

Late mandibula fracture after third molar extraction; literature review

Fratura de mandíbula tardia pós exodontia de terceiro molar; revisão de literatura

DOI:10.34117/bjdv7n6-525

Recebimento dos originais: 07/05/2021

Aceitação para publicação: 01/06/2021

Laís Regina Silva Pereira

Graduada em Odontologia pela Universidade Federal da Paraíba
Centro Universitário Tabosa de Almeida - ASCES-UNITA, Brasil
E-mail: laisregina_11@hotmail.com

Matheus Simões Medeiros

Graduando em Odontologia pela Universidade Federal da Paraíba
Universidade Federal da Paraíba, Paraíba, Brasil
E-mail: matheus_simoes2012@live.com

Raissa Leitão Guedes

Residente em cirurgia e traumatologia bucomaxilo facial pela Universidade Federal da Paraíba
Universidade Federal da Paraíba, Paraíba, Brasil
E-mail: raissa.guedes2@gmail.com

Millena Lorrana de Almeida Sousa

Residente em cirurgia e traumatologia bucomaxilo facial pela Universidade Federal da Paraíba
Universidade Federal da Paraíba, Paraíba, Brasil
E-mail: millenalas@gmail.com

Danilo de Moraes Castanha

Residente em cirurgia e traumatologia bucomaxilo facial pela Universidade Federal da Paraíba
Universidade Federal da Paraíba, Paraíba, Brasil
E-mail: danilo.castanha@hotmail.com

James Fábio do Nascimento Souza

Graduado em Odontologia pela União Educacional do Norte- UNINORTE/ Acre
Centro Educacional Uninorte- UNINORTE, Brasil
E-mail: thejamesfabio@hotmail.com

Alleson Jamesson da Silva

Residente em cirurgia e traumatologia bucomaxilo facial pela Universidade Federal da Paraíba
Universidade Federal da Paraíba, Paraíba, Brasil
E-mail: allesonjamesson@gmail.com

Eduardo Dias Ribeiro

Doutor em Cirurgia e Traumatologia Buco-Maxilo-Faciais
Universidade Federal da Paraíba, Paraíba, Brasil
E-mail: eduardo_ufpb@hotmail.com

Marcos Antônio Farias de Paiva

Doutor em Estomatologia e coordenador da Residência em CTBMF do HULW/PB
Universidade Federal da Paraíba, Paraíba, Brasil
E-mail: marcosafp2@hotmail.com

ABSTRACT

Extraction of lower third molars is one of the most common procedures performed in oral surgery, may undergo intraoperative and post complications, with an incidence that ranges from 3.47% to 9.1%, including: bleeding, pain, dental or bone fractures, displacement of teeth or fragments, subcutaneous emphysema, nerve damage, edema and infection. Treatment depends on the fracture characteristics, maxillomandibular fixation and surgical treatment by means of fracture reduction and fixation. This article was carried out based on a search in online databases, such as PUBMED, written in Portuguese and English. Late mandibular fracture after extracion of third molars occurs between the 2nd and 6th week after surgery, most of which occur during chewing more consistent foods can cause severe trauma to the bone weakened by surgery. For this reason, the need to inform operated patients about postoperative care and the limitation of masticatory strength for 2 months after surgery, so that there is an adequate bone repair in the operated region. we conclude the importance of guiding patients on the risks inherent in the surgery to which the patient will be submitted, as well as guiding the postoperative care, necessary both in writing and verbally, to avoid any post-surgical complications or legal implications that may occur.

Keywords: Molar third; postoperative complications; mandible.

RESUMO

A extração de terceiros molares inferiores é um dos procedimentos mais realizados em cirurgia oral, pode sofrer complicações transoperatória e pós, com incidência que varia de 3,47% a 9,1%, dentre elas: sangramento, dor, fraturas dentárias ou ósseas, deslocamento de dentes ou fragmentos, enfisema subcutâneo, lesão nervosa, edema e infecção. O tratamento depende das características da fratura, fixação maxilomandibular e tratamento cirúrgico por meio de redução e fixação da fratura. O presente artigo foi realizado a partir de uma pesquisa em bancos de dados online, como PUBMED, escritos em língua portuguesa e inglesa. A fratura mandibular tardia após exodontia de terceiros molares ocorre entre a 2ª e 6ª semana após a cirurgia, a maioria ocorre durante a mastigação de alimentos mais consistentes, onde a força mastigatória necessária para triturar os alimentos pode causar um trauma acentuado ao osso enfraquecido pela cirurgia. Por esse motivo, a necessidade de informar os pacientes operados sobre os cuidados pós-operatórios e a limitação da força mastigatória por 2 meses após a cirurgia, o para que haja um reparo ósseo adequado na região operada. Podemos concluir a importância de orientar os pacientes dos riscos inerentes a cirurgia na qual o paciente será submetido, bem como orientar os cuidados pós-operatório, necessários tanto por escrito quanto verbalmente, para evitar quaisquer complicações pós-cirúrgica ou implicação jurídicas que possam ocorrer.

Palavras-chave: Terceiro molar; complicações pós-operatória; mandíbula.

1 INTRODUCTION

Surgical extraction of lower third molars is one of the most common procedures performed in oral surgery. The reasons for extracting these teeth include acute or chronic injuries, pericoronitis, presence of cysts or tumors, periodontal disease, caries and even preparation for orthodontic treatment or orthognathic surgery. The incidence of complications as bleeding, pain, dental or bone fractures, displacement of teeth or its fragments, subcutaneous emphysema, nerve damage, edema and infection varies from 3.47% to 9.1% and may happen both in intraoperative or postoperative period, especially when it comes to a lower third molar. infecção (8) (2) (13) (16) (18).

Episodes of mandible fractures typically occur during an accident or surgery, but less frequently as a post-operative complication, usually in the first 4 weeks after surgery. Its incidence is seen in the literature varying depending on the study, but it is always very low. This complication requires immediate treatment to avoid aggravations. On the other hand, surgeons who frequently perform impacted third molars extractions, must be able to identify the cases most likely to develop a fracture, aiming to properly guide the patient about possible risks and obtaining the informed consent (8) (6) (13) (18).

Completely dentate patients are more likely to occur a fracture after surgery. Another possible etiologies for mandibular fracture during third molars extraction may include age, gender, tooth angulation and impaction, location, surgical technique, presence of long roots, edentulism, excessive force, pre existing bone injuries or systemic diseases related to bone metabolism. Knowledge of the clinical complications, ethical and legal risks associated to third molars extraction, support the dental surgeon in daily practice (6) (14) (16) (19).

The choice of treatment depends on the fracture characteristics and the surgeon's preference, which may include light diet (soft food diet), maxillomandibular fixation and surgical treatment aiming its reduction and fixation (16).

2 METHODOLOGY

This article was characterized as an integrative review, according to Pereira et al. (2018) it is a qualitative and descriptive study.

Literature review of studies published by PubMed (National Library of Medicine; <https://www.ncbi.nlm.nih.gov/pubmed/>) and LILACS (Latin American and Caribbean Health Sciences Literature; <https://lilacs.bvsalud.org/>) which databases was conducted from April 2020 to April 2021. The strategies used to locate the articles were guided by the question and inclusion criteria previously established to maintain consistency searching the articles and avoid possible bias. The keywords were used according to Medical Subject Headings (MESH; <https://www.ncbi.nlm.nih.gov/mesh>) and Health Sciences Descriptors (Decs; <http://decs.bvs.br/>), comprehensive controlled vocabulary for the purpose of indexing journal articles and books in the life sciences. The research strategies are shown in table 1.

Table 1: Search strategy and key-words

DATABASE / SEARCH TERMS	
PubMed	LILACS
Search Filters:	
Publication data from last year. ((Late Molar third fracture) OR Late Mandibula Fracture) AND Third Molar Extraction	

3 LITERATURE REVIEW

As the only movable bone of the face, its anatomical shape and the strong masticatory muscles inserted to it. The lower jaw has unique biomechanical characteristics that directly or indirectly makes it conducive to fractures, mainly in fragile regions such as the angle, the condyle and mandibular body. Several previous studies claim that impacted third molars increases the risk of fractures on the mandibular angle, especially when inadequate or exaggerated forces are caused in this bone, either by facial trauma, surgical procedures, as well as excessive masticatory forces in a weakened bone, resulting in a non-pathological late fracture caused by bone weakening, which can occur after extraction of an impacted third molar (2) (20).

Third molars extraction is the most common surgical procedure performed by oral and maxillofacial surgeons. Generally, this procedure occurs without accidents or complications, however, in some situations, serious complications, such as fracture of the mandible, can occur, both due to iatrogenesis, as well as negligence in the post-operative care by the patient (16) (18) (17).

It is noteworthy that in these situations, the professional must closely monitor his patient in order to achieve the best possible treatment. In these cases, the informed consent is indispensable, which must contain all the information, risks and possible complications inherent to the procedure to be performed. This is a crucial instrument to protect the dental surgeon from ethical and legal disputes that may happen (17).

Alveolar osteitis, secondary infection, bleeding, paresthesia and fracture of neighboring teeth are the most common postoperative complications involving third molars extraction. On the other hand, mandibular fracture, severe hemorrhage or iatrogenic displacement of these elements are the most serious complications. The incidence of mandibular fracture during or after third molars extraction ranges from 0.0046% to 0.0049% for some authors and 0.0034% to 0.0075% for others, about 37 out of 750 thousand extractions (2) (19) (4) (7).

According to Pell and Gregory classification, late mandible fractures usually occur in Class II/III and Type B/C impactions. Depending on the procedure and its complexity, a large bone defect may be present in the operated area after third molar surgical removal. However, these patients are usually in good general health, do not have bone pathology and, when the fracture occurs, it is usually a simple line. These characteristics contribute to healing without complications, unless the bone is infected, as in the case described by Yamamoto, where a patient had a late fracture of the lower jaw 23 days after extraction, due a inappropriate initial treatment. Wich evolved with osteomyelitis in the mandibular angle (19) (3).

In previous studies, authors report that late mandibular fracture after third molar extraction occurs between the 2nd and 6th week after surgery, in individuals between 20 and 40 years old. Most late lower jaw fractures occur while chewing more consistent foods, such as bread, nuts and meats, when the masticatory forces required to grind food can cause severe trauma to the already weakened bone by surgery. Most cases report that at the moment of late mandible fracture, the patient hears a "crack" on the affected side during chewing, accompanied by pain, a rapid evolution to edema and trismus, with or without malocclusion and paresthesia (3) (1) (12).

For this reason, in order to avoid such a complication, Nogueira, et al. (11), emphasize the need to inform operated patients about the limitation of masticatory force for 2 months, after surgery, a time necessary for an adequated bone repair.

An accurate clinical examination and image evaluation, including radiographs and CT scans, are essential when planning any surgical procedure. When evaluating an

imaging test, it essential to determine the procedure complexity and analyze whether it has sufficient ability to deal with challenging cases. It is worth mentioning that, the surgeon must remove only the necessary bone tissue to execute the extraction, sectioning the tooth whenever necessary, consequently, reducing fragility of the remaining bone and incidence of fractures (1) (19) (15).

Applying piezoelectric ultrasound waves, depending on the case, may be recommended in order to reduce excessive forces during dental avulsion and to manipulate nervous structures, avoiding or decreasing cases of paresthesia. Some authors suggest that in cases, where there is a large impaction of the third molar, related with the base of the mandible, where an increased risk of late mandibular fracture is already expected, a titanium miniplate should be installed in the oblique line region in a preventive way, this ways, increasing the resistance to forces deferred to this bone (7) (12).

In cases where the fracture occurred, treatment should continue, depending on the force vectors associated with it, preferably with semi-rigid bone fixation, as described by Champy et al.(5) in 1978, which is based on the use of only a mini-plate in the tension zone (oblique line), with monocortical screws and by intraoral access, through functionally stable fixation, using two 2.0 mm locking reconstruction plates with monocortical screws in the tension zone and bicortical screws in the compression zone or using the load bearing principle, with a 2.4 mm locking plate system, being able to use an intra or extraoral access (10) (9).

4 FINAL CONSIDERATIONS

It is fundamental to guide patients about the risks inherent about the surgery they will be submitted, as well as guiding the post-operative care, both in writing and verbally ways, aiming to avoid any post-surgical complications or legal implications that may occur.

REFERENCES

1. Grau-Manclús V, Gargallo-Albiol J, Almendros-Marqués N, Gay-Escoda C. Mandibular fractures related to the surgical extraction of impacted lower third molars: a report of 11 cases. *J Oral Maxillofac Surg.* 2011 May;69(5):1286–90.
2. Cankaya AB, Erdem MA, Cakarer S, Cifter M, Oral CK. Iatrogenic mandibular fracture associated with third molar removal. *Int J Med Sci.* 2011 Sep 17;8(7):547–53.
3. Oliveira CCMX, Silva Júnior EZ da, Brasil Júnior O, Almeida HCR de, Pacheco GM. Fratura de mandíbula durante exodontia de terceiro molar inferior incluso: relato de caso. *Revista de Cirurgia e Traumatologia Buco-maxilo-facial.* 2013;13(4):15–20.
4. Pires WR, Bonardi JP, Faverani LP, Momesso GAC, Muñoz XMJP, Silva AFM, et al. Late mandibular fracture occurring in the postoperative period after third molar removal: systematic review and analysis of 124 cases. *Int J Oral Maxillofac Surg.* 2017 Jan;46(1):46–53.
5. Xu J-J, Teng L, Jin X-L, Lu J-J, Zhang C. Iatrogenic mandibular fracture associated with third molar removal after mandibular angle osteotomy. *J Craniofac Surg.* 2014 May;25(3):e263-5.
6. Corrêa APS, Faverani LP, Ramalho-Ferreira G, Ferreira S, Souza FÁ, de Oliveira Puttini I, et al. Unerupted lower third molar extractions and their risks for mandibular fracture. *Journal of Craniofacial Surgery.* 2014;25(3):e228–9.
7. Özçakir-Tomruk C, Arslan A. Mandibular angle fractures during third molar removal: a report of two cases. *Aust Dent J.* 2012 Jun;57(2):231–5.
8. Yamamoto S, Taniike N, Yamashita D, Takenobu T. Osteomyelitis of the Mandible Caused by Late Fracture following Third Molar Extraction. *Case Rep Dent.* 2019 Aug 4;2019:1–6.
9. Zhou H, Lv K, Yang R, Li Z, Li Z. Mechanics in the Production of Mandibular Fractures: A Clinical, Retrospective Case-Control Study. *PLoS ONE.* 2016 Feb 22;11(2):e0149553.
10. Dos Santos Silva W, Silveira RJ, de Araujo Andrade MGB, Franco A, Silva RF. 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.* 2017 Jun 30;8(2):e5.
11. CASTANHA DM, ANDRADE TI, COSTA MR, NUNES J, VASCONCELOS RCARD, ACIDENTES ECEED, et al. Considerações a respeito de acidentes e complicações em exodontias de terceiros molares: revisão de literatura. *BRAZILIAN JOURNAL OF SURGERY AND CLINICAL RESEARCH, PARANÁ.* 2018;24(3):105–9.
12. Feniar JG, Kawano H, Camolesi GCV, Palmieri M, Sobral SDS, Duarte FL, et al. Extraction of impacted third molar with preventive installation of titanium miniplate: Case report. *Annals of Medicine and Surgery.* 2020;49:33–6.
13. Carlsen A, Marcussen M. Spontaneous fractures of the mandible concept and treatment strategy. *Med Oral.* 2016;21(1):e88–94.

14. Almeida ROP de, Pereira BB. Relação entre exodontia de terceiros molares e fratura de mandíbula. *R Odontol Planal Cent.* 2021;
15. Noetzel N, Fienitz T, Kreppel M, Zirk M, Safi A-F, Rothamel D. Osteotomy speed, heat development, and bone structure influence by various piezoelectric systems-an in vitro study. *Clin Oral Investig.* 2019 Nov;23(11):4029–41.
16. Nogueira AS, do Egito Vasconcelos BC, Frota R, Cardoso ÁB. Orientações pós-operatórias em cirurgia bucal. *CEP.* 2006;54753:901.
17. Pereira AS, Shitsuka DM, Parreira FJ, Shitsuka R. Metodologia da pesquisa científica.[e-book]. Santa Maria. Ed. UAB/NTE/UFSM. Disponível em: [https://repositorio.ufsm.br/bitstream/handle ...](https://repositorio.ufsm.br/bitstream/handle...); 2018.
18. Champy M, Loddé JP, Schmitt R, Jaeger JH, Muster D. Mandibular osteosynthesis by miniature screwed plates via a buccal approach. *J Maxillofac Surg.* 1978 Feb;6(1):14–21.
19. Lima VN de, Figueiredo CMBF, Momesso GAC, Queiroz SBF de, Faverani LP. Fratura mandibular associado à remoção de terceiro molar inferior: revisão de literatura. *Arch Health Invest.* 2017 Oct 3;6(9).
20. Lim H-Y, Jung T-Y, Park S-J. Evaluation of postoperative complications according to treatment of third molars in mandibular angle fracture. *J Korean Assoc Oral Maxillofac Surg.* 2017 Feb 20;43(1):37–41.