region and the presence of an unerupted wisdom tooth will weaken the angle region [9]. This fact can be related to present case, where the fracture location (due to impacted 46), was a weak point.

Chuong R et al., described the correlation between the location of the fracture, position of the teeth and ensuing occurrence of complications in their study of 327 mandibular fractures [10]. There was no notable difference in the rate of complications between cases where they retained the teeth in the line of injury (16 of 152 cases-11% approx.), and where they extracted the teeth (7 of 50 cases-14%). They advocated for teeth in the line of injury, which had root exposures in severely distracted fragments, interfered with reduction or fixation of the fractures, or with significant mobility, to be extracted [10].

The decision, whether to extract or retain the tooth, must be taken on the basis of individual clinical scenario. Partially impacted tooth with pericoronitis, a tooth with extensive periapical lesion and teeth with fractured roots, should be removed [11]. For a case scenario like present study, tooth in the line of mandibular fracture is advised to be removed in sites with broken alveolar walls and whenever there is a possibility of considerable periodontal damage which may lead to formation of deep pockets, making proper healing doubtful [11]. Also here, since the tooth itself was fractured, so it was decided to go ahead with treatment plan.

Open surgical reduction and fixation of mandibular fractures is the current standard of treatment and enables good prognosis [12]. The Risdon submandibular approach is routinely applied for open reduction and internal fixation of mandibular fractures [12]. Furthermore, the surgical layer of the capsule of submandibular gland that is elevated to access the mandibular border can be identified safely using various anatomic landmarks [13].

The utility of the surgical approach to the submandibular gland through the submandibular triangle have already been pointed out by some surgeons [14]. However, postoperative neuropraxia of the facial nerve can follow fracture management, although this approach is well established. Differences in the surgeon's experience and specialty might be related to differences in the reported incidence of this particular complication [14]. In almost all cases, the neuropraxia is transient [14]. Damage to the facial nerve frequently produces weakness of the depressors of the mandible, and the cause might be nerve manipulation during the identification process or compression of the nerve by retractors [14].

The Risdon submandibular approach, without the routine identification of the mandibular nerve, actually minimises the risk of nerve damage [15]. This advantage of the submandibular approach should be applied to trauma surgery as it was proved in a study, only one patient (out of 24, i.e., 4.2%) developed facial nerve weakness [15]. In present case, the patient did not showed any signs of facial nerve weakness at the surgical site.

The placement of the skin incision was slightly lower (3 cm below the mandibular border) than the original Risdon incision (2 cm below the mandibular border), but remained within the submandibular wrinkle. Thus, the resulting skin scar was almost invisible. This approach was found to be useful in this case because it was easier (direct access), quicker (as it took only about 5 minutes to approach the fracture site), less tedious and safer.

Reconstruction plates are used in cases such as: comminuted fractures, severely displaced fractures, defect fractures, infected fractures and fractures in atrophic mandibles, where the bone can no longer uphold compressive forces [16]. In such situations, the osteosynthesis must withstand full functional load, which is only possible by application of the tension-band principle [16].

Rigid internal fixation has become a sought-after technique for treatment of facial bone fractures as it can improve three dimensional stability of the fracture site, promoting primary fracture healing [17]. Immediate postoperative jaw function is possible when absolute stability of the fragments is achieved [17]. In case of severely oblique fractures, comminuted fractures, mandibular continuity defects and fractures with bone loss (like the anticipated bone loss in present case), compression plates are not indicated [17,18]. In such situations, overlapping or collapse of the bony segments may occur because of compression across the fracture site. Thus, using a reconstruction plate will be the best fracture fixation method [17].

CONCLUSION(S)

The combination of findings that is reported in this article is relatively rare because impacted mandibular first molars are not a common clinical scenario. Observations such as proximity of the tooth to mandibular canal and the fact that this case report describes the management protocol of an impacted tooth associated with mandibular body fracture, add an important update to the existing literature because of its rarity.

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