

## Immediate Surgical Management of Zygomatic Complex Fractures

Saluja H\*, Dehane V\*, Rudagi BM\*\*, Gaikwad P\*\*

### Abstract

*Avulsion of the zygomatic bone has few mentions in literature. In these rare cases the fractured zygoma becomes completely detached with consequent exposure to the outer environment, thereby increasing chances of contamination by microbes. Since this fracture is usually accompanied by other concomitant injuries, resulting in lengthy delays in definitive treatment, it is recommended that the avulsed bone be preserved for a few days and subsequently repositioned. In cases where the lateral wall of the orbit is completely separated and displaced laterally but still maintains some soft tissue attachments, immediate treatment is required to prevent necrosis of bone and also to provide support to the orbital contents which then would then result in better aesthetic outcome. We describe two such cases.*

**Key words:** *Avulsed, zygoma, orbit, lateral wall, esthetics*

### Introduction

Classical zygomatic fractures result from direct forces which dissipate through the bone and its attachments. Very rarely, shear injuries, occurring from tangentially directed force vectors, can cause complete separation and devascularization of the lateral wall of the orbit or avulsion of the zygomatic bone. The usual occurrence of other severe concomitant injuries causes lengthy delay in initiation of definitive treatment. Only a few cases of avulsion of the zygoma is mentioned in literature. The treatment protocol for such cases includes preservation of the avulsed bone in preservative solution at  $-80^{\circ}\text{C}$  with repositioning of the bone being carried out at a suitable later date. Two cases of zygomatic fracture which were not completely avulsed but had some soft tissue attachments are described. Both these cases were operated upon on the same day that the injury occurred. This article emphasizes the need for immediate reduction of complex zygomatic fractures with complete avulsion

as early as possible, in order to prevent necrosis of the lateral wall of the orbit. This results in better aesthetics.

### Case Reports

#### Case 1:

A 45 year male was involved in a road traffic accident, and he suffered from the following cranial and maxillofacial bone injuries:

- 1) Temporal bone fracture on left side.
- 2) Deep left facial laceration with traumatic skin flap elevation.
- 3) Avulsion of left zygomatic bone (Fig. 1A).



**Figure 1A:** Preoperative Photograph

\*Senior lecturer, \*\*Professor

Department of Oral & Maxillofacial Surgery, Rural Dental College, Loni, Tal - Rahata, District - Ahmednagar, Maharashtra, India. 413736.

### Corresponding Address :

Harish Saluja

Department of Oral & Maxillofacial Surgery

Rural Dental College, Loni, Tal - Rahata, District - Ahmednagar

Maharashtra – 413736 India. Ph: 09766921178

Email: [harry\\_saluja@yahoo.co.in](mailto:harry_saluja@yahoo.co.in)

There was no history of vomiting, unconsciousness, nasal bleeding, ear bleeding, abdominal or chest trauma.

Computed tomography revealed avulsed left zygomatic bone but clinically it was not completely avulsed, some soft tissue attachments were still present. It was decided that operative treatment be commenced immediately under general anesthesia. Using the existing bone deep facial laceration, the wound was explored, debrided and irrigated to make sure there were no foreign particles. All the unsupported tissues with compromised blood supply were excised. Following this, lateral wall of orbit was repositioned and fixation was done using titanium miniplates (Fig. 1B). Five holed, 2.0 mm titanium miniplate was used to fix the Infra-orbital rim and a four holed, 2.0 mm titanium miniplate was used for the fronto-zygomatic suture. An eight holed, 2.0 mm plate was used to fix the zygomatic arch. All the plates were secured with the help of 2 x 6 mm titanium screws. Care was taken not to damage the vital structures. Proper irrigation and debridement was carried out. Layer wise closure of the wound was carried out using 4-0 Vicryl for the muscular layer and 6-0 Prolene for the skin.



**Figure 1B:** Intraoperative Photograph showing reduced Zygoma fixed with miniplates

Post-operative radiographs showed excellent reduction of the fractures, Patient recovered well and was discharged after 5 days. Periodic follow-up showed satisfactory healing of soft tissues with minimal scarring.

#### Case 2:

A 40 year male was involved in a road traffic accident and he suffered the following injuries:

- 1) Deep right cheek laceration
- 2) Deep laceration of lateral wall of the right orbit which was completely separated, displaced latero-inferiorly and was hanging because of soft tissue attachments (Fig. 2A).

- 3) The right sided greater wing of sphenoid bone was fractured and displaced.
- 4) Fracture of distal third, shaft of radius on right side.



**Figure 2A:** 3-D CT scan showing the avulsed Zygoma

The patient underwent surgical repositioning of the avulsed zygomatic bone under general anesthesia. The wound was explored using the existing facial laceration. Thorough debridement and irrigation was carried out to exclude the presence of any foreign bodies. All the residual and unsupported tissues with compromised blood supply were excised. The displaced fragment was properly replaced in its anatomic position. The displaced greater wing of the sphenoid was reduced and then fixation was done. Titanium miniplates and screws were used to stabilize the fractured segments (Fig. 2B). The fronto-zygomatic suture was stabilized using a 5-holed 2mm titanium miniplate. The infra-orbital rim was stabilized using a 6-holed 2 mm titanium miniplate. Following plating, the surgical site was thoroughly cleansed and the flap was repositioned. Layer wise suturing was done using 4-0 Vicryl for the muscular layer and 6-0 Prolene for the skin layer.

Patient developed post operative paraesthesia in right infraorbital region.



**Figure 2B:** Intraoperative Photograph showing reduced Zygoma fixed with miniplates.

## Discussion

Avulsion injuries of facial bones are exceedingly rare and occur principally from high energy forces where the main force vector is directed tangentially to the facial skeleton.

Very few cases of avulsed zygomatic bone have been reported in literature. In a case report by Yokoo et al, surgical reduction was done after 40 days and during this period the avulsed zygomatic bone was washed with amikacine sulphate, treated with 10% dimethyl sulphoxide (DMSO) and preserved at -80°C and subsequently replaced.<sup>[1]</sup>

In another case of avulsed zygoma describe by Jessica et. al., avulsed bone was preserved in sterile normal saline solution in the refrigerator and was repositioned after 36 hours.<sup>[2]</sup>

In both of our cases, the zygomatic bones had soft tissue attachments and were not completely avulsed and were not exposed to the external environment. Injuries to the middle third of the face commonly destroy the integrity of the orbital skeleton. This is frequently complicated by injury to the eye, the incidence ranges between 2.7% and 90.6%.<sup>[3]</sup> In both our cases, although the anatomy of the orbit was affected, the vision was normal. We repositioned the avulsed fragments immediately in both the cases. The reason for immediate treatment of lateral wall was to prevent necrosis of the bone, to support the orbital content on the lateral aspect and for aesthetics of the patient (immediate primary soft tissue closure). Following orbito-zygomatic complex (OZC) fractures, the reported incidence of long-term sensory disturbances of the infraorbital nerve varies between 24% and 50%.<sup>[4-5]</sup> In one of our patients, infraorbital nerve paresthesia was present.

Both patients had regular uneventful follow up for 1 year. Our opinion is that if zygoma is completely avulsed and exposed to the external environment, which is rare, preserving the avulsed bone in various solutions for a short time period and repositioning it at a later stage is recommended. For fractures of zygomatic bone still having soft tissue attachment that is not exposed to external environment, immediate repositioning of the bone can be carried out with excellent results.

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