

SURGICAL MANAGEMENT OF COMPLEX MANDIBULAR FRACTURE: CASE REPORT

JONH ELTON REIS RAMOS^{1*}, LETYCIA MARIA LOPES DE OLIVEIRA¹, ABEL JARA DE SOUZA¹, LAIZ VIEIRA DE SOUZA¹, MARCIO TADASHI TINO², ALESSANDRO ROCHA LELLIS², GIOVANNI GASPERINNI², ITALO CORDEIRO DE TOLEDO³

1. DDS, Resident of Oral and Maxillofacial Surgery, Hospital of Clinics Federal University of Goiás, Goiânia - GO, BRAZIL; 2. DDS, MsC, Staff Department of Oral and Maxillofacial Surgery, Hospital of Clinics Federal University of Goiás, Goiânia - GO, BRAZIL; 3. DDS, MsC, PhD Staff Department of Oral and Maxillofacial Surgery, Hospital of Clinics Federal University of Goiás, Goiânia - GO, BRAZIL; 4. DDS, MsC, PhD Staff Department of Oral and Maxillofacial Surgery, Tropical Disease Hospital, Goiânia - GO, BRAZIL.

* Hospital of Clinics Federal University of Goiás, 1st Avenue, S/N, Sector East University, Brazil. ZIP OCDE: 74605-020. jonhreisbuco@gmail.com

Received 03/13/2020. Accept: 04/01/2020

ABSTRACT

The jaw is considered the strongest bone in the facial skeleton. However, due to their vulnerable position and anatomical configuration, traumatic injuries associated with the mandibular condyle, angular and body fractures are frequently observed. The objective of the treatment of mandibular fractures is to reestablish function, anatomy and aesthetics, through the reduction and often fixation of fragments. The present study aims to report a clinical case of a patient victim of physical aggression presenting a complex fracture of the jaw undergoing surgical treatment, with satisfactory results using intraoral and extraoral access to the fracture line. After a six-month postoperative follow-up, the patient did not report any complaints and the imaging exam did not show any changes, satisfactory occlusion.

KEYWORDS: Facial Injuries, mandibular injuries; internal fracture fixation.

1. INTRODUCTION

The jaw is considered the strongest bone in the facial skeleton. However, due to their vulnerable position and anatomical configuration, traumatic injuries associated with the mandibular condyle, angular and body fractures are frequently observed. These fractures affect almost 65-76% of all maxillofacial fractures, mainly after motor vehicle collisions and aggressions¹.

The patterns of mandibular fractures depend on several factors, including direction and amount of force of trauma, presence of soft tissue volume and biomechanical characteristics of the jaw such as density and bone mass, as well as the anatomical structures that create the areas of least resistance².

The classifications vary according to the fracture pattern, being simple or closed, composed or open, comminuted, pathological, in green branch, complex and fractures in pediatric and atrophic jaws³.

Another way of classifying these fractures varies according to the anatomical region, such as the symphysis, parasymphysis, mandibular body and

mandible angle and the muscle action in relation to the mobility of the segments, being classified as favorable and unfavorable⁴.

The diagnosis of mandibular fractures is performed through clinical examinations, assessing the presence of signs and symptoms such as pain on movement, bone crackling, edema and ecchymosis, occlusal alteration, jaw mobility and bleeding. Aiding in the diagnosis and for better location of fractures, complementary exams, such as panoramic radiographs, oblique lateral view of the right and left jaw, postero-anterior (AP) mandible or face, reverse townes (modified AP) and ATM are used. However, the gold standard for identification and location of fractures, as well as for determining extension and three-dimensional visualization, are computed tomography of the face⁵.

The basic principle of treatment is the reduction, containment and immobilization of fractured segments; the orientation of dental occlusion, within normal standard, will lead to a perfect consolidation of fractured segments with good functional and aesthetic recovery of the patient. The means of containment and immobilization frequently cited in the literature are: odontosynthesis, Kirschner wire transfixation, cerclages, gutters, rigid and semi-rigid osteosynthesis, external fixation devices, external control devices and bandages. The presence of teeth in the dental arch is a factor that allows a greater degree of favorability in the treatment of mandibular fractures⁶.

The objective of the work is to report a clinical case of a patient victim of physical aggression presenting a complex fracture of the mandible submitted to surgical treatment, with satisfactory results using intraoral and extraoral access to the fracture line.

2. CASE REPORT

Patient 25 years old, melanoderma, male, born in Goianesia - Goiás, sought the emergency room of the Buccomaxillofacial Surgery and Traumatology service of Hospital das Clínicas, Universidade Federal de Goiás for rehabilitation. As the main complaint, the patient reported pain and inability to chew. The patient

was a victim of physical aggression, with a broken jaw. He denied chronic use of medications, drug allergies, previous surgery, underlying pathologies. Regarding family history, she reported having a hypertensive mother. In relation to social history, she denied the use of illegal substances, referred to the use of alcohol and tobacco. Physical examination revealed significant occlusal changes, regular oral hygiene, stable maxilla, crackling and marked mobility in the manipulation of the jaw, enlargement in the left oral region, hypoesthesia in the bilateral lower lip region, preserved facial mimics (Image 1). Dentosynthesis was performed between dental elements 44 and 45 to stabilize fractured segments in the initial care (Figure 2).

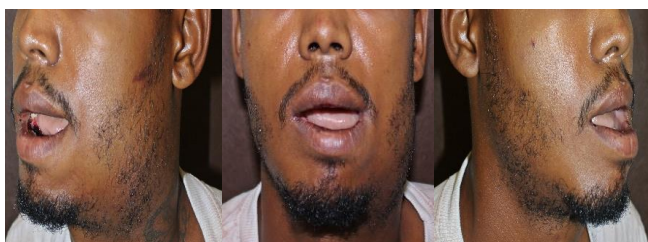


Figure 1. Initial photography - unstable occlusion, mastectomy incompetence and edema.



Figure 2. Initial intraoral photos.

After clinical evaluation and imaging findings (Figure 3), he was diagnosed with a mandibular body fracture on the right side and mandibular angle on the left side.



Figure 3. Computed tomography 3d reconstruction.

Preoperative exams were normal. Surgery was performed in August 2019. Patient positioned in supine position, nasotracheal intubation under general anesthesia, asepsis and antisepsis with chlorhexidine, apposition of operative fields, installation of oropharyngeal plug, infiltration in the region of the

mandibular body to the right and left mandibular angle, extra oral with 2% lidocaine with 1,200,000 epinephrine, Risdon type access on the left, divulsion by planes, subperiosteal detachment, fracture exposure, reduction and rigid internal fracture fixation with 02 device plates (2.0mm and 2.4mm system), 01 plate in the compression region and another in the tension region (Figure 4), in the case of body fracture, we opted for intraoral access in the bottom of the vestibule, subperiosteal detachment, fracture exposure, reduction and fixation with 02 plates (2.0mm system), 04 holes and 04 screws, tension and compression regions (Figure 5), extraction of unit 38 (Figure 6), copious irrigation with 0.9% saline, flat suture with 4-0 vicryl internally and 5-0 nylon for skin suture. Removal of the oropharyngeal plug, removal of the operative fields and extubation without complications.

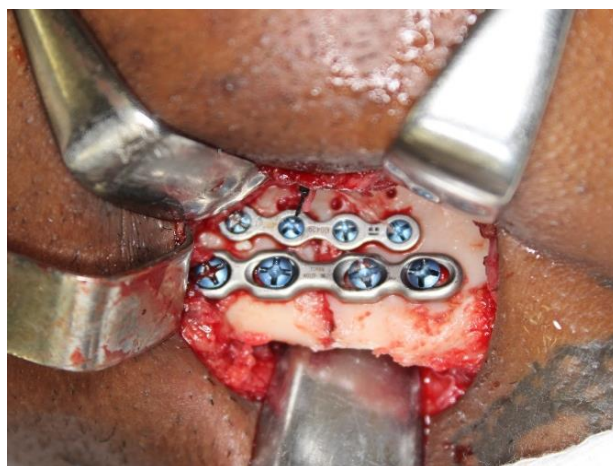


Figure 4. Extraoral access - reduction and fixation with 2.0 and 2.4 mm system plates.

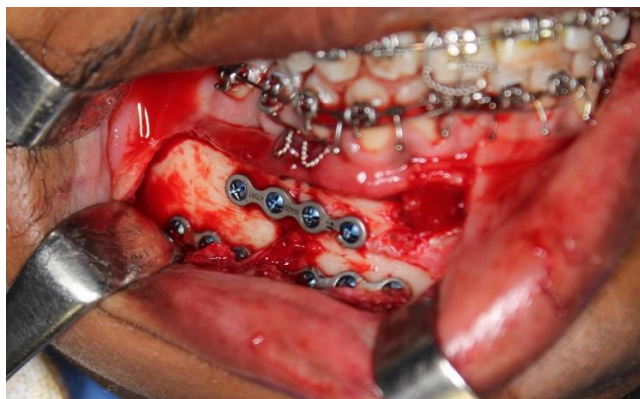


Figure 5. Intraoral access - reduction and fixation with 2.0mm system plates.



Figure 6. Dental element 38.

The patient was discharged after 24 hours with a prescription for amoxicillin 500mg every 8h / 8h for seven days, dexamethasone 4mg every 8h / 8h for three days and sodium dipyrone 500mg every 6h / 6h for three days. Guidance was also given on diet and care for the surgical wound. In the one-week postoperative clinical control, slight edema was observed in the region of the left mandibular angle, absence of limited mouth opening and surgical wound without signs of infection or dehiscence. After six months of postoperative follow-up, computed tomography was performed for evaluation (Figure 7). The patient did not report any complaints and the imaging exam did not show any alteration, satisfactory occlusion (image x), so the patient was discharged on an outpatient basis.

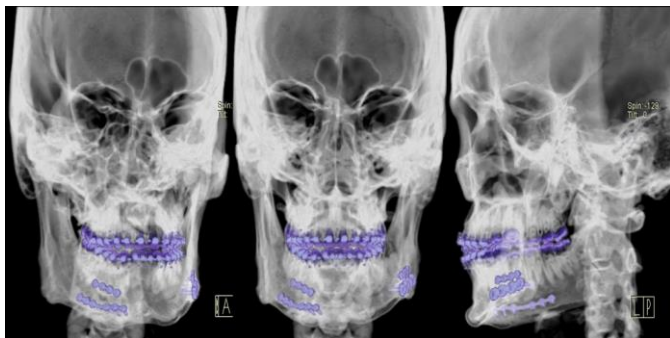


Figure 7. Postoperative tomography.



Figure 8. Final occlusion

3. DISCUSSION

Mandibular fracture is the second most frequent fracture of facial bones, standing out among etiologic agents and motorcycle and automatic accidents after physical attacks^{7,8}.

They can extend over regions (branch, angle, body, parasymphysis and symphysis), involving unusual regions and neighboring structures. They can be classified depending on the tissue impairments that have been affected, the action of the masticatory muscles and their anatomical location. The most affected region are the angle and parasymphysis^{1,2,3,8}.

Masticatory incompetence, atypical mobility when manipulating the jaw, limited mouth opening, edema, ecchymosis and facial asymmetry are the most frequent

signs and symptoms^{6,9}.

The objective of the treatment of mandibular fractures is to reestablish function, anatomy and aesthetics, through the reduction and often fixation of fragments. Treatment will be determined after analysis of the type and region of the fracture, presence of TMJ dysfunctions, occlusal changes, age, medical and / or psychological conditions, functional limitations (mouth opening, laterality and protrusion) and / or esthetics in relation to the patient, in addition to the complaint¹⁰.

Among the forms of treatment are internal fixations, functionally stable or rigid. They promote better coaptation of the fracture traces and allow a good evolution with very low complication rates. They are performed through Load-Sharing and Load-Bearing devices. Load-Sharing shares the load with bone on each side of the fracture, are mini-plates from 1.5mm to 2.0mm thick, indicated for fractures with solid bone fragments that can withstand part of the functional load (simple linear fractures). Load-Bearing, on the other hand, is resistant and rigid enough to support all the load generated to the jaw, they are reconstruction plates from 2.4mm to 2.7mm thick, with indication of fractures with comminutions and small bone surface due to atrophy or damage, resulting in a loss of the mandibular portion^{11,12,13}.

In the case reported, the surgical treatment determined was to use the load-sharing system for body fracture and load-bearing for angle fracture, assessing the area of least resistance, considering the loss of tooth 38. With a liquid diet guidance for 45 days. The surgical access of choice was the Risdon indicated for fractures and angle and intraoral for angle fracture, due to the degree of displacement and complexity of the case presented¹⁴.

Complications in the treatment of mandibular fractures can occur due to a failure to reduce fractured bone segments, which can lead to the formation of fibrotic tissue in the fracture line, which hinders bone formation and causes local pain, a condition called pseudoarthrosis. In such cases, a surgical re-approach may be necessary¹⁵.

4. CONCLUSION

The best method of treating complex mandibular fractures is performed when a correct diagnosis is made, following surgical and physiological procedures in a minimal way, in addition to a rigorous postoperative follow-up. When the correct form is indicated, the open surgical reduction and the fixation of the following fractures, the use of plates and screws, is related to an earlier return of the mandibular movements, improving the functional capacity and reducing the complication rates.

REFERENCES

- [1] Miloro M., Ghali GE, Larsen P.E, Waite PD. *Princípios de Cirurgia Bucomaxilofacial de Peterson*. Editora Santos, Revista Da Faculdade De Odontologia -

- UPF, 1ed. 2009; 23(1):407-10.
- [2] Zellweger R. Maxillofacial fractures. ANZ Journal of Surgery. 2007; 77:613
- [3] Ellis III, E, Miles BA. Fractures of the mandible: a technical perspective. *Plas Reconstr Surg*. 2007; 12:76-89.
- [4] Ellis III, E. Management of fractures through the angle of the mandible. *OralMaxillofacial Surg Clin N Am*. 2009; 21:163-174,.
- [5] Junior RC, Moraes RB, Landes C, Luz JGC. Comparison of a 2.0-mm locking system with conventional 2.0- and 2.4-mm systems in the treatment of mandibular fractures: a randomized controlled trial. *Oral Maxillofacial Surg* 2017; 21(3):327-34.
- [6] Emshoff R, Schoning H, Rothler G, Waldhart E. Trends in the incidence and cause of sport-related mandibular fractures: a retrospective analysis. *J Oral Maxillofac Surg* 1997; 55(6):585-92.
- [7] Stacey DH, Doyle JF, Mount DL, Snyder MC, Gutowski KA. Management of mandible fractures. *Plast Reconstr Surg*. 2006; 117(3):48-60.
- [8] Tucker DI, et al. Characterization and Management of Mandibular Fractures: Lessons Learned from Iraq and Afghanistan. *Atlas Oral Maxillofacial Surg Clin* 2013; 21(1):61-68.
- [9] Mendonça JCG, et al. Acesso extraoral para ostessintese de fratura de ângulo mandibular. *Arch Health Invest, Araçatuba*. 2015; 4(6):9-14.
- [10] Guven Y, et al. A Complex Facial Trauma Case with Multiple Mandibular Fractures and Dentoalveolar Injuries. *Case Reports In Dentistry*. 2015; 2015:1-6.
- [11] Bouchard C, Mansouri M. Open Reduction with Internal Fixation of Mandibular Angle Fractures: A Retrospective Study. *J Can Dent Assoc, Québec*. 2017; 83(3):1-6.
- [12] Scolozzi P, Richter M. Treatment of Severe Mandibular Fractures Using AO Reconstruction Plates. *J Oral Maxillofac.Surg*. 2003; 61:458-461.
- [13] Renton TF, Wiesenfeld D. Mandibular fracture osteosynthesis: a comparison of three techniques. *Br J Oral Maxillofac Surg* 1996; 45(2):143-8.
- [14] Olson B, Fonseca RJ, Zeitler DL et al. Fractures of the mandible: A review of 580 cases. *J Oral Maxillofac Surg* 1982; 40:23-8.
- [15] Hilger PA. Rigid internal and external fixation of mandibular fracture. In: Foster CA, Shermam JB, eds. *Surgery of facial bone fracture*. Philadelphia:Churchill Livingstone. 1987; 195-211.