

Tripod Fracture in Adolescent: A Case Report

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ABSTRACT

Fractures that accompany the zygomatic complex can cause complications such as dystopia, enophthalmos and aesthetic changes if not treated in a timely manner. Current treatments rely on material and diagnostic resources, such as CT scans, to provide excellent aesthetic and functional results. The objective of this work is to present a case of orbital floor fracture and lateral wall of left orbit, showing aesthetic and functional results. We present a case from a 17 years old, male patient who fell from the roof with his face hitting the floor for the first time. Based on clinical and supportive examination, diagnosis of tripod fracture was made. Open reduction with internal fixation with miniplates and screws was performed to this patient.

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INTRODUCTION

The fractures that affect the zygomatic process are extremely complex, and the surgeon's experience is essential, since they involve orbit floor (Fraiole RE, Branstetter BF 4th, Deleyiannis FW, 2008). The Zygoma is a bone located in the viscerocranium, where it has a joint, through sutures, with bones, such as the maxilla, temporal, sphenoid and frontal, and presents a quadrangular shape (Miloro M. 2011).

Blowout fracture is fracture that is found in the orbit floor, however approximately 5 to 10% include the combination of lateral wall flooring, there are uncommon cases in which fractures can only happen in the medial wall (Santos Salles, LD., Brito, WF., Menezes, VCB., Magalhaes, HT., Silva, AHA. 2019). The fractures of the zygomatic complex are classified into low, medium and high energy, where it requires orbital reconstruction, this usually does not need orbital repair because it is less cominutive than the high and the low energy is a minimally displaced fracture, in which the treatment is frequently conservative (Santos Salles, LD., Brito, WF., Menezes, VCB., Magalhaes, HT., Silva, AHA. 2019).

It is well known that in an anamnesis, the skull and face should be carefully inspected for fractures and soft tissue injuries. Patients experience pain, ecchymosis and periorbital edema, often associated with subconjunctival and periorbital ecchymosis, diplopia, trismus, enophthalmia, exophthalmia,

paresthesia in the affected area, deformity of the orbital rim, epistaxis on the affected side, malar depression and eyelid fissure displacement anterior to the tragus (exclusive zygomatic arch fracture), altered pupillary level and ophthalmoplegia (Marinho, R. O., & Freire-Maia, B. 2013., Candamourty R, Narayanan V, Baig MF et al., 2013).

The diagnosis of a fracture may be made by the patient's physical examination and anamnesis, but an imaging examination is necessary for the confirmation of the fracture, its ex-tension and for medical-legal purposes. Waters Projection is the best radiological test for the evaluation of zygoma fractures, but the gold standard is CT, in which further details on the fracture can be obtained, including the evaluation of soft orbital tissues (Fraiole, R. E., Branstetter, B. F., 4th, & Deleyiannis, F. W. 2008., Susarla, S. M., & Peacock, Z. S. 2014).

Thus through research on the occurrence of facial trauma and enhanced care, it has been found that the most common treatment is open reduction with internal fixation with mini-plates and screws (Marinho, R. O., & Freire-Maia, B. 2013). The purpose of this work is to report, as well as to treat, a clinical case of tripod fracture.

CASE REPORT

A male, 17 years old patient was brought to emergency room by his family after fell from the roof as high 3 meters. The patient fell from the roof with his face hitting the floor for the first time. Patient was complaining pain on his right eyes and cheek. Clinical examination was done and found that patient had swelling and bruise on his right cheek and eyes [Fig 1]. Subconjunctival bleeding was also presented on his right eye [Fig 2]. There was an open wound on patient right cheek approximate length was 5 cm with muscle expose. No diplopia was shown, no dizziness, nausea nor history of unconsciousness.



Fig 1. Swelling and bruise on his right cheek and eyes



Fig 2. Subconjunctival bleeding on patient's right eye

Emergency doctor then did a situational stitching to close the wound and control the bleeding, then performed a CT scan. The scan image showed suggestive of right

zygomatic bone dislocation, right orbital floor fracture, lateral wall fracture and right orbital medial wall fracture was observed [Fig 3]. In view of the clinical picture, it was decided to reduce the fracture and rigid internal fixation with mini-plates, screws under general anaesthesia.



Fig 3. 3D CT scan image that showed suggestive of right zygomatic bone dislocation, right orbital floor fracture, lateral wall fracture and right orbital medial wall fracture



Fig 4. Surgical access through intraciliary sulci incision



Fig 5. Surgical access through gingivobuccal sulci incision

The surgical access was through incising intraciliary sulci [Fig 4] and gingivobuccal sulci [Fig 5] inside of the oral cavity for exposure, reduction and rigid fixation of the fracture with mini plates and titanium screws number 6 and 4. Then the incision in intraciliary sulci was closed by layer stitching with vicryl 4-0 and prolene 6-0. Intraoral incision was closed with chromic 4-0. We also did debridement and redo the closure of the vulnus on his right cheek, the closure was using vicryl 4-0 to stitch the inner tissue and prolene 6-0 to stitch the skin. After the procedure, x-ray was performed to evaluate the mini plate and screw and shows good alignment of the fracture line [Fig 6].



Fig 6. Evaluation of post-surgery with x-ray shows good alignment

DISCUSSION

Quadripod fracture, quadramalar fracture, and commonly known as a tripod fracture or trimalar fracture were zygomaticomaxillary complex fracture's other names. Zygomaticomaxillary complex fracture has four components: the zygomaticofrontal suture superiorly along the wall or zygomaticosphenoid suture inferiorly that is called the lateral orbital wall, separation of the maxilla and zygoma along the anterior maxilla (close to zygomaticomaxillary suture), the zygomatic arch, and the orbital floor near the infraorbital canal (Fraoli, R. E., Branstetter, B. F., 4th, & Deleyiannis, F. W. 2008).

The Zygoma is a bone located in the viscerocranium, where it has a joint, through sutures, with bones, such as the maxilla, temporal, sphenoid and frontal, and presents a quadrangular shape. The fractures that involves zygomatic process are complicated, and the operator experience is essential, since they affect the orbital floor (Miloro M. 2011). Because the displacement of the zygomatic bone, zygomatic complex fractures are known for their common relativization, and may leads to important functional alterations (Santos Salles, LD., Brito, WF., Menezes, VCB., Magalhaes, HT., Silva, AHA. 2019).

The zygomaticomaxillary complex functions as facial main buttress, due to the prominent and convex shape, it is often get injured in trauma that involves facial structures.

The most frequent cause in these injuries are sports injuries, interpersonal violence, and traffic accidents (4). The diagnosis of ZMC fractures must be determined by detailed mechanism of injury history and medical background of the patient, complete clinical examination, and the use of further investigations, such as radiology imaging to determine fracture and associated structures (Marinho, R. O., & Freire-Maia, B. 2013).

Primary examination is important to screen neurologic and ophthalmologic complications that require rapid treatment to stay away from unwanted complications. Most fractures that involve ZMC complex can be evaluated as true orbital fractures. Thereof, ocular examination including visual-acuity assessment and respond of pupils must be done thoroughly. Even plain x-ray, such as waters view, may confirm the presence of a ZMC fracture, but it is not proper for determining appropriate diagnosis of the complete injury. To help determining the exact diagnosis and planning treatment for ZMC fractures, Computed Tomography (CT) is considered the gold-standard of radiologic investigation (Santos Salles, LD., Brito, WF., Menezes, VCB., Magalhaes, HT., Silva, AHA. 2019).

The indication for the treatment of fractures involving this area also depends on the impact of the parameters of the injury, since ZMC has a very important role in facial aesthetics, protection and midface function. Aesthetic intent is suggested for treatment, safety, preventing functional disability requires functioning of the eyes and nerves and reducing the risk of restriction of mandibular motion (Marinho, R. O., & Freire-Maia, B. 2013).

For ZMC in the zygomatic buttress area, Keen suggested an intraoral method for open reduction and fixation. The extra oral approaches provide access to frontozygomatic and zygomaticomaxillary sutures for direct fixation. Many times, ZMC fractures present difficult diagnostic and reconstructive problems for surgeons. The aim of any treatment method is to provide the best results with the least morbidity. Many surgeons have advocated various methods for the repair of ZMC fractures, with emphasis on the types of incisions, methods of fixation and sometimes even reconstruction. As a treatment of choice for zygomatic fractures, Dingman suggested open reduction and fixation. For zygomatic complex fractures, Gillie's suggested closed reduction (Candamourty R, Narayanan V, Baig MF et al. 2013).

It is possible to manage nondisplaced fractures while waiting. To avoid activities that may result in facial injury, patients should be advised and should remain on sinus precautions, a soft diet, and decongestants. While there is no strong evidence that antibiotics are routinely used for closed fractures, many surgeons will prescribe 5 to 7 days of antibiotics for prophylactic sinus coverage (Susarla, S. M., & Peacock, Z. S. 2014).

For displaced fractures resulting in trismus, asymmetric contour, or significant damage to the orbital floor, reduction should be performed. A gingivobuccal sulcus incision can be accessed through the zygomaticomaxillary buttress. Typically, this incision is made 5 mm higher through the mucosa and then periosteum than the mucogingival junction (Santos Salles, LD., Brito, WF., Menezes, VCB., Magalhaes, HT., Silva, AHA. 2019).

CONCLUSIONS

Anamnesis, clinical and imaging examination are primordial for the choice of the best surgical technique and surgical material, minimizing possible complications, favouring aesthetic and functional rehabilitation. In the

clinical case in question, the material used was paramount for the final aesthetic and functional results. In cases of zygomatic complex fracture, surgical planning is essential for the final result.

Declaration of Conflicting Interests

The authors declared that no potential conflicts of interests with respect to the authorship and publication of this article.

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