International Journal of Otorhinolaryngology and Head and Neck Surgery
*Chengappa MMD et al. Int J Otorhinolaryngol Head Neck Surg. 2022 Apr;8(4):417-421*
http://www.ijorl.com
pISSN 2454-5929 | eISSN 2454-5937

DOI: https://dx.doi.org/10.18203/issn.2454-5929.ijohns20220815

**Case Report**

# A comprehensive rehabilitation in a case and panfacial fracture with extensive oral soft tissue trauma of lip and tongue in a musician: a case report

**Dempsy Chengappa M. M.[1], Sandeep Mehta[2], Shanender S. Sambyal[2], Gaurav Dua[2], Andrews Navin Kumar***

[1]Department of Pediatric Dentistry, [2]Department of Oral and Maxillofacial Surgery, INHS Sanjivani, Kochi, Kerala, India

**Received:** 12 February 2022
**Accepted:** 05 February 2022

***Correspondence:**
Dr. Andrews Navin Kumar,
E-mail: navin.andrews@gmail.com



## ABSTRACT

Pan facial fractures as the name suggest it involves multiple fractures of facial bones and so the management of such multiple fractures is also extremely complicated and the patient is generally left with residual deformities, which might leave a deep psychological impact on the individual's life. Maxillofacial region also harbours organs which are very essential for the normal survival of the Individual such as eyes, organ for olfaction, respiration, mastication, deglutition and aesthetics and phonetics. All these factors put additional pressure in complexities of fracture management, also create a dilemma for surgeon. Another peculiarity of the panfacial fractures is the difficulty in accessing the fracture sites and because of that reduction and fixation are compromised often leading to secondary deformity. Determining the sequence of repairing of the pan facial fracture is the most challenging and requires great experience as well as knowledge of anatomy, as the approach varies with each case. All the vertical and horizontal pillars have to be restored to get the near-normal facial anatomy and aesthetic. Even after all the aggressive treatment, the residual deformity in cases of panfacial trauma is not uncommon, which often requires a second stage corrective surgery. This article briefs about the management and simple approaches used to reduce and fix a case of pan facial trauma in a -year-old male who underwent a road traffic accident.

**Keywords:** Pan facial fracture, Open reduction, Internal fixation

## INTRODUCTION

Panfacial bone fractures are defined as facial fractures simultaneously involving the upper, middle, and lower thirds of the face.[1] Fractures of the frontal bone, nasoethmoid-orbital (NEO) region, zygomatic complex, maxilla, and mandible are the most commonly involved bones.[2,3]

Even for experienced surgeons achieving the near-original facial architecture is very difficult because of the multiple bony injuries, severe degree of fragmentation, and difficulty in identification of reference segments and this becomes extremely difficult if loss of soft also occurs, that could guide the start of facial reconstruction, which may result in malocclusion or facial deformities, including "dish" face deformity, loss of facial height or projection, increased facial width, and enophthalmos.[4-6]

Airway management is another important aspect in panfacial fractures, which requires special cooperation among surgeons and anesthetists in airway management during the repair of panfacial fractures, due to problems of shared airway and occlusion. Several methods have been proposed for airway management and sequencing of repair

of panfacial fractures i.e. bottom-to-top, top-to-bottom, inside-out, and outside-in.[8,9]

Panfacial fractures are usually caused by high-energy injuries for example road traffic accidents. Panfacial fractures account for 4–10% of all facial fractures.[10]

The principles of management of panfacial fractures emphasize the restoration of facial skeleton along the facial buttresses and pillars.[11] In our case reconstruction of pan facial injury begins with reduction of frontal bone followed by midfacial bone alignment. Using maxillary framework as a template the lower face is constructed in the last that is in top-to-bottom sequence.

## CASE REPORT

A 24 year-old male patient was brought to the emergency department of the hospital with a history of road traffic accident. There was a history of unconsciousness and vomiting with bleeding from his nose and mouth (Figure 1). On clinical examination, there was subconjunctival ecchymosis on the right side and deranged occlusion with multiple mobile teeth including 11, 12, 21, 22, 31, and 41.

The patient was continuously bleeding from his oral cavity and on examination it was found that the patient has bit his tongue and almost one-third of the tongue was almost detached from the remaining tongue (Figure 2). The patient was stabilised and thoroughly examined to rule out multisystem injury. The patient was primarily managed with suturing of the forehead laceration on the right side, tongue laceration, and multiple (03) lip lacerations of the upper lip on the left side with sutured using 3-0 vicryl and 4-0 ethilon under local anaesthesia with adrenaline (1:80,000).

**Figure 1:**

Clinical examination and radiographic analysis revealed right zygomatic complex fracture, comminuted fracture of the anterior mandible with dentoalveolar fracture with respect to upper and lower anteriors (Figure 3).

**Figure 2:**

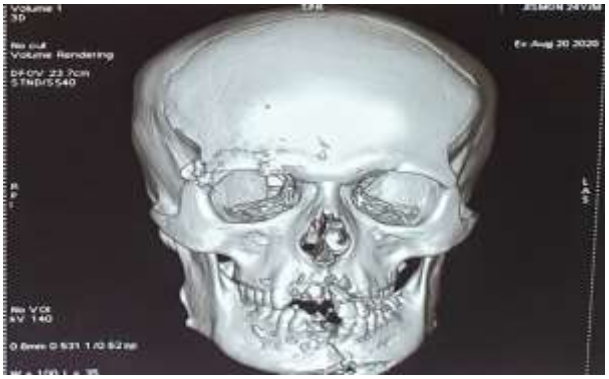

**Figure 3:**

Patient was informed about need for surgical intervention and informed written consent was obtained. All the routine blood investigations were made which are required for surgery to be done under general anaesthesia. Nasal intubation was done for induction of GA. Patient underwent open reduction and internal fixation of the panfacial fractures using multiple scattered incisions, at first right side frontozygomatic (FZ) suture was reduced and stabilized with 01X 04 hole straight AO titanium plate and screws. Lower degloving incision from premolar-to-premolar region was placed, and thorough wound toileting was one initially with normal saline and then with normal saline with 3% hydrogen peroxide solution and the wound was thoroughly scrubbed. A sterile soft bristle toothbrush was used to scrape the wound to remove the debris and grime. Fractures were reduced and stabilized with 03 X sterilized AO titanium plates and screws at the anterior mandible (Figure 4). After the fixation of fracture with titanium AO miniplates was done, the site was closed with 3-0 vicryl and 4-0 ethilon. All the unsalvageable teeth were extracted during the surgery (i.e. 11, 12, 21, 22, 31, and 41). After the surgery wound hygiene was maintained using chlorhexidine irrigation and with povidone-iodine ointment respectively. Postoperative medications were advised including antibiotics (augmentin, IV) and analgesics (diclofenac sodium, IM). Post-surgery individual recovered well. Extraoral sutures were removed after a week. Patient was advised soft diet for one month. Postoperative stability and functions were satisfactory

with scars on his right forehead and left upper lip with alopecia. Patient developed secondary infection of the wound concerning to anterior mandible after 8 weeks with draining sinus and purulent discharge. The wound was debrided under local anesthesia with the retrieval of titanium miniplates and screws from chin. During the healing period, the Upper lip commissure was administered with injection hyaluronidase twice at 15 days interval to prevent lip strictures.

**Figure 4:**

**Figure 5:**

**Figure 6:**

Prosthetic rehabilitation of the missing teeth was done with upper and lower removable partial denture very early, to provide lip support during healing. A second stage surgery was after 4 months of surgery for aesthetic management were lip fat grafting of the upper lip, scar revision of the right forehead region, and hair transplant for mustache and beard on the left side were done (Figure 5). The individual was also sent for psychiatric counselling, speech therapy, and lip physiotherapy as he was a musician by profession and difficult to perform his work because of his injuries to his tongue, lip, and avulsions of his upper and lower anterior teeth.

**Figure 7:**

## DISCUSSION

Panfacial bone fractures are defined as facial fractures simultaneously involving the upper, middle, and lower thirds of the face.[1,12] Management of these patients is directed towards the rehabilitation of functional, anatomical structures, and aesthetic contours of the face. Treatment of these fractures should be aimed at the prevention of residual deformity.[13] The patient's history about the mode of injury helps us to identify the probable energy of the impact and the extent of trauma to the soft as well as the hard tissues.[14]

Pan-facial trauma patients generally have multisystem injuries, so the treatment should be multi-disciplinary. Frontal and palato-alveolar fractures are part of extended pan facial trauma as stated by Markowitz.[2] The horizontal and vertical buttresses make the framework of the face and also help in transmission forces of mastication to the base of the skull. The facial buttresses absorb the forces and prevent their transmission to the brain. The reduction and stabilization of buttresses are very important for near-normal rehabilitation of facial functions and aesthetics. Along with the correction of facial buttresses, nasal projection also plays an important in aesthetics as if left uncorrected may lead to complications like saddle nose, epiphora, and tele canthus.[15]

It is observed that in road traffic accidents (RTAs) the pan facial fractures are generally bilateral, in such cases, intubation may change from nasal to any other, as it may hinder the reduction of fractures, submental intubation is the most preferred route of intubation in such complicated

cases as it is fairly easy to perform and this technique has low morbidity.[16,17] Pan-facial trauma patients must be examined and managed according to the set guidelines of advanced trauma life support (ATLS) guidelines as stated by Robert Marciani. After thorough clinical examination, diagnosis is made by correlating the clinical findings with the various imaging techniques (CT scan or MRI). Early surgical intervention avoids postoperative deformity or unacceptable aesthetics.[18]

To achieve both esthetic and functional outcomes in panfacial fractures, researchers have developed an organized sequence of repair, to return patients with panfacial fractures to premorbid facial form and function. Two approaches have been mentioned in the literature in addressing this sequence of repair, "bottom-up and outside-in" and "top-down and inside out." The "bottom-up and outside-in" approach has been one of the guiding principles in the management of panfacial fractures. This principle is based on addressing the outer facial frame with the bony pillars before addressing the interfacial frame. Another principle is the "top-down and inside out" approach, which is based on the fact that the aesthetic core of the face (naso-orbital-ethmoid region), should be considered early in the sequencing of repair with occlusal restoration.[19,20]

Researchers have compared the combinations of these approaches over the past two decades; however, none has compared top-down and bottom-up in isolation with inside-out and outside-in.[7,10,21] In reality, following a combined process is the best sequence of action since the primary goal is to restore function by occlusal restoration and esthetics by achieving premorbid facial width and height. To establish facial width and projection, Kim et al have suggested fixing the fronto-zygomatic suture first as we followed in our case.[22,23] From the bottom, the mandible fractures were returned to their premorbid condition by MMF and occlusal restoration to set the maxillary component with the mandible as a single block that will articulate with the cranial base.[15] This sequence has been reported by Imazawa et al also.[24] Gruss and Phillips advised reduction of zygomatic arch and malar projection first to re-establish "outer facial frame" before reducing NOE or "inner facial frame".[19,20] Occlusion was achieved by maxillomandibular fixation also brings maxilla in its proper position. Mini plates were used for stabilization and fixation of fractures as advised by AO.[5,15,17] With timely early surgical intervention and planned secondary surgeries, we were able to achieve, complete soft and hard tissue healing, satisfactory aesthetics and complete use of lips and tongue to perform his profession for the patient (Figures 6 and 7).

## CONCLUSION

RTAs are the most common cause of panfacial fractures in our country and young adult males are most commonly affected. The majority of maxillofacial fractures were treated by open reduction and internal fixation for that the maxillofacial surgeon must be thorough and experienced in managing a case of pan facial trauma. To conclude; a minimally invasive approach should be used to treat the panfacial fractures as any heroic attempt may lead to more complications. Early surgical intervention with open reduction and internal fixation of the fractures using miniplate osteosynthesis yields good postoperative results. Patients with complex soft and hard tissue injuries should be informed pre-operatively regarding the need for secondary corrective surgery at a later stage. The surgical approach to panfacial fractures management should focus on attaining harmony between the functional (occlusal) and aesthetic components by restoring the vertical and horizontal relationships of the facial bones.

*Funding: No funding sources*
*Conflict of interest: None declared*
*Ethical approval: Not required*

## REFERENCES

1. Manson PN, Clark N, Robertson B, Crawley WA. Comprehensive management of pan-facial fractures. J Craniomaxillofac Trauma. 1995;1:43-56.
2. Markowitz BL, Manson PN. Panfacial fractures: organization of treatment. Clin Plast Surg. 1989;16:105-14.
3. Adamo Arthur K. Intraoperative airway management with pan-facial fractures: Alternative approach. J Craniomaxillofac Surg. 1996;2:30-5.
4. Wenig BL. Management of panfacial fractures. Otolaryngol Clin North Am. 1991;24:93-101.
5. De Melo WM, Sonoda CK, Shinohara EH, Garcia IR. Using the "bottom-up and outside-in" sequence for panfacial fracture management: does it provide a clinical significance? J Craniofac Surg. 2013;24:479-81.
6. He D, Zhang Y, Ellis E, 3rd. Panfacial fractures: analysis of 33 cases treated late. J Oral Maxillofac Surg. 2007;65:2459-65.
7. Degala S, Sundar SS, Mamata KS. A Comparative Prospective Study of Two Different Treatment Sequences i.e., Bottom Up-Inside Out and Topdown-Outside in, in the Treatment of Panfacial Fractures. J Maxillofac Oral Surg. 2015;14:986-94.
8. Chandra PM, Ali FM, Singhai A, Mudhol A, Ustad F. Submental orotracheal intubation: A better alternative to tracheostomy in panfacial fractures. Anesth Essays Res. 2013;7:415-7.
9. Rodrigues WC, de Melo WM, de Almeida RS, Pardo-Kaba SC, Sonoda CK, Shinohara EH. Submental intubation in cases of panfacial fractures: A retrospective study. Anesth Prog Fall. 64:153-61.
10. Curtis W, Horswell BB. Panfacial fractures: an approach to management. Oral Maxillofac Surg Clin North Am. 2013;25:649-60.
11. Louis P. Management of Panfacial fractures. In: Miloro M, editor. Peterson's principle of Oral and maxillofacial surgery. 2nd edition. B C Decker Inc: Hamilton. 2004.

12. Obuekwe ON, Ojo MA, Akpata O, Etetafia M. Maxillofacial trauma due to road traffic accidents in Benin city, Nigeria: A Prospective study. Ann Afr Med. 2003;2:58-63.
13. Pau M, Reinbacher KE, Feichtinger M, Navysany K, Kärcher H. The mandibular symphysis as a starting point for the occlusallevel reconstruction of panfacial fractures with bicondylar fractures and interruption of the maxillary and mandibular arches: report of two cases. J Craniomaxillofac Surg. 2014;42(4):51-6.
14. Martou G, Antonyshyn OM. Advances in surgical approaches to the upper facial skeleton. Curr Opin Otolaryngol Head Neck Surg. 2011;19(4):242-7.
15. Rosenberger E, Kriet JD, Humphrey C. Management of nasoethmoid fractures. Curr Opin Otolaryngol Head Neck Surg. 2013;21(4):410-6.
16. Rosenberger E, Kriet JD, Humphrey C. Management of nasoeth- moid fractures. Curr Opin Otolaryngol Head Neck Surg. 2013;21:410-6.
17. Mittal G, Mittal RK, Katyal S, Uppal S, Mittal V. Airway manage- ment in maxillofacial trauma: Do we really need tracheostomy/submental intubation. J Clin Diagn Res. 2014;8:77-9.
18. Singh M, Ricci JA, Caterson EJ. Use of intraoperative computed tomography for revisional procedures in patients with complex maxillofacial trauma. Plast Reconstr Surg Glob Open. 2015;3:e463.
19. Gruss JS, Phillips JH. Complex facial trauma: the evolving role of rigid fixation and immediate bone graft reconstruction. Clin Plast Surg. 1989;16:93-104.
20. Gruss JS, Mackinnon SE. Complex maxillary fractures: role of buttress reconstruction and immediate bone grafts. Plast Reconstr Surg. 1986;78:9-22.
21. Yang R, Zhang C, Liu Y, Li Z, Li Z. Why should we start from mandibular fractures in the treatment of panfacial fractures? J Oral Maxillofac Surg. 2012;70:1386-92.
22. Kim J, Choi JH, Chung YK, Kim SW. Panfacial bone fracture and medial to lateral approach. Arch Craniofac Surg. 2016;17:181-5.
23. Merville L. Multiple dislocations of the facial skeleton. J Maxillofac Surg. 1974;2:187-200.
24. Imazawa T, Komuro Y, Inoue M, Yanai A. Mandibular fractures treated with maxillomandibular fixation screws (MMFS method). J Craniofac Surg. 2006;17:544-9.

**Cite this article as:** Chengappa MMD, Mehta S, Sambyal SS, Dua G, Kumar AN. A comprehensive rehabilitation in a case panfacial fracture with extensive oral soft tissue trauma of lip and tongue in a musician: a case report. Int J Otorhinolaryngol Head Neck Surg 2022;8:417-21.