

HEAD AND FACE TRAUMA IN A BABY: SURGICAL TREATMENT OF JAW FRACTURE

TRAUMA DE CABEÇA E FACE EM BEBÊ: TRATAMENTO CIRÚRGICO DE FRATURA DE MAXILAR

AGNALDO ROCHA PRATA-JÚNIOR^{1*}, LEONARDO VITOR MAGRI¹, LUIZ CARLOS PIRES SOBRINHO², YURI MANOEL SANTIAGO SILVA DE OLIVEIRA³, JOSÉ AUGUSTO DE OLIVEIRA NETO³, ERVILY DA COSTA FONSECA OLIVEIRA³, VIVIAN KETHLYN CARVALHO SANTOS³, ANGELA BEATRIZ CAVALCANTE DE AMORIM IZAK⁴

1. Dentist, Maxillofacial Surgery Resident, HUGOL/SES, Goiânia, Goiás, Brazil; 2. Dentistry Student, Goyazes University, Trindade, Goiás, Brazil; 3. Dentistry Student, Tiradentes University, Aracaju, Sergipe, Brazil; 4. Maxillofacial Surgeon, HUGOL/SES, Goiânia, Goiás, Brazil.

* Anhanguera Avenue, 14527, Santos Dumont, Goiânia, Goiás, Brazil. ZIP CODE: 74463-350. prata.aiesec@gmail.com

ABSTRACT

Pediatric facial trauma is relatively uncommon as it represents only 10% of all the facial fractures. The absence of bone suture consolidation, greater bone elasticity, the presence of more fatty structures on the face and less pneumatization of the paranasal sinuses contribute to the lower incidence of facial fractures in children. Some fractures require surgical treatment and child must be followed-up for a multidisciplinary team. The present work aims to report and discuss the clinical case of surgical treatment and follow-up of jaw fracture in a baby pediatric patient, female, only eleven months old. After six months, the patient was cured and without any trauma-related sequelae.

KEYWORDS: Mandible; Pediatrics; Oral and Maxillofacial Surgeons.

RESUMO

O trauma facial pediátrico é relativamente incomum, pois representa apenas 10% de todas as fraturas faciais. A ausência de consolidação das suturas ósseas, maior elasticidade óssea, presença de mais estruturas gordurosas na face e menor pneumatização dos seios paranasais contribuem para a menor incidência de fraturas faciais em crianças. Algumas fraturas requerem tratamento cirúrgico e a criança deve ser acompanhada por uma equipe multidisciplinar. O presente trabalho tem como objetivo relatar e discutir o caso clínico de tratamento cirúrgico e acompanhamento de fratura de mandíbula em uma paciente pediátrica bebê, do sexo feminino, com apenas onze meses de idade. Após seis meses, a paciente estava curada e sem sequelas relacionadas ao trauma.

PALAVRAS-CHAVE: Mandíbula; Pediatria; Cirurgião Bucomaxilofacial.

1. INTRODUCTION

Pediatric facial trauma is relatively uncommon as it represents only 10% of all the facial fractures^{1,2}. These traumas can cause significant morbidities³, such as deformities and bone growth impairment which can prevent the correct development of vital functions⁴, as phonation and feeding.

As the most prevalent etiology, motor vehicle trauma occupies the first position, representing 35 to 50% of all causes, followed by sports injuries, interpersonal violence and falls from standing height⁵⁻⁷.

Some characteristics contribute to the lower incidence of facial fractures in children as the absence of bone suture consolidation, greater bone elasticity, the presence of more fatty structures on the face and less pneumatization of the paranasal sinuses⁸.

Because they have a better and faster bone remodeling and regeneration mechanism when compared to adults, pediatric facial fractures usually have conservative assisted treatment, which means patient does not go under surgery. On the other hand, fractures that require surgical treatment - mandibular fractures with displacement and/or pathological bone mobility - require urgent fixation.

In pediatric patients, absorbable materials are indicated for osteosynthesis because it has the advantage of no need to remove the fixation material⁹, however, the high cost and scarcity of absorbable fixation materials in the Public Health System are factors that make rare the use of this material.

The present work aims to report and discuss the clinical case of surgical treatment and follow-up of jaw fracture in a baby pediatric patient, female, only eleven months old.

2. CASE REPORT

Female patient, 11 months old, hit by a car was referred to the Maxillofacial Surgery Service of the Otávio Lage Siqueira Emergency Hospital.

In the anamnesis, her mother reported that while parking her car in the garage at home, the child, who still crawls, was accidentally hit by the vehicle. She also denied loss of consciousness or post-trauma emesis, as well as no comorbidities, allergies and/or continuous use of medication.

On facial examination, it was noted anisocoria, bilateral eyelids ecchymoses, edema with eyelid ptosis on the left side and edema in the mandibular region on the right side, sublingual ecchymosis, crepitation and pathological bone mobility in the region of the right mandibular parasymphysis.

After initial assessment, imaging tests and evaluation of the pediatric and pediatric neurosurgery was requested. By pediatric neurosurgery patient had a frontal pneumocephalus requiring hospitalization for conservative treatment. After pediatrics evaluation, there were no noteworthy changes.

Multislice computed tomography of the face showed fracture of the lateral wall of the left orbit without displacement and fracture of the right mandibular parasymphysis.



Figure 1. 3D reconstruction showing mandible fracture.

During hospitalization, patient was under intensive multidisciplinary care, which included nursing, physiotherapy, speech therapy, nutrition and psychology team. On the fourth day of hospitalization, the patient still had left eyelid ptosis and anisocoria (with mydriasis on the left). She also developed paresis of the marginal nerve of the mandible on the right side (House-Brackmann III).

After case discussion with the maxillofacial team, considering the anatomical aspects of the fracture, as well as the great pathological mobility, the surgical treatment for bone reduction and fixation was established.

Under general anesthesia and oral intubation, with mandible transoral approach followed by identification of the mental nerve, we performed rigid internal fixation of the right parasymphysis using a four-hole 2.0 system plate and four 07mm screws installed at the base of the mandible. The presence of multiple teeth bud made it impossible to install any other osteosynthesis material. For suturing, we used 4-0 Vicryl (multifilament polyglactin) for repositioning the mentalis muscle and suturing the mucosa in the vestibule.

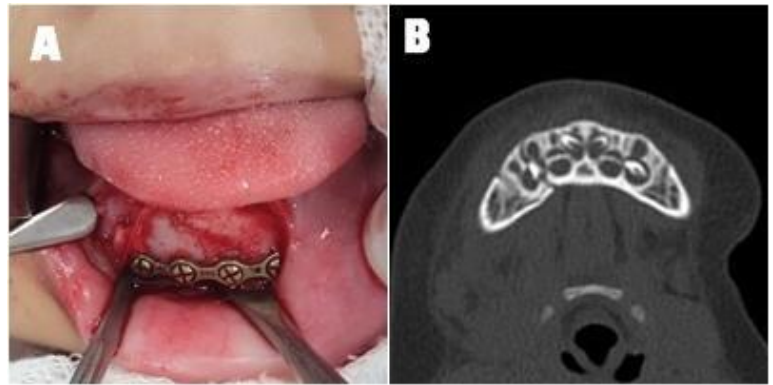


Figure 2. A – Intraoperative image showing fracture reduction and osteosynthesis. B – Axial section of the computed tomography of the face showing the relationship between the fracture and the teeth bud.

After surgery, the patient was kept hospitalized for more five days using intravenous amoxicillin/clavulanic acid. At discharge, we kept her on outpatient follow-up with the pediatric neurosurgery and oral and maxillofacial surgery teams.

After six months, the patient was cured and without any trauma-related sequelae. On multislice computed tomography of the face of the same period of surgery it was noted satisfactory bone reduction and good positioning of osteosynthesis material.

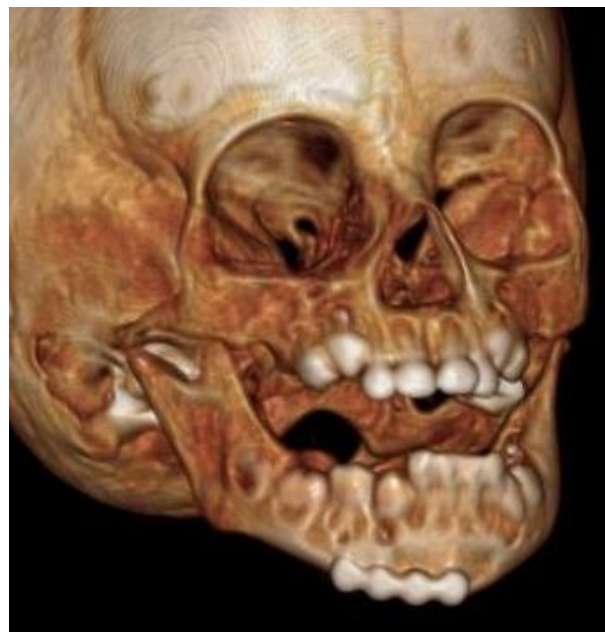


Figure 3. 3D reconstruction showing osteosynthesis after 06 months.

3. DISCUSSION

In 2008, a research from National Trauma Data Bank (2001 to 2005) cataloged 277,008 admissions of pediatric trauma patients, on which 12,739 (4.6%) suffered facial fractures. Of these 12,739 patients, 32.7% suffered mandibular fractures; 30.2%, nose fractures; and 28.6%, zygoma and maxilla fractures. In the mandibular fractures, symphysis, angle and body were the most affected, respectively; 25% of all these patients underwent surgical intervention.¹⁰ The affected sites in the research is similar to the report in question.

Mandible fractures have higher prevalence due to the its topography and motility when related to the skull base, which trigger greater vulnerability and frequency of trauma in this region.

Pediatric mandibular fractures treatment is still controversial. Studies suggest that the treatment should follow two main pillars: the fracture location and the presence of deciduous or mixed dentition.¹¹

Considering pediatric condyle fractures, which remained intact in the case reported, there is greater consensus about conservative treatment and follow-up. Likewise, it is consensus that more complex fractures – e.g. displaced bones - involving the mandibular arch may require internal fixation, as evidenced in this report. These guidelines are consistent with the internal guidelines established by the maxillofacial surgery team of the Otávio Lage Siqueira Emergency Hospital.

Regarding potential difficulties related to the patient's dentition stage, it is known that the primary teeth are not suitable for installing a maxillomandibular block, since its size and periodontium do not resist to the tensile strength that wires or arch bars require. Therefore, when established closed treatment that requires devices as arch bars and/or wires, it can damage the primary dentition or avulse the teeth involved^{11,12}.

The presence of teeth bud in deciduous or mixed dentition occupy most of the bone anatomy of middle face and mandible^{1,4,13}. It makes this surgery more complex when compared to adult patients. The surgeon must as much as possible to avoid any damage to the developing teeth. For that, surgical planning using CT scan images and three-dimensional reconstruction can guide where to place plates and screw, as presented in this case.

The best treatment prognosis is achieved through the multidisciplinary care together with the pediatrics, nursing, physiotherapy, speech therapy, nutrition and psychology team. The care offered by different specialties offers a faster healing process and less morbidity to pediatric patients undergoing open surgical treatment of facial fractures.

4. CONCLUSION

Although rare, pediatric facial fractures remain as a dramatic condition that can be associated to great morbidities. Early diagnosis and adequate treatment – whether conservative or surgical – are the keys to reducing long-term sequelae rates, both biological and/or psychological. In addition, clinical discussions must be mandatory between the teams responsible for the patient's treatment, such as pediatrics and neurosurgery as shown in this case.

5. REFERENCES

- [1] Ferreira PC, Amarante JM, Silva PN, et al. Retrospectivo estudo de 1251 fraturas maxilofaciais em crianças e adolescentes. *Plast Reconstr Surg* 2005; 115: 1500-1508.
- [2] Ul Haq ME, Khan AS. A retrospective study of causes, management, and complications of

- pediatric facial fractures. *Eur J Dent* 2018;12(2):247-52.
- [3] Gebran SG, Wasicek PJ, Elegbede A, et al. Characterization of Age-Related Injury Patterns and Surgical Treatment of Pediatric Facial Fractures: Analysis of the National Trauma Data Bank. *J Craniofac Surg* 2019; 30(7): 1097.
- [4] Moffitt JK, Wainwright AJ, Bartz-Kurycki M, et al. Factors Associated With Surgical Management for Pediatric Facial Fractures at a Level One Trauma Center. *J Craniofac Surg* 2019; 30(3).
- [5] Imahara SD, Hopper RA, Wang J, Rivara FP, Klein MB. Padrões e resultados de fraturas faciais pediátricas no Estados Unidos: uma pesquisa do National Trauma Data Bank. *J Am Coll Surg* 2008; 207: 710-716.
- [6] Alcalá-Galiano A, Arribas-García JJ, Martín-Pérez MA, Romance A, Montalvo-Moreno JJ, Juncos JMM. Pediatrícofraturas faciais: as crianças não são apenas pequenos adultos. *Rádio-graphics* 2008; 28: 441–461.
- [7] Thorén H, Iso-Kungas P, Iizuka T, Lindqvist C, Törnwall J. Mudança nas tendências de causas e padrões de fraturas faciais em crianças. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2009; 107: 318-324.
- [8] Andrew TW, Morbia R, Peter Lorenz H. Pediatric Facial Trauma. *Clin Plastic Surg* 2019; 46(2): 239-247
- [9] Taylan Filinte G, Akan İM, Ayçiçek Çardak GN, Özkaya Mutlu Ö, Aköz T. Dilemma in pediatric mandible fractures: resorbable or metallic plates? *Ulus Travma Acil Cerrahi Derg* 2015;21(6):509-13.
- [10] Imahara, S. D., Hopper, R. A., Wang, J., et al. Patterns and outcomes of pediatric facial fractures in the United States: A survey of the National Trauma Data Bank. *J Am Coll Surg*. 2008; 207:710.
- [11] Kao R, Rabbani CC, Patel JM, Parkhurst SM, Mantravadi AV, Ting JY, Sim MW, Koehler K, Shipchandler TZ. Management of Mandible Fracture in 150 Children Across 7 Years in a US Tertiary Care Hospital. *JAMA Facial Plast Surg*. 2019; 21(5): 414-418.
- [12] Tu HK, Tenhulzen D. Compression osteosynthesis of mandibular fractures: a retrospective study. *J Oral Maxillofac Surg*. 1985;43(8):585-589
- [13] Gassner R, Tuli T, Ha'chl O, et al. Craniomaxillofacial trauma in children: a review of 3,385 cases with 6,060 injuries in 10 years. *J Oral Maxillofac Surg* 2004; 62:399–407.