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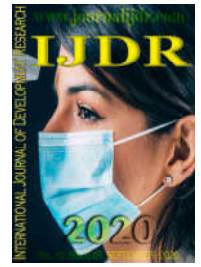
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RESEARCH ARTICLE

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## MANDIBLE FRACTURE ASSOCIATED TO THIRD MOLAR EXODONTIA: A CASE REPORT

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### ABSTRACT

The mandibular fracture resulting from inferior third molars exodontia is considered an uncommon complication. This iatrogenesis, although rare, can occur during the surgery or after. Therefore, it is of fundamental importance that the risk factors such as position, shape, and volume of the tooth are identified during surgical planning and minimized on the transoperative. When bone fracture exists, it requires a fast diagnosis and treatment, avoiding higher morbidity to the patient. The treatment can diversify between non-surgical, using the maxillomandibular block, and surgical, through open reduction and internal fixation. Thus, the aim of this article consists in reporting a clinical case of a female patient, 23 years old, diagnosed with mandibular angle fracture, associated with the removal of unit 38. The treatment chosen was the bloody reduction and installation of a mini-plate in a stress zone, following the protocol described by Champy. It is concluded that the Champy technique, when well indicated and performed, presents effective and satisfactory results.

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## INTRODUCTION

The third molars extraction is a procedure frequently performed in an outpatient setting. For this reason, some complications are commonly reported in the literature, the main interferences being severe pain, edema, hemorrhage, trismus, nerve damage, infection, dental, and bone fractures (Bornardi *et al.*, 2015; Seguro *et al.*, 2014). Mandibular fractures resulting from the removal of the lower third molars are uncommon and have an incidence that varies between 0,00034 a 0,0075% (Joshi *et al.*, 2016). Although rare, it is of fundamental importance to prevent, as well, establish the proper diagnosis and treatment, to avoid higher morbidity to the patient (Oliveira *et al.*, 2020). The clinical and imaging examination contribute to the realization of correct surgical planning. Data regarding age, sex, and patient's general condition information, as well as, medical and dental history, should be analyzed, thus, the risk factors are identified and minimized. Through the imaging examination, the position, shape, and volume of the tooth are observed, as well as the

bone structure, enabling the comprehension of the degree of the surgical difficulty and higher predictability of possible incidents that may occur (Seguro *et al.*, 2014). Therefore, the professional must inform the patient of the probable complications resulting from the surgical procedure (Basyuni *et al.*, 2016). Mandibular fractures occur when the forces exerted on bone tissue are larger than their resistance. (Bornardi *et al.*, 2015). Local, systemic, and related to the surgical technique factors may predispose this iatrogenesis (Oliveira *et al.*, 2020). The choice of the treatment is based on the type of fracture and profile of the patient, which may diversify between a non-surgical approach, using maxillomandibular block (MMB), and surgical, through open reduction associated with rigid or semi-rigid fixation (Pires *et al.*, 2016). Thus, the aim of this article is reporting a clinical case of mandibular angle fracture (MAF), resulting from exodontia of the inferior third molar, which the established treatment is based on the technique described by Champy in 1978, that consists in a surgical reduction, associated with internal fixation with a miniplate.

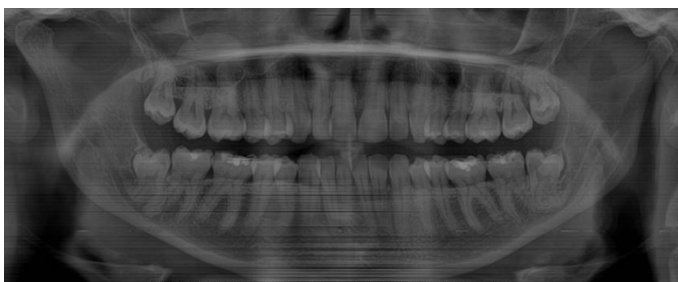
## CASE REPORT

A female patient, 23 years old, ASA I, attended the private office, reporting having undergone exodontia of dental unit 38, 7 days ago. She related an increase of volume, occlusion alteration and loss of sensation in the left side of the inferior lip. On physical examination, she presented mild edema, trismus, posterior open bite, paraesthesia of the left inferior alveolar nerve, bone crackling, and atypical mandible mobility when manipulated. The responsible professional for the trans-surgical complication contacted the specialized surgeon, reporting the mandibular fracture resulting from the procedure (Figure 1).

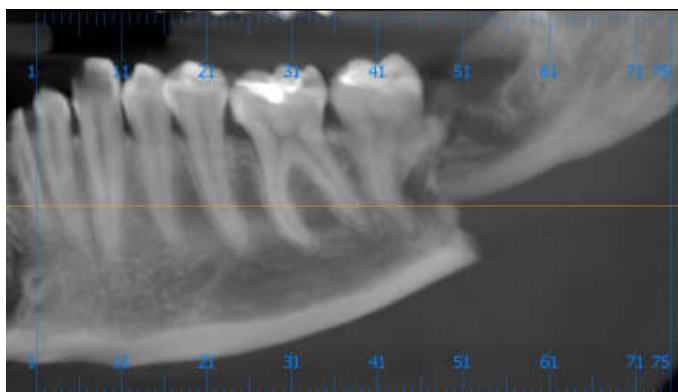


**Figure 1. Intraoral appearance after a mandibular fracture**

When analyzing the preoperative panoramic radiographic examination, it was observed that unit 38 fell under the PIA and Gregory IIA classification, positioned in a distalized way according to Winter's classification (Figure 2). Due to the suspicion of mandibular fracture, it was requested a Cone Beam computed tomography of the region. It evidenced a hypodense image, suggestive of MAF on the left side (Figure 3).



**Figure 2. Panoramic radiography performed before the extraction of unit 38**



**Figure 3. Panoramic reconstruction**

In 3D reconstruction, it was possible to observe a superior and lateral displacement of the proximal stump, confirming the diagnostic hypothesis (Figures 4 and 5). The chosen treatment was the open reduction in the hospital environment, under general anesthesia. The necessary laboratory tests were requested, which did not present any alterations that contraindicated the surgical intervention. Therefore, the patient was admitted and referred to the operating room.



**Figures 4 and 5: 3D reconstruction of the mandible after a fracture**

After anesthetic induction and nasotracheal intubation, extra and intraoral antiseptics were performed, using 2% aqueous chlorhexidine solution. The chosen access was the mandibular vestibular, performed 3 to 5 mm inferior to the mucogingival junction, over the external oblique line. Mucoperiosteal displacement was carefully performed, exposing the affected site, followed by the reduction of bone stumps and intermaxillary block using 6 screws and steel wires, assuring functional occlusion. The fixation was made through a 2.0 mm mini-plate, non-compressive, associated with 6 monocortical screws. It was adjusted at the upper edge of the mandible, which refers to the tension zone, following the protocol established by Champy in 1978 (Figures 6 and 7).

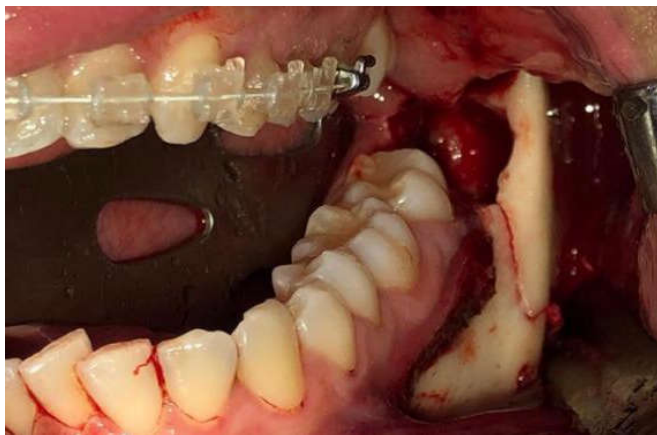


Figure 6. Reduced mandibular fracture

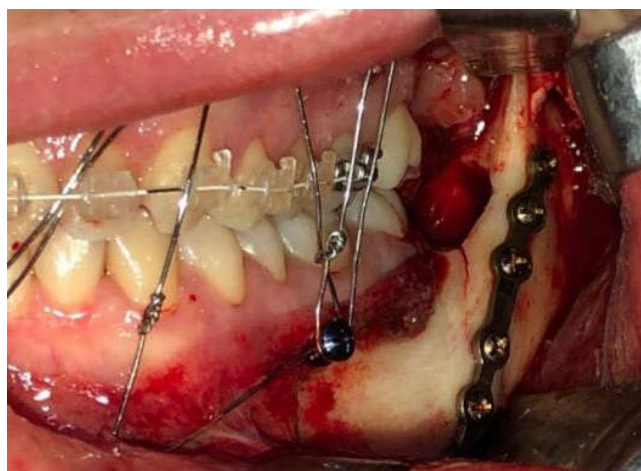


Figure 7. Rigid mandibular fixation by the Champy technique

It proceeded with vigorous washing of the region using 0.9% saline and the occlusion of the access with 4-0 vicryl thread. In the next day, the patient was in good general condition, with compatible edema to the procedure and stable occlusion. In the immediate postoperative panoramic radiograph, a good reduction and bone fixation were noted (Figure 8). She was discharged with a prescription containing Amoxicillin associated with Potassium Clavulanate, Tenoxicam, Dipyron, and mouthwash with 0.12% chlorhexidine digluconate solution. Beyond that, due to the paresthesia of the lower alveolar nerve, the patient was referred for laser therapy associated with the ETNA® medication.



Figure 8. Immediate panoramic radiography

During the 30-days-postoperative-period, the patient presented a good mouth opening without pain complaints, good occlusion, and adequate mandibular movements. After 16 months of monitoring, a panoramic radiograph evidenced good alveolar repair and a fracture line (Figure 9). Besides

that, it was possible to notice an appropriate occlusion, aesthetics and function (Figure 10). However, despite the drug treatment and the laser sessions, used in the postoperative, the paresthesia still persists.



Figure 9. Panoramic radiography after 16 months



Figure 10. Dental occlusion after sixteen months

## DISCUSSION

The indications of surgical removal of third molars vary and cause divergences between authors. One of the reasons to do it is to avoid the appearance of pathological changes, in a prophylactic stamp (Andrade *et al.*, 2012). The emergence of accidents and complications coming from exodontia of the inferior third molars are diverse and among them, there are mandible bone fractures in trans and postoperative. Although being considered rare, they can occur and bring serious consequences (Oliveira *et al.*, 2013; Rodrigues *et al.*, 2013; Silva *et al.*, 2017; Oliveira *et al.*, 2020). Besides that, the practice made by non-specialized dentist-surgeons can entail more easily the appearance of difficulties, because most of them do not present the same preparation and technique ability (if) compared to the bucco-maxillofacial surgeons (Andrade *et al.*, 2012). The mandibular fractures which occur in the transoperative are multifactorial and could be associated to local factors, such as the osteotomy excess, the teeth impaction degree, the tooth's relative volume, and its location, or systematic, as age, bone pathologies, cysts, and tumors (Oliveira *et al.*, 2020). To Rodrigues *et al.* (2013), there are factors related to the surgeon and the surgical technique, such as failed planning, inappropriate handling of the tissues involved difficulting the visualization, inadequate instruments to the execution of the procedure, mistaken lever use, promoting an excessive manual strength, and inadequate technique with an excess osteotomy or incorrect dental section.

It is important to stand out that these fractures affect more frequently patients with advanced age, due to the mandible weakening as a result of the bone elasticity reduction in the aging process (Joshi *et al.*, 2016; Oliveira *et al.*, 2013). The

fractures in the transoperative present a bigger prevalence in the female gender, since the mandible has a thinner thickness and consequently a higher bone fragility, whereas the male gender is prevalent in the postoperative since the masticatory strength in men is higher (Ethunandan *et al.*, 2012). The left side is the most stricken because of its visualization in the surgical field and the applied strength control by the right-handed surgeon is better in the patient's right side when compared to the left one (Joshi *et al.*, 2016). The angled region is the most affected. This low resistance is due to the location being a transition zone between the body and the mandibular branch (Joshi *et al.*, 2016; Rodrigues *et al.*, 2013). Besides that, this region shelters the third molar, causing a bone volume reduction of this area (Andrade *et al.*, 2012; Joshi *et al.*, 2016; Silva *et al.*, 2017). In the current report, most of the findings, as the fracture's region, the stricken side, and the patient's gender corroborate with the literature, except for its age. Besides, it is important to highlight that there were factor associations that culminated in the fracture, but the main cause is probably related to the technique, which was possibly employed an excessive and inadequate manual strength. A fact which can be stood out is that the mandible fractures in the third molar extraction transoperative are most common between the classes II/III and type B/C in the Pell and Gregory classification, in comparison with the class I and type A (Bonardi *et al.*, 2015). Relating to the dental position, there is not a full agreement between the authors, to Bonardi *et al.* (2015), the highest incidence is found in the mesioangular teeth, whereas to Joshi *et al.* (2016), those would be the dental units vertically positioned, however, they converge when they relate that there is a smaller frequency in the distoangular ones when compared to the other angulations. In the described clinical case, the tooth matched the criteria of class II type A and it was distoangular, which shows, concerning the classification, that it was not the most usual according to the literature.

The mandible fractures treatment can be, basically non-surgical, through the JMB, or surgical, through a bloody reduction and internal fixation with plates and screws (Oliveira *et al.*, 2020; Rodrigues *et al.*, 2013). Those will depend, mainly, on the fracture's type and anatomy, which means they will be in accordance with the trait and stability (favorable or unfavorable). Regarding stability, in MAF, it is of great importance to know the masseter, temporal and medial pterygoid muscles, which are connected to the branch, tend to affect the bone, minimizing the dislocation in vertically and horizontally favorable fractures, in other words, the fracture's branch will be against the muscular action. Nonetheless, they dislocate the proximal segment upwards and medially when the fractures are vertically and horizontally unfavorable, which means when the fracture's branch is in favor of these muscles' action (Fonseca *et al.*, 2015). Having that in mind, a lot of techniques were described in the literature to MAF. To the non-surgical treatment – closed– the intermaxillary block is applied in 45 days. This is generally adopted when the fracture is in a favorable condition or when the patient refuses to be submitted to the procedure under general anesthesia (Rodrigues *et al.*, 2013; Oliveira *et al.*, 2020). Whereas to the surgical treatment – open–three methods that stand out: Champy's Technique, AO/ASIF (*Arbeitsgemeinschaft für Osteosynthesefragen*) Technique, and Modified AO Technique, using two plates. When well indicated, those three possess a great result (Franck *et al.*, 2014), however, to achieve that, the correct classification of the fracture must be

made (Rodrigues *et al.*, 2013), avoiding, therefore, postoperative complications (Franck *et al.*, 2014). Champy's Technique consists in the fixation, after the MAF reduction, with a miniplate from the 2.0 mm system (Rodrigues *et al.*, 2013; Franck *et al.*, 2014; Belloti Neto *et al.*, 2018) non-compressive and with monocortical screws (Belloti Neto *et al.*, 2018; Franck *et al.*, 2014) in the upper edge of the mandible's angle, by intraoral access (Belloti Neto *et al.*, 2018; Rodrigues *et al.*, 2013, Franck *et al.*, 2014). This can be used in fractures classified as simple, that is, linear, with a single trace, without comminution, without or with a little displacement, and presenting whole bone segments (Rodrigues *et al.*, 2013). In the AO Technique, a 2,4 mm (variable sizes) reconstruction plate is used in a bicortical way, fixed in the mandible's inferior edge. In this technique's modification (Franck *et al.*, 2014), besides a 2,4 mm plate in the compression zone, the basal region of the mandible, it is fixed a plate of 2.0 mm in the tension zone, upper edge, next to the teeth (Franck *et al.*, 2014; Oliveira *et al.*, 2020), both are made through an extraoral approach, Risdon's access (Franck *et al.*, 2014). In them, the fixation material should promote a higher resistance and be able to support the charge applied in the fracture region (Oliveira *et al.*, 2020; Rodrigues *et al.*, 2013), because of that, they are used in more complex fractures, comminuted, dislocated and with a huge reduction of the bone remnant (Rodrigues *et al.*, 2013).

In the described case, the AFM was simple, dislocated, and unfavorable, with that in mind, the open reduction (Fonseca *et al.*, 2015) associated to Champy's Technique were indicated (Belloti Neto *et al.*, 2018; Franck *et al.*, 2014; Rodrigues *et al.*, 2013). On that way, adequate stability was achieved, with only one device and a good occlusal relation, according to the researched authors, resulting in an absence of postoperative complications, good fracture consolidation, and functional and aesthetical reestablishment of the patient (Belloti Neto *et al.*, 2018; Franck *et al.*, 2014). It must be reminded that the access used, according to Teixeira *et al.* (2012), possess advantages when compared to the extraoral one, keeping in mind that the last one can provide a cervical scar, neuropraxia of the mandible's marginal branch of the facial nerve, time expenditure, and more technical complexity.

## CONCLUSION

Situations like these reported in this article are rare, however, they deserve attention. When neglected, they can cause serious damage to the patient. Thus, it is necessary to make a correct study and preoperative planning, identifying all possible mistakes and risk factors. Beyond that, it is essential a correct performance of the transoperative technique, to avoid accidents and complications, such as MAF. If they occur, the surgeon must establish an accurate diagnosis and treat or refer the patient to a qualified professional. It is important to highlight that the technique described by Champy is effective and presents satisfactory results when properly indicated and performed.

## REFERENCES

- Andrade VC, Rodrigues RM, Bacchi A, Coser RC, Bourguignon Filho AM (2012). Complicações e Acidentes em Cirurgias de Terceiros Molares – Revisão De Literatura. *Saber Científico Odontológico*. Porto Velho. 1: 27-44.

- Basyuni S, Ferro A, Cameron M (2016). Mandibular fracture risk. Cambridge. British Dental Journal, pp 220.
- Belloti Neto O, Lopes MF, Mandarino SCA (2018). Tratamento de Fratura Mandibular pela Técnica de Champy: Relato de Caso. Braz. J. Surg. Clin. Res. 3: 101-104.
- Bonardi JP, Cordeiro RF, Stabile GAV, Pereira-Stabile CL (2015). Tratamento de fratura iatrogênica do ângulo mandibular ocorrida durante exodontia do terceiro molar: caso clínico. Rev port estomatol med dent cir maxilofac. 1: 68-72.
- Champy M, Loddé JP, Schmitt R, Jaeguer JH, Muster D (1978). Mandibular osteosynthesis by miniatures screwed plates via a buccal approach. Journal of Maxillo Facial Surgery. 6: 14-21.
- Ethunandan M, Shanahan D, Patel M (2012). Iatrogenic mandibular fractures following removal of impacted third molars: an analysis of 130 cases. British Dental Journal. 4: 179-184.
- Fonseca RJ. *et al* (2015). Trauma Bucocomaxilofacial. Rio de Janeiro: Elsevier.
- Franck FC, Oliveira Júnior PF, Vitale M, Pino DS, Dias FJN (2014). Meios de Fixação mais utilizados em Fraturas de Ângulo Mandibular. Revista Científica da FHO|UNIARARAS. 1:25-32.
- Joshi A, Goel M, Thorat A(2016) Identifying the risk factors causing iatrogenic mandibular fractures associated with exodontia: a systemic meta-analysis of 200 cases from 1953 to 2015. Oral Maxillofac Surg.
- Oliveira CCMX, Silva Júnior EZ, Brasil Júnior O, Almeida HCR, Pacheco GM (2013). Fratura de mandíbula durante exodontia de terceiro molar inferior incluso: relato de caso. Rev. Cir. Traumatol. Buco-Maxilo-Fac. Camaragibe. 4: 15-20
- Oliveira LML, Ramos JER, Oliveira MTT, Tino MT, Lellis AR, Toledo IC, Gasperinni G (2020). Tratamento de fratura mandibular após exodontia de terceiros molares: Relato de caso. Braz. J. Surg. Clin. Res. Goiânia. 2:55-58.
- PiresWR, Bonadir JP, Faverani LP, Momesso GAC, Muñoz XMJP, Silva AFM, Panzarini APF, Ponzoni BD (2016). Late mandibular fracture occurring in the postoperative period after third molar removal: systematic review and an alysis of 124 cases. Int J Oral Maxillofac Surg, pp 1-8.
- Rodrigues AR, Oliveira MTF, Paiva LGJ, Rocha FS, Silva MCP, Zanetta-Barbosa D (2013). O Fratura mandibular durante remoção do terceiro molar: fatores de risco, medidas preventivas e métodos de tratamento. Rev Odontol Bras Central. 63: 124-127.
- Seguro D, Oliveira RV (2014). Complicações pós-cirúrgicas na remoção de terceiros molares inclusos. UNINGÁ Review. 1: 30-34.
- Silva WS, Silveira RJ, Andrade MGBA, Franco A, Silva RF (2017). Is The Late Mandibular Fracture From Third Molar Extraction a Risk Towards Malpractice? Case Report with the Analysis of Ethical and Legal Aspects. J Oral Maxillofac Res. 2: 1-6.
- Teixeira LMS, Reher P, Reher VGS (2012). Anatomia Aplicada a Odontologia. 2ª. Ed. Guanabara Koogan, Rio de Janeiro.

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