

**Facial asymmetry secondary to malunited zygomatic fracture – Our Experience****Abhishek Rathi<sup>1</sup>, Gaurav Mittal<sup>2</sup>, Anmol Agarwal<sup>3</sup>, Vidhi C. Rathi<sup>4</sup>**

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**ABSTRACT:**

A disturbed aesthetic balance due to asymmetry of the middle third of the face or deformity of the bony framework of the orbit can be embarrassing to the individual at both social and psychological level. Both of these deformities can occur in case of malunited fractured zygomatic complex. By using either bicoronal or lateral eyebrow, and infraorbital approaches, the zygomatic complex is detached at its attachment including the zygomatic arch when indicated. Refracturing of the fusion site with an osteotome is a good procedure for obtaining sufficient motility and accurate fixation. Following repositioning it may be necessary to fill the gap at the lateral or inferior orbital rim with bone graft to assure good fixation of the fragment.

**Keywords:** Delayed repair, Zygomatic osteotomy, Zygomatic fracture.

**INTRODUCTION**

Maxillofacial injuries are often neglected in patients with serious clinical conditions such as intracranial injury and injury to the cervical spine. In cases that have neurosurgical conditions or underlying medical diseases, surgical manipulation may be difficult, and the success rate of the surgery may be lowered due to the delay in treatment. Fracture sites start to heal spontaneously 10 to 14 days after trauma without immediate management<sup>1</sup>. It is generally accepted that fracture reduction is difficult or impossible in delayed cases even with the maximal force possible with an extractor. Such delayed cases may require surgical procedures such as loosening of the bony fragment by refracturing previous fracture sites with an osteotome<sup>2</sup> or plugging up the defect area using grafts<sup>3</sup>.

We are presenting 3 cases of delayed repair and their management.

**CASE 1**

A 48 year old male reported with chief complaint of pain and altered sensation on the

right side of face following trauma approximately 3 months back. Extraoral examination revealed a scar on the frontozygomatic region with suture tracts and loss of malar prominence. The grid test revealed absence of diplopia. On palpation, there was tenderness in the frontozygomatic region associated with a discontinuity at the suture and inferior orbital rim was tender with a discontinuity of the rim on the medial aspect. Similar finding was noted in case of the zygomaticomaxillary buttress. There was paraesthesia associated with the right infraorbital region. No mobility could be elicited in any of the regions. Intraorally mouth opening seemed normal nearing about 29 mm and no other noticeable findings apart from tenderness in the right buccal vestibule at the buttress region. Findings were indicative of zygomaticomaxillary complex fracture and it was decided that the complex will be repositioned after refracturing the fused sites and fixation will be done.

Intra operatively, under general anesthesia, via lateral eyebrow approach the frontozygomatic suture was refractured following which keens approach was used to expose the buttress and osteotomy was performed at the buttress (Figure 1). 2 screws were fixed in the body of the zygoma and then were raised with help of wires ensuring sufficient mobilization for repositioning (Figure 2). We did not need to approach the infraorbital rim as movements were palpated in the region after the zygoma was being tried to be mobilized. Following mobilization using a zygomatic hook the repositioned fragment was stabilized and 2 mm L plate was fixed at the buttress (Figure 3) followed by 2 mm, 2 hole with gap plate on the frontozygomatic region. The infraorbital margin was reduced stably hence the fixation of that area was avoided. The lateral eyebrow incision was closed in layers with vicryl and prolene while intraoral incision was closed with vicryl followed by copious irrigation. During followup it was observed that the malar deficiency was resolved and the patient assumingly had pre - traumatic appearance. Paraesthesia was persistent but the patient is still under follow up for the same.



Figure 1: Fracture site post osteotomy

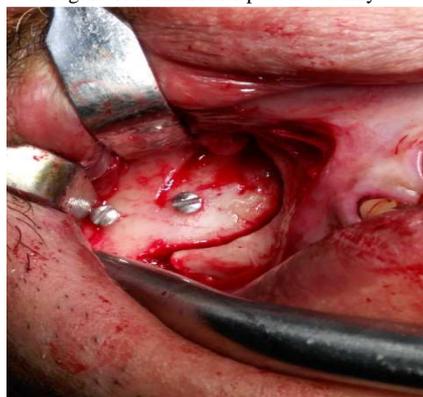


Figure 2: Screws placed in fractured fragment for mobilization

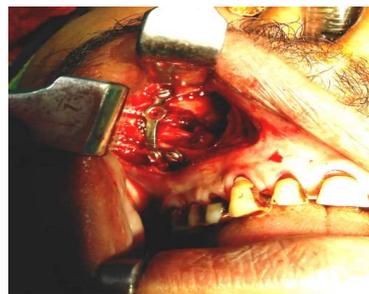


Figure 3: Fixation of the osteotomized fragment using L plate

### CASE 2

A 24 year old male reported with the chief complaint of heaviness on the upper lip and cheek of the left side. History reported for the same was a road traffic accident around 1 month back. Since then the patient felt difficulty in mouth opening and pinprick sensations on the left cheek. Extraoral examination revealed a very insignificant swelling while intraoral palpation revealed discontinuity at the zygomaticomaxillary buttress region and mild tenderness at the infraorbital region. The patient was operated under general anesthesia where via intraoral approach the fractured fragment was reduced with minimal manipulation and fixated with L plate on the zygomaticomaxillary buttress. The wound was irrigated and layered closure was done. Postoperatively patient reported resolution of difficulty in mouth opening. Postoperative appearance was satisfactory to the patient.

### CASE 3

A 26 year old male reported with chief complaint of difficulty in opening of the mouth and pain in left side of the face. History revealed a road traffic accident approximately 25 days back. Extraoral examination revealed facial asymmetry due to depressed malar prominence on the left side. Mouth opening was reduced while palpation revealed mild tenderness in the Frontozygomatic region. Intraoral palpation revealed discontinuity in buttress region along with tenderness. Intraoperatively, intraoral approach was executed for manipulation of the depressed fragment to achieve reduction and fixation was

done using L plate. The movements were palpated while manipulation and satisfactory reduction was achieved at the frontozygomatic region and infraorbital region. Postoperatively patient reported mild paraesthesia, but the difficulty in mouth opening was resolved.

## **DISCUSSION**

Zygomatic complex fractures are related to different conditions, and the surgical treatment with adequate reduction is a challenge for surgeons. The only muscles associated to it are related to facial expression which submits low force activity for fracture dislocation. For this reason, the anatomic position of the Zygomatic Complex fracture is principally related to a surgical procedure with proper reduction and stabilization of fracture<sup>4</sup>.

Malunion of zygoma can be the result of improper reduction and fixation or non intervention when surgery was indicated. The signs are more or less the same including flattening of malar prominence, enophthalmos, altered papillary level and limitation of mandibular motions which fortunately was not the case with our patient. Poor malar projection is a result of uncorrected inferior and posterior rotation of the zygoma which was observed in our patient. Increased facial width in addition to decreased malar projection, results from inadequate reduction of the zygomatic arch. Bone malposition is usually caused by inaccurate anatomical alignment of fragments of zygoma with adjacent unfractured bones. The error is frequently observed when the attachments of the zygoma to its adjacent bone is comminuted which can lead to misperceive the position of the comminuted area as normal and therefore setup fracture reduction incorrectly.<sup>5</sup>

According to Yaremchuk, malunion that is identified upto 6 weeks after trauma can be corrected using routine zygomatic reduction technique.<sup>6</sup> However, Spinelli and Forman have concluded that severe late post traumatic deformities are best managed by osteotomy and repositioning in conjunction with bone grafting.<sup>7</sup>

Severe late post traumatic deformities may require zygomatic refracture or osteotomy in which case CT is warranted. Zygomatic osteotomy reproduces the fracture lines of the original injury. The ideal zygomatic osteotomy initiates from the infraorbital rim moving inferoposteriorly to the zygomatic buttress from where it is continued to the posterior face where it is completed on the outer aspect with the help of an curved osteotome, inserted via a coronal approach, behind lateral orbital rim within the temporal fossa and extends from the anterior end of the inferior orbital fissure to join with the cut already made in the inferior part of the buttress. Within the orbit, the cut passes from infraorbital rim posteriorly to the anterior end of inferior orbital fissure. The root of the zygomatic arch is sectioned, resulting in complete freeing of the zygoma from its bony attachments. Before mobilization, the bony movements should be marked at infraorbital rim, the zygomaticofrontal suture and zygomatic arch. After zygoma has been mobilized, it is repositioned. In case of a long standing malunion, it might be necessary to excise bone in some area to permit proper reduction.<sup>5</sup>

Olate et al<sup>8</sup> believes that zygomaticomaxillary buttress is the key point for surgical repair of zygomatic complex in accordance to which Zingg et al<sup>9</sup> claims that fixation of the zygomaticomaxillary buttress may be indicated to give the proper anterior projection of the zygomatic complex in cases of unstable or complex fracture. Markowitz and Manson<sup>10</sup> showed that the greater wing of the sphenoid is a key area in determining the final result. Undetected axial rotation of the zygoma at the greater wing of the sphenoid is often the culprit in an unsatisfactory outcome. In our case, an osteotomy at the zygomaticomaxillary buttress was sufficient for mobilizing as the movements were palpated while manipulation of the fragment on all key points. We followed the sequential approach given by Kova'cs and Gharemani<sup>11</sup> in one of the cases which involved, exposure carried out initially at the zygomaticofrontal area followed by intra oral

incision to attain stability post reduction. In other 2 cases a single intraoral incision at the buttress was sufficient for a satisfactory outcome which is in accordance with Olate et al.<sup>8</sup>

Often the movement of zygoma create gap defects and step deformity which can be corrected by bone grafts which in turn can ensure bony union, and stability. Increased width of the inferior orbital fissure can occur as result of repositioning which can lead to increased orbital volume resulting in enophthalmos. The inferior orbital fissure should be exposed and obliterated with graft as no important structure passes through it. Bone grafting can help in treating previous enophthalmos and preventing its occurrence following osteotomy. Usually, bone defects greater than 5 mm within facial skeleton should be grafted but any gap within critical buttress requires stabilization with bone graft.<sup>12</sup>

The other treatment alternative includes camouflaging the defect with implants or transplants which can be employed in case of limited or flattening of malar eminence with little orbital involvement, or, comminuted fracture where it cannot be mobilized or repositioned in a single piece.<sup>13</sup> Though according to Ellis and Kittidumkerng, some imprecision in reduction may be tolerable and clinically insignificant, depending on the magnitude, the location, and the soft tissue and skin on the fracture.<sup>14</sup>

A single intraoral incision in the maxillary vestibule which helps in exposure of the maxillary buttress was enough to attain stability of the fractured complex in the reported cases which is in accordance to various authors.<sup>8</sup> A single approach from the maxillary vestibule in our experience, is time saving, provides good access, reduces the amount of hardware and produces satisfactory aesthetic outcome.

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