

IATROGENIC MANDIBULAR FRACTURE ASSOCIATED WITH THIRD MOLAR REMOVAL: CASES REPORT

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ABSTRACT

Surgery for removal of impacted teeth is a procedure commonly performed by dentists and specialists in oral and maxillofacial surgery and has, among the possible accidents and complications, the risk of immediate or late mandibular fracture. The fracture of the mandibular angle associated with the removal of the third molar is a rare and serious complication. Usually occurs due to inadequate surgical planning and execution, as technical and instrumental inappropriate and excessive use of force during the dislocation of the tooth. Local factors such as the degree of inclusion, presence of previous infection, the angle and volume of the tooth, as well as the age and physiological condition of the patient are important factors in the occurrence of these fractures. This article reports two cases of patients with jaw fractures caused by removal of third molar and covers techniques that could be used to minimize the risk of fracture, as well as discusses the bone fixation protocol in these fractures.

KEYWORDS: Third molar, internal fracture fixation, mandible.

1. INTRODUCTION

The removal of impacted teeth is a workaday procedure in the practice of Dentistry and is associated with various surgical risks, such as the inferior alveolar nerve injury, fracture of adjacent teeth, bleeding, alveolitis, infections and bone fractures¹.

According to the literature, the mandible fracture incidence resulting from removal of third molar is less than 0.1%. However, its risk increases when involve large osteotomies in previous local infection (pericoronitis), long and divergent roots, patients with advanced age and, when there lack of surgeon's skill².

Fractures can occur during surgery (immediate) or post-operative period (late)³. When immediate, are usually caused by applying excessive force professional and

patients typically report a sickening crack or a sudden and severe pain. In cases of late fractures occur in the first four weeks after the surgical procedure and are caused by local trauma or by masticatory loads².

Signs and symptoms in those fractures are pain, swelling, limited mouth opening, dysgeusia, bone rung on the edge of the jaw, trismus, the inferior alveolar nerve hypoesthesia and drainage of secretions. The diagnosis is made by imaging exam, such as panoramic radiography and computed tomography¹.

Bodner *et al.* (2011)⁵ conducted a systematic review of 44 articles and 189 mandibular fractures associated with the removal of teeth included. There was a predominance of males (2.2: 1), age ranging between the second and eighth decades of life; the highest incidence occurred in the fifth decade. Regarding the angulation of the tooth when cited, 37% were in vertical position; 26% of the teeth were in a horizontal position; 24% of the teeth were mesio-angulated; 13% were of diso-angulated. On the state of inclusion, 52% of the teeth were fully included.

Ethunandan *et al.* (2012)³, also held a systematic review evaluating 18 articles and 130 cases of fractures related to the removal of third molars included. In yours study, there was predominance of males (2.4: 1); age it varied between 19 to 79 years, with a peak of incidence between 36 and 60 years. The fractures occurred more frequently in mesio-angled teeth (32.6%) and the degree of inclusion, 72% of the teeth were fully included. Regarding the moment of fracture, there was a higher incidence in the late fractures as compared to immediate fractures (2.7: 1). Finally, as regards the classification of Pell and Gregory, classes II/ III and Type B/ C were the most common.

The treatment of these fractures is to restore the dental occlusion and all the physiological temporomandibu-

lar functions through conservative or surgical procedures, depending on the severity of the case⁶.

2. CASE REPORT

CASE 1.

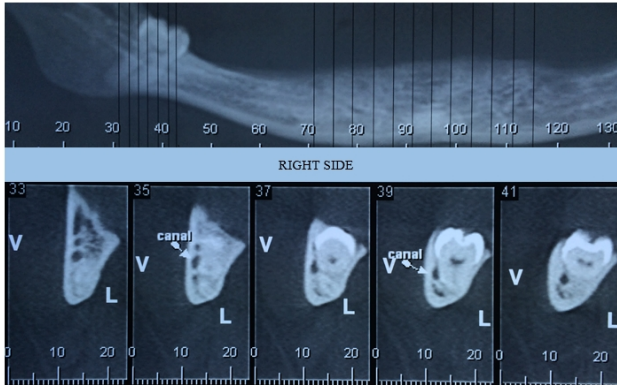


Figure 1. Pre-extraction cone beam TC: observe intimate relationship between the tooth and the alveolar canal, and reduced bone volume around the third molar. Canal: alveolar canal.

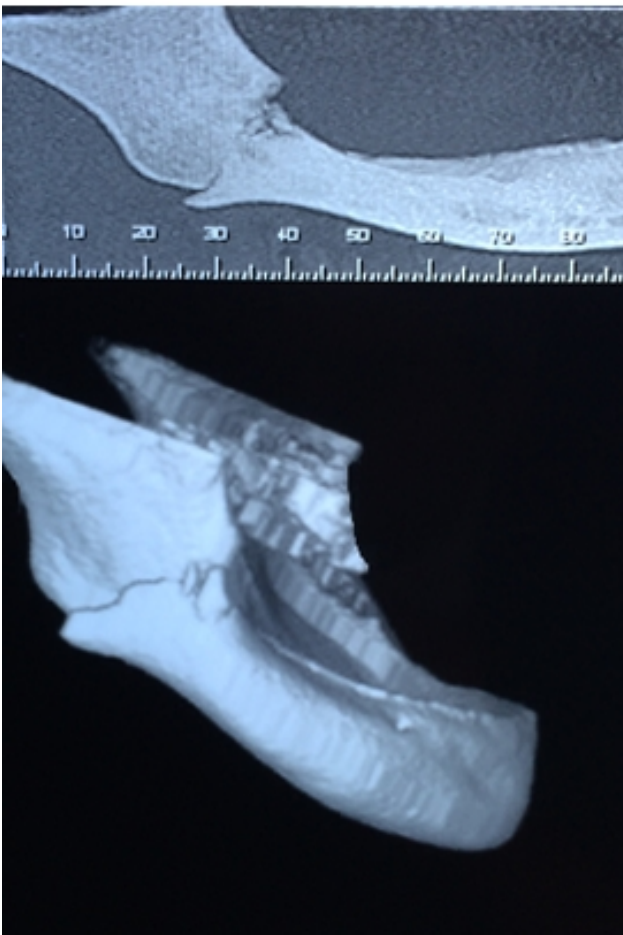


Figure 2. Post-extraction tomography. Mandible fracture at the site of removal of impacted tooth.

Female patient (42 years old), presenting situation of pain, swelling and bone crackle in right mandible; re-

ported that a week ago had been referred to the tooth removal included.

Requested to preoperative CT jaw, where it was observed the presence of lower right third molar included with divergent roots and in close relation to the inferior alveolar nerve and the basilar of the mandible (Figure 1).

A new CT scan was requested and found mandibular angle fracture law, in the region of surgery performed to remove the impacted tooth (Figure 2).

When asked, the patient reported that the surgeon had used a forceps for removal of said tooth. Faced with this situation, was planned surgical procedure for treatment of fracture in the hospital under general anesthesia. The procedure consisted of headgear access (Risdon access), dilatation of soft tissues, fracture reduction, reconstruction using bone fixation plate/ screws 2.4 mm in the compression zone and plate/ screws 2.0 mm in the mandible zone of tension (Figures 3 and 4), followed by suturing anatomical planes.



Figure 3. Extra-oral surgical access and exposure of the fracture.

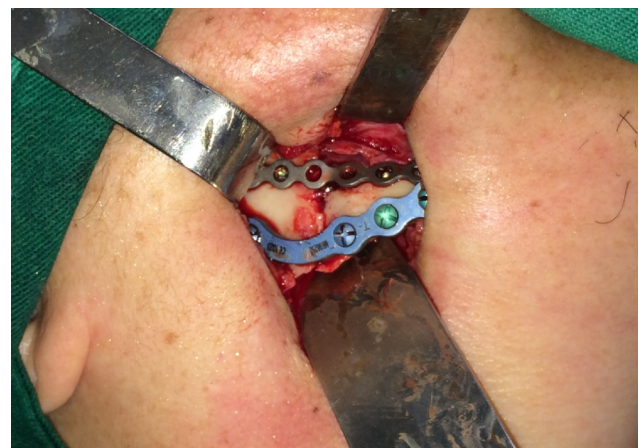


Figure 4. Reduction and bone fracture fixation.

The patient returned to the clinic for clinical and radiographic follow-up, doing well, no complaints and/ or complications, good reduction and bone fixation in follow-up 1 year and 6 months (Figure 5).



Figure 5. Radiography post-operative control.

CASE 2

Female patient (31 years old), with trismus and pain in angular region of the right mandible. The patient claimed that ten days ago had been referred to the removal of an impacted tooth. The pre-extraction panoramic radiograph revealed the element 48 included in a vertical position (Figure 6).

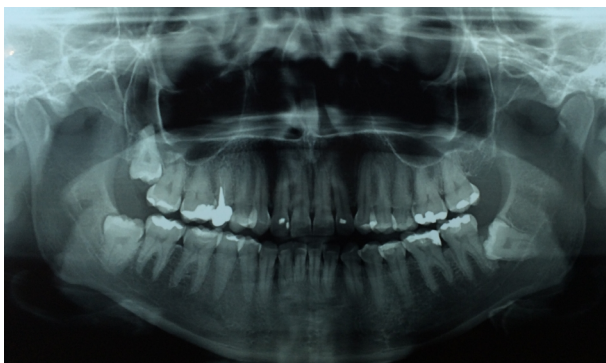


Figure 6. Pre-extraction panoramic radiograph: Note the lower right third molar included in a vertical position.

A post-extraction panoramic radiograph was requested; was observed a angle mandibular right fracture in the tooth removed area (Figure 7). Treatment consisted of extra-oral access (Risdon access), dilatation of the soft tissues (Figure 8), trans-operative intermaxillary block, fracture reduction and bone fixation using plates/ screws - system 2.0mm *locking* in to compression and tension zones of the jaw (Figure 9), followed by suture of the anatomical planes.

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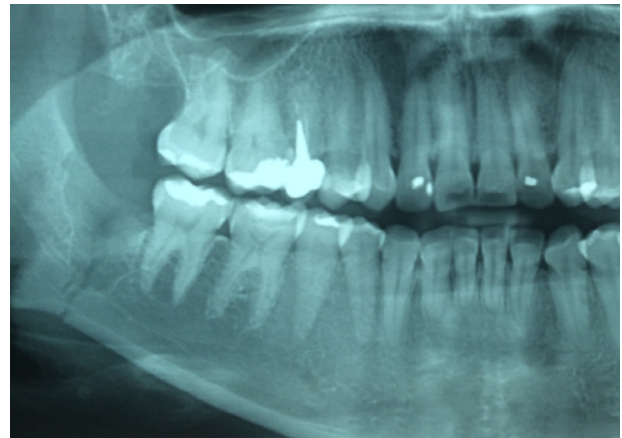


Figure 7. Post-extraction panoramic radiograph: Note the fracture line in the region where the included tooth was removed.

The patient had no complaints and/or incidents, with a good dental occlusion, documented by clinical and radiographic follow-up of 6 months (Figure 10).

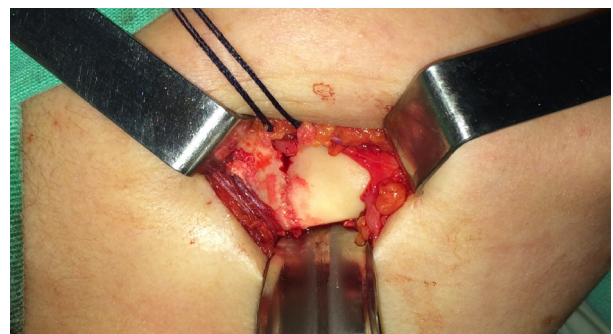


Figure 8. Surgical access; observe fracture of the mandibular angle.

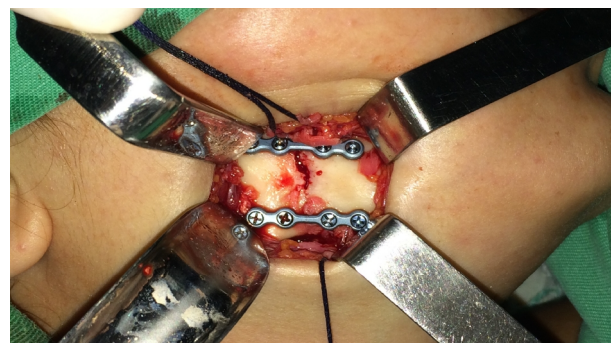


Figure 9. Reduction and bone fixation with plates/ screws system 2.0 mm.

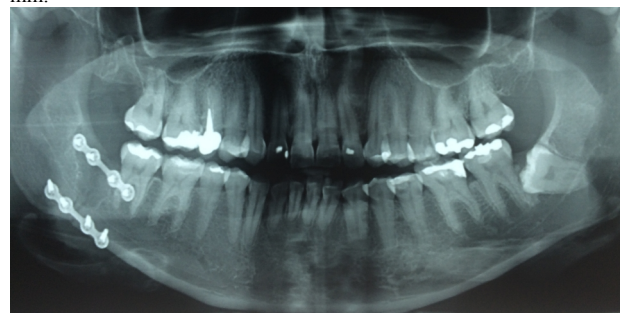


Figure 10. Postoperative panoramic radiograph.

3. DISCUSSION

Mandible fracture associated with extraction of third molars is a rare complication, with an incidence ranging from 0.0046 to 0.0075%¹. The reason for the occurrence of these fractures is that these teeth occupy the space that should be filled by bone, resulting in bone fragility area. Another fact is that the angle of the jaw has a range of thinner bone tissue when compared to other areas of dental support. Therefore fracture occurs when the forces exceed incident bone strength, or the force applied to remove the tooth is greater than the force supported by the bone in the region^{2,7}.

It is important to identify high-risk patients, such as fully impacted teeth in vertical or horizontal position, long and divergent roots and intimate relationship with the mandibular basilar with little bone structure, tooth ankylosis, atrophic jaws, advanced age, with osteoporosis, and previous pericoronaritis associated pathological lesions, and formulate a comprehensive treatment plan that includes the choice of type of anesthesia (general or local), surgical technique, as an extension of bone removal, sectioning of the tooth and application of strength to tooth dislocation, minimizing the risk of fracture.

According to Wolff's law, after a tooth extraction, the alveolar bone loses its function being gradually resorbed over time and can result in severely resorbed jaw⁸. The life expectancy of Brazilians, in both genders, has been increasing, which also reflects a higher frequency of elderly patients with edentulous jaws severely absorbed with third molars that were not removed when young. Therefore, the maintenance of asymptomatic impacted teeth can cause in the future, major complications to elderly patients with edentulous jaws reabsorbed as pericoronaritis and increased risk of fractures, such as the first reported case.

The decrease in bone elasticity and healing capacity, risk of osteoporosis, bone atrophy, increased chances of tooth ankylosis, incidence of postoperative complications and diseases are factors that contribute to the increased risk of fractures in this age group³. In such cases, the separation of the roots and crown can minimize the risk of fractures⁵.

A viable option for cases of teeth included in severely atrophic mandible at risk for the mandibular fractures is described by Sverzut *et al.* (2013)⁹. The authors reported a case of a woman (54 year old) whose jaw presented with severe bone resorption and had two impacted third molars. The proposed treatment involved the use of a *locking* reconstruction plate 2.4 mm, pre-molded from a prototype of the patient's mandible in order to prevent a mandible fracture during removal of the teeth. The surgical procedure was performed under general anesthesia for the installation of the jaw plate for intra-oral route, followed by removal of impacted teeth.

Immediate or late mandibular fractures were not observed with a follow-up of 16 months. The concepts mentioned above could have solids applied in the first case described, considering the case of an elderly patient with, with an atrophic jaw, divergent roots and severe dental inclusion.

The literature is very controversial about the real need for the removal of asymptomatic impacted teeth. However, maintaining the teeth in those cases, can cause several problems to the patient in the future as the need for surgery while the elderly, resulting in increased risk of complications such as infections and fractures. The mere presence of this tooth already increases the risk of mandibular angle fracture, which can already justify the "prophylactic removal" of asymptomatic impacted teeth.

According to Bodner *et al.* (2011)⁵, fully enclosed teeth have a greater risk of fracture because the amount of bone removed during surgery is greater. Moreover, patients with semi-enclosed tooth may have pericoronaritis predisposing fractures during removal of the tooth.

The second case showed a fully enclosed tooth, upright, but with a good amount of bone between the tooth apex and the foundation of the jaw and which at first glance would not present a high risk of mandibular fracture, which leads us to believe that the fracture can be caused by surgical technique failure.

A technique described in the literature which can be used in cases of high risk of mandibular fractures is coronectomy¹⁰, described mainly for cases of high risk of damage to the inferior alveolar nerve, but can avoid mandibular fracture in surgery of teeth included at high risk of producing the mandibular fracture. Another technique that can be used in such cases is to perform a sagittal osteotomy of the mandibular branch for tooth removal¹¹.

Considering the possibility that fracture occur in the postoperative period, it is interesting guide patients to keep liquid and soft diet for 4 weeks after surgery and prevent the practice of contact sports. Also, from a legal point of view, it is essential to sign a free and informed consent by the patient, declaring to be aware of the risks involved in the procedure.

The diagnosis of these fractures should be early and treatment, given the risk of infection due to communication with the oral cavity by the surgical wound removal of impacted tooth, resulting in increased morbidity for the patient and hospital stay.

Regarding the type of treatment/ bone fixation, the literature describes various techniques such as fixation with steel wire and lock intermaxilla¹², Champy technique⁴, plates/ screws 2.0 mm in areas of tension and compression¹³ and reconstruction plates⁹. In both cases presented, the choice was made to stable internal fixation with two plates because it is fractures with bone defects,

the result of osteotomy and removal of impacted teeth and avoid locking jaw 30 to 40 days the patient.

4. CONCLUSION

Mandible fracture associated with the removal of the third molar is a rare complication. However, it is serious and may have your risk minimized due an accurate diagnosis, careful evaluation of the difficulty of extraction, identification of high-risk patients and by treatment plan inclusive, which includes appropriate surgical approach to the removal of the least possible amount of bone, tooth sectioning, atraumatic technique and the possible need for card installation and prophylactic screw.

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