

PANFACIAL TRAUMA-A FLEXIBLE SURGICAL APPROACH

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ABSTRACT

Panfacial fractures are those involving the mandible, maxilla, and zygomatic complex at the same time and usually accompanying naso-orbito-ethmoid (NOE) and frontal bone fractures. When there are multiple facial fractures, involving upper & lower face, reconstruction should be approached as puzzle. It is difficult to follow an established pattern of sequencing and organizing the repair of panfacial fractures. Successful reconstructions can be achieved through a flexible approach that adheres to several key principles. The goal of treatment as with all facial fracture is to restore both the functions and pre-injury 3-dimensional facial contours. To achieve this goal, various management schemes have been proposed including “bottom to top,” “top to bottom,” “inside-out,” or “outside-in”. Nevertheless, despite aggressive management, severe post-traumatic deformities continue to appear. The correct timing of surgical intervention and use of rigid fixation allows the restoration of morphological and functional nature of face after Panfacial fractures. The aim of presenting the paper is to analyze the principles that determine the choice of method of treatment and that prevent the development of secondary deformity.

Key Words: Panfacial fracture, Orbital floor defect, Midface fracture

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INTRODUCTION

Although there is no clear definition and classification of panfacial fractures in the literature but the terms usually refer to simultaneous fracture of several bones of the face with severe degree of fragmentation which makes it difficult to restore the facial architecture. The surgeon's task is not only to ensure a complete anatomical esthetics and functional repair of the face but restoring to its original three dimensional shape.^{1,2}

The mode of fracture is because of road traffic accidents, interpersonal violence sports related and industrial accidents, fall from heights, animal attacks and gunshot wounds. The mode of injury helps to identify the probable energy of impact as well as the likely extent of injury.³ It is commonly associated with multisystem, thus treatment is often multi disciplinary. The goal of management of panfacial fractures is the restoration of both function and preinjury three dimensional facial contour without delay while minimizing pain and suffering to the patient with the least possible cost.²

We are reporting a case of panfacial injury managed at UCMS College of Dental Surgery, Bhairahawa, Nepal.

CASE REPORT

A 25 yr old male patient met an road traffic accident (RTA) and admitted via emergency department to UCMS College of Dental Surgery with swelling of face, facial deformity and inability to close the mouth. There was no history of loss of consciousness and vomiting but bleeding from ear and nose were present on clinical examination.(Figure 1)

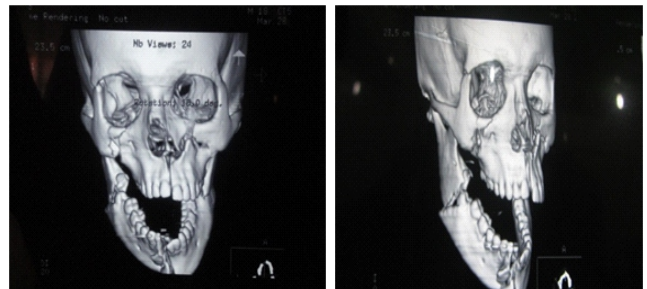
Figure 1: Preoperative photograph



Patient was subjected to hematological, biochemical and radiological investigations. His hematological and biological profile were normal. Radiographic and 3-dimensional Computed Tomography (CT) images revealed bilateral fractures. Right sided fractures were present at frontozygomatic suture, mandibular angle and parasymphysis

where as left sided fractures are present at subcondylar region, mandibular angle region. There was mid palatal split and both side infra orbital rim fractures.(Figure :2,3)

Figure 2,3: 3D CT face showing panfacial fractures



Patient underwent open reduction and internal fixation (ORTF) under general anesthesia. Through mandibular vestibular incision, right parasymphysis then right angle fractures were reduced and fixation achieved using miniplates.

Through left extended submandibular incision, left angle and left subcondylar fracture were reduced and fixation was done by using miniplates. After stabilization of mandibular fractures, intermaxillary fixation (IMF) was done. Next maxillary fractures at mid palate, left buttress and left pyriform and right zygomatic buttress area were reduced through maxillary vestibular incision and fixation were done using miniplates.

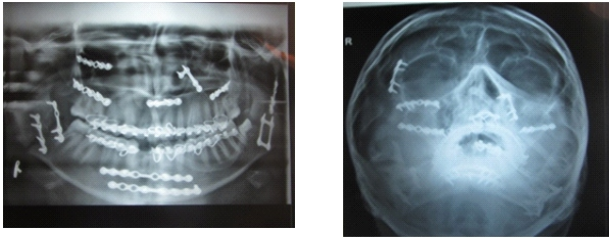
Then fracture at right frontozygomatic region and right infraorbital fractures were exposed, reduction was done and fixation was done with miniplates.Figure 4,5

Figure 4, 5 showing intraoperative photographs



After placing miniplates intraoral incisions were closed in layers with 3-0 vicryl. Extraoral incisions were closed with 4-0 vicryl and 5-0 prolene.

The patient recovered uneventfully after which the patient was shifted to post operative ward.

Figure: 6,7 showing postoperative radiographs**Figure 8: Post-operative photograph**

DISCUSSION

The management of panfacial fracture is extremely complex. The significant complication associated with panfacial fracture is widening of facial complex.⁴

Whenever possible, facial fractures were optimally treated within the first few days after injury. Severe facial trauma occurs in the setting of other life threatening injuries that must be addressed first. Definitive intervention may be delayed for upto two weeks but is not generally advisable because early soft tissue scarring and callus formation make adequate reduction more challenging. Over the time, the facial soft tissue envelope contracts and becomes less pliable. The skin and soft tissues then are more difficult to re-drape over the reconstructed facial skeleton, potentially compromising the ability to achieve an excellent or even an adequate result. Fractures must be identified as assessed for displacement, comminuting, and bone loss. Careful physical examination is necessary to determine whether a mildly displaced fracture is causing functional or aesthetic deformation.⁵

The goal of treatment, as with all facial fractures, is to restore both the function and pre injury three dimensional(3D) facial contours. To achieve this goal, various management schemes have been proposed including “bottom to top”, “top to bottom”, “inside-out”, or “outside-in”.²

Many surgeons prefer the mandible as a foundation on which to reconstruct the occlusion first. The mandible reconstructed properly will re-establish lower facial width and projection facial height.⁶

A somewhat different approach was advocated by Manson and Kelly and associates Gruss JS that might be called a “bottom to top to middle” approach. They advocated total reconstruction of mandible including to subcondylar fracture and placement of the jaws into IMF. If sagittal maxillary fractures were present these were reduced and stabilized before mandibular reconstruction so that the maxillary arch could be used as template for the mandibular arch form providing proper facial width. Then frontal and temporal regions were approached. After stabilizing nasoethmoidal fractures were reduced and stabilized. At last the reduction of LeFort I level would proceed.⁷

Gruss and Philips advised reduction of the zygomatic arch and malar projection as a first step in treatment, to re-establish the “outer facial frame”, and provide upper facial width and projection before naso-ethmoidal, maxillary and mandibular re-construction.⁸

Merville agreed that sequencing reduction should proceed from “top to bottom” if the NOE region was involved in panfacial fractures.⁹

The “bottom up and inside out”¹⁰ approach allowed stable reconstruction of mandibular fracture and establishes the mandible as foundation for setting the rest of face especially when reasonable dentition is present and with atleast one intact condyle. The occlusion is set by placing IMF, which ensure maxilla in proper position. Zygomaticomaxillary complex is reduced and fixated first to correct anteroposterior and transverse dimensions of face. This allows more accurate repositioning of upper midface before fixation at zygo buttress. Maxilla is now fixated along zygomaticomaxillary buttress “inner facial frame” or NOE complex is then reduced and stabilized. The internal orbit is next reconstructed. In the final stage of panfacial trauma the orbital floors and nasal dorsums are reconstructed with bone grafts or alloplastic substitutes.

“Top down and outside in”¹⁰ starts at zygomatic region. Frontozygomatic suture is reduced and fixated. Zygomatic arch is reduced properly to avoid under projection of midface. Then NOE complex fracture is positioned. Maxilla is addressed next using the position of zygomaticomaxillary buttress and piriform rim as guide.

Maxillomandibular fixation can be established. Reduction and fixation of mandibular condyle/ symphysis/ body/ angle fractures are then reduced. Subcondylar fracture can be treated closed with use of this approach.

Neither one of these techniques will achieve optimal result in every situation, rather approach that goes from known to unknown is certainly more accurate. If there is calvarial injury sequencing should start caudally and proceed cranially to achieve optimal results. If there is remarkable comminution of mandible sequencing should start cranially to caudally. Thus maxillofacial surgeon should be comfortable with both approaches and should use known landmarks to achieve optimal results.¹⁰

CONCLUSION

Recent advances in the management of facial trauma enable accurate restoration of facial form and function. An organized, yet flexible approach is required to achieve consistent anatomic reduction of fractures. When bony reduction and fixation has been completed, the re-establishment of soft-tissue relationships is vital. In our experiences, timing and sequential management of panfacial trauma in conjunction with the neurosurgical team, focused on restoration of function and facial form to get optimal result.

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