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Mandibula Fracture by Fire Weapon Projectile: Surgical Treatment Through The Use Of External Fixers: Case Report.

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Abstract: *The indiscriminate use of firearms, made firearm projectile injuries (PAF), common in large and small centers, which in turn affect the maxillofacial region, especially the lower third of the face. In these facial wounds, comminuted fractures in the mandible and the presence of infectious foci predominate. Despite the various possibilities for treating mandibular fractures, the use of external fixators has become a viable option, especially in cases of complex fractures associated with an infectious condition, even though they are adapted for use in the face. The objective of this work is to present a clinical case of a patient victim of a PAF injury in the face with a comminuted fracture in the jaw symphyseal region, admitted to the service of Maxillofacial Surgery at Hospital de Urgência de Teresina - PI. The proposed treatment was closed reduction of the fracture and stabilization using the external fixation system.*

Keywords: *Skull Fracture, Basilar.Mandibular Injuries.Wound Closure Techniques.*

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I. Introduction

Firearm projectile injuries have become a worldwide public health problem. The use of firearms affects all individuals in society with increasing statistical indexes [1]. In 61% of the victims, injuries occurred to the head and / or face, with a greater incidence in the mandible region [2], with the mandibular body region being the most affected [1]. Mandibular fractures are usually comminuted, with small and / or multiple fracture lines, resulting in bone fragments in the area affected by the traumatic agent [2]. These are contaminated wounds whose projectile penetration path is extremely unpredictable.

An updated integrative literatur The use of external fixators is another option for the treatment of wounds due to PAF in the mandible [3], being an unusual choice in the treatment of these fractures due to the use of plates and screws, in addition to having a restricted indication [4]. The regular use of external fixators for the treatment of jaw fractures began during the second world war [4]. Traditional fasteners have significant disadvantages. Systems composed of an acrylic bar with metallic pins require extra materials and equipment, which, once installed, can no longer be adjusted. The use of fasteners designed to treat wrist fractures, although fast and simple to apply, are bulky to use and the shapes of the pins and bars are not suitable for the mandible [3]. Unlike the traditional external fixator, there are fixators that are suitable for the mandible, adapting to the contours of this bone, being lighter, positioned just 1.0 cm from the skin surface and being adjustable [3]. As the bar is closer to the bone than in other systems, it promotes more stability at the fracture sites. The special titanium pins have the correct length of the screw head for the regions of parasymphysis, body and the mandible branch. The new combination of clamps for connecting the fastener bar, pins and all additional titanium connecting rods is of recent design [3]. The external fixation pin can be used on fractures that have edentulous sites or with inadequate dentition, where there are bone losses secondary to injuries by firearms, comminuted fractures, infections, pathological fractures or osteomyelitis. The use is also indicated in special conditions such as compromised upper airways, nutritional problems. It can also be used in fractures of atrophic edentulous mandibles or in mandibular fractures associated with those of the middle third of the face, when a quick and simple method for fixation is necessary [5].

The objective of this work is to present a clinical case of a patient victim of a PAF injury in the face with a comminuted fracture in the region of the mandibular symphysis, admitted to the Buccomaxillofacial Surgery service of the Hospital de Urgência de Teresina - PI. It was chosen as a treatment method the closed reduction of the fracture and stabilization using the external fixation system.

II. Case Report

Feoderma patient, 57 years old, male, was attended by the Oral and Maxillofacial Surgery and Traumatology of Hospital - PI, with history of injury by a firearm projectile (PAF) in the face after an attempt suicide with shotgun. He had difficulty feeding and drainage of purulent secretion through the PAF inlet in the submental region, with an evolution of 10 days.

On physical examination (Figures 1 and 2),swelling in the chin region, local hyperemiaand sutured transfixing lesion in the submental regionand oral floor with signs of infection and dehiscence,had spontaneous drainage of salivary secretionsand purulent, atypical mandibular mobility atmanipulation, altered intermaxillary relationship,partial edentulism, satisfactory and poor mouth openingoral hygiene. Computed tomography examination(figure 3) there was a comminuted mandibular fracture in a symphyseal region without great and shards of associated PA.

Intravenous antibiotic therapy followedsurgical procedure surgical procedure forclosed reduction and stabilization of the mandibular fracture,under general anesthesia, where irrigation was performedabundant, conservative wound debridement withremoval of projectile fragments and unviable tissues,surgical exploration of intra and extra-oral wounds andsuture. Assessing local conditions (infection,edentulism, comminution, inability to blockadequate maxillomandibular (BMM), substantial losssoft tissue), history of trauma and evolution ofdisease, we opted for closed reduction of the fracture andstabilization using the external fixation system,by adapting an external wrist fixator.Eight bicortical pins were then installed, throughtrocar, two pins in the post-foramen regionbilaterally and four in the symphysis region, theNext, the four pins on each side were joinedthrough clamps and metal bar.

On the first postoperative day (DPO), salivary drainage through the skin by pressure from the tongue on the oral floor, communication was buffered with vaseline gauze. In the seventh DPO, observed external fixator in position (figure 4), discrete mandibular mobility to manipulation, intra-oral injury with healing by second intention and without signs of infection. It was then the union of the pins and metallic bar of each side with acrylic resin (figure 5), aiming at greater fracture stabilization, and irrigation of intraoral injury with saline. On postoperative imaging (figure 6) the good bone pins positioning, alignment and satisfactory bone contour.

Three months after surgery, repair was notedmucous and bony, with no signs of infection and no signs ofmobility in mandibular symphysis, through examinationclinical-radiographic examination, the external fixatorlocal anesthesia. One year after surgery, the patientreturned with pain complaints associated with the element35, which was removed, ceasing the patient's pain. Ois still being preserved through revisionssemester, the last one being held in the twentieth monthafter surgery, where contour was observedmaintained mandible, absence of atypical mobility andpreserved jaw functions.

III. Results And Discussion

Comminuted fractures of the mandible have beentreated in a variety of ways, including open reductionwith plates and screws, use of internal fixation withsteel wires, closed reduction using BMM and,in some cases, through closed reduction with useof external fixators [6].External fixators have proven to be a methodpopular way to treat gunshot wounds.Systems incorporating an acrylic bar with metal andpins require extra materials and equipment [3] suchsystems made of titanium are biocompatible and ensuresstrength and stiffness [7]. External fixation of fractures of thejaw is a technique in which the segments aremanipulated in place by the pins and fixed withconnectors [4]. It is often considered a subtypeclosed reduction even when an open techniqueis used to place the external fixator, no bodystranger is introduced at the fracture site [3]. Providessemi-rigid fixation to the mandibular segmentsfractures [4], even so, such fixation guarantees theadequate fragment stability [7].

Figura 1 – Exame físico extra-oral.

Figura 2 – Exame físico intra-oral.

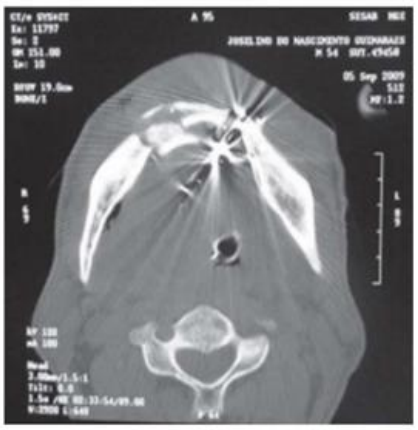

Figura 3 – Tomografia computadorizada pré-operatória.

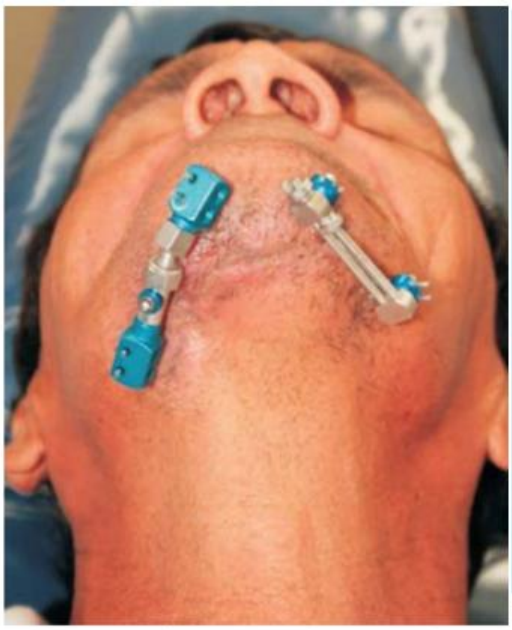

Figura 4 – Sétimo dia pós-operatório.

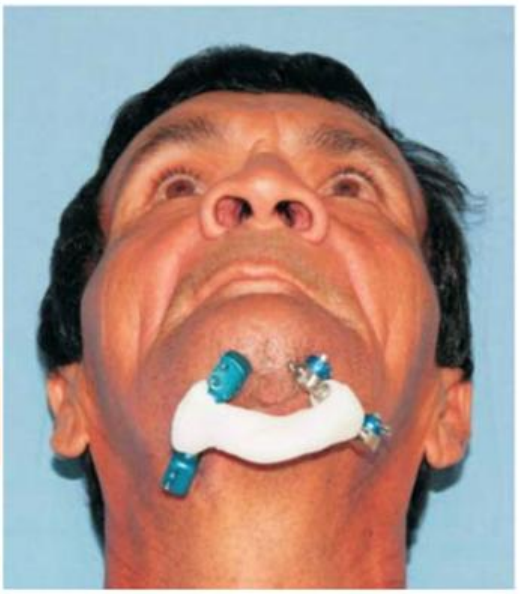

Figura 5 – União de fixadores externos com resina acrílica.

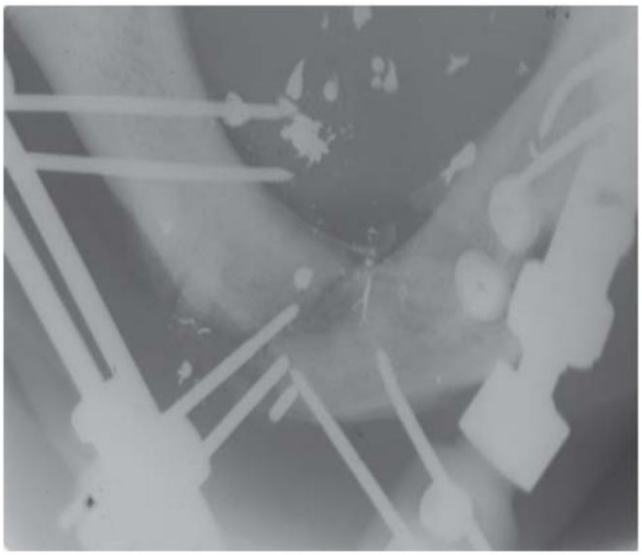

Figura 6 – Radiografia oclusal pós-operatória.

Despite the few cases evaluated withof external fixation in human mandible, the fixatorsexternal factors seem favorable for osteosynthesis [4].Generally, the indications for external fixation arewhen maxillomandibular block is not adequatebecause of dental absences, fracturescomminuted, infection present, soft tissue ofinsufficient coverage or against indication due toconcomitant medical reasons [8].

Of the post-operative infections, cellulite inaround the pins, the unions, the malocclusions, and thepin loosening are frequent problems withthis fixation technique. Other complications includeinjury to the lower alveolar nerve, especially inatrophic jaws. In addition to damage to the parotid glandand formation of mucoceles. The burning of the skin byacrylic polymerization can occur if precautions andthe appropriate technique are not followed [4]. In thiswork, no complications were observed afteroperations, the union of the fragments and theabsence of foci of infection. No problemrelated to the use of the equipment was verified.

More recently, open reduction usingplates and / or screws was indicated for fracturescominutivas, even contradicting basic concepts ofmaxillofacial surgery where fracture statescomminuted should be treated by closed reductionto prevent a shortage of blood supply. However, the literature suggests that preventingsome source of vascularization does not lead to the incidenceincreased infection, as long as stabilizationbone fragments is achieved [9].Currently, the treatment considered standardfor complex mandible fractures is the use ofrigid internal fixation and use of bone grafts. However,the use of external fixators as a treatment optionfor such mandibular injuries it still has its space,particularly in injuries associated with conditions infectious, with the presence of an extensive reactioninflammation and areas of bone sequestration, as well asin injuries caused by firearms, with extensivebone and soft tissue destruction. External fixationwith orthopedic fixators should be remembered asvalid and more affordable option for treatmentcomplex injuries, as the deviceused is available in the public health system,therefore not needing specific material [6].

IV. Conclusion

In mandibular comminuted fractures originatingof PAF injuries there is no consensus for aonly form of treatment. The use of fasteners treatment is a viable and effective treatment optionwhen well indicated, as could be observed in the caseclinical description, where satisfactorymandibular contour, absence of atypical mobility,good intermaxillary relationship and mandibular functionspreserved. It is concluded that fracture stabilizationcomminuted by PAF using the external fixation method isefficient when respecting the techniques of use andantibiotic therapy protocols.

References

[1]. SILVA, J.J.,et.al. Lesão por arma de fogo em terço inferior de face de crianças: relato de caso. **Rev.Cir.Traumatol. Buco- Maxilo-Facial**., Camaragibe, v.4, n.3, p. 163-168, 2004.

[2]. PEREIRA, C.C.S. et.al. Fratura mandibular por projétil de arma de fogo. **Rev. Cir. Traumatol. Buco-Maxilo-Facial.**, Camaragibe. v.6, n. 3, p. 39 – 46, 2006.

[3]. GIBBONS, A.J.; MACKENZIE, N.; BREEDERVELD, R.S. Use of a custom designed external fixator system to treat ballistic injuries to the mandible. **Int. J. Oral Maxillofac. Surg.,** Copenhagen, v.40, n. 1, p. 103-105, 2011.

[4]. CORNELIUS, C.P.; AUGUSTIN, J.B.; SAILER, L.K. External pin fixation for stabilization of the mandible-comeback of a method: historical review and first experiences with the 'mandible external fixator'. **Int. J. Oral Maxillofac. Surg.,** Copenhagen, v.13, n.1, p. 1-14, 2009.

[5]. MILORO, M. et.al. **Princípios de Cirurgia Bucomaxilofacial.** 2 ed. São Paulo: editora Santos, 2008.

[6]. TENIUS, F.P. et.al. Uso de fixadores ortopédicos para fixação externa em fraturas complexas de mandíbula: estudo retrospectivo. **Rev. Soc. Bras. Cir. Craniomaxilofac.**,São Paulo, v.9, n. 2, p. 25-30, 2006.

[7]. CASCONE, P. et.al. Rigid versus semirigid fixation for condylar fracture: Experience with the external fixation system. **Int. J. Oral Maxillofac. Surg.,** Copenhagen, v.66, n.2, p. 265-271, 2008.

[8]. BRAIDY, H.F.; ZICCARDI, V.B. External fixation for mandible fractures. **Atlas oral Maxillofac. Surg. Clin. North. Am**. Philadelphia PA, v.17,n.1, p. 45-53, 2009.

[9]. ELLIS, E 3rd; MUNIZ, O.; ANAND; K. Treatment considerations for comminuted mandibular fractures. **Int. J. Oral Maxillofac. Surg.,**Copenhagen, v.61, n.8, p.861-870, 2003.

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