TPM Vol. 32, No. S5, 2025
ISSN: 1972-6325
https://www.tpmap.org/

MANAGEMENT OF PANFACIAL TRAUMA-A LITERATURE REVIEW

DR. SARAVANA KUMAR MDS PHD
PROFESSOR, SREE BALAJI DENTAL COLLEGE AND HOSPITAL, CHENNAI

DR. NANDHINI
POSTGRADUATE TRAINEE, SREE BALAJI DENTAL COLLEGE AND HOSPITAL, CHENNAI

SRI BRINDHA AJIEETH A
SAVEETHA MEDICAL COLLEGE, SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES

Abstract

Background: Even for skilled surgeons, treating panfacial fractures (PFFs) can be quite challenging. Many have made an effort to systematise the surgical method, in actual practise executing surgery by using a unidirectional sequence is far more challenging.

This study's objectives were to analyse the literature on PFF surgery sequence and examine PFF fixation sequence in clinical instances.

Methods: Up until December 2023 publications were searched for in the PubMed and Google Scholar databases. Fracture portion, fixation sequence and countries were among the information taken from the investigations utilising standard templates. Author and publication year information were also taken from the bibliography.

INTRODUCTION

All three parts of the face—the mandible, which midface, and frontal bone—are involved in panfacial fractures (PFFs). The term "panfacial bone fracture" is used in practise or in papers when these three areas are implicated. Fractures involving two or three facial regions were included in this investigation. Even for skilled surgeons, managing PFFs can be quite difficult since, in many instances, there are no stable structures available to restore bone integrity. PFFs need to be repaired in a methodical manner with a complete understanding of the sequence, but it can be challenging to determine the best course of action for these complicated fractures.Numeruos authors have tired to systematise the stratergy for surgical approach.

The frontal bone is the first area that craniofacial surgeons repair, then the midface, utilising the upper face as a model for the lower face[1]. The "top-bottom" sequence is the name of this approach. Oral and maxillofacial surgeons, on the other hand, think that the top-bottom sequence is inappropriate since it could lead to malocclusion when used on PFFs that involve the maxilla and mandible as two occlusal portions. The "bottom-top" sequence has been proposed as a result. The mandible, the strongest bone in the facial skeleton acts as a buttress that may be precisely connected to the cranial vault through rigorous internal fixation, is the key of the bottom-top sequence [2].Top-bottom is used by certain surgeons whereas bottom-top is preferred by others.

There are even more disagreements between "inside-out" and "outside-in" approaches. Performing surgery, however, by using a unidirectional sequence on Panfacial fractures is considerably more challenging in practise because every patient has a unique form and degree of fracture. Depending on the location of the fracture, surgery is decided. As a result, the choice of sequencing may vary between surgeons.

In order to ascertain and contrast how the sequence is being employed , a survey of the most recent literature on sequence selection for Panfacial fractures was done .Reviewing the Panfacial fracture fixation sequence in clinical instances was another objective.

METHODS

Searches were made in the Google Scholar and PubMed databases to review articles till December 2023.The key search words are Panfacial trauma, sequence, Technique

RESULTS

The articles were analysed and duplicates were removed.The articles are searched for keywords and few articles were excluded as it doesnot mention about the surgical sequence.Finally the articles that are eligible for this study are included [3-24]

Sequence	No of articles
Top to bottom approach	3
Bottom to top approach	17
Both approaches	3

DISCUSSION

Panfacial fractures can cause damage to soft tissues in addition to the bone framework, which can impair function and appearance [3]. To maximise the result, careful and methodical planning is therefore required. As soon as the patient arrives at the ED, this begins. When necessary, a thorough assessment of the patient and quick attention to emergency interventions must be performed. Males are more likely than females to sustain high energy injuries, which account for 4–10% of all face fractures and are the most common cause of panfacial fractures [4].

Panfacial fractures rarely happen on their own and are frequently accompanied by other injuries that require medical attention. More dangerous than panfacial fractures, intracranial, intraabdominal, and thoracic injuries can be fatal [5]. Even before a patient with panfacial trauma is examined, cervical injuries present a substantial risk of hemiplegia or quadriplegia. Therefore, unless otherwise demonstrated, it is preferable to abide by the rule that states, "All patients with maxillofacial trauma are considered to have cervical spine injuries." Blind nasal intubation is not advised for airway stabilization in cases of panfacial fractures due to the potential risk of penetrating the skull base, especially when nasal and ethmoidal bone fractures are present. This highlights the importance for maxillofacial trainees and residents to be proficient in life-saving procedures and to quickly recognize cases requiring special attention.

Since both maxillofacial surgeons and anesthetists work in the same area, airway modification may be necessary for treating panfacial fractures. In complex maxillofacial injuries where orotracheal or nasotracheal intubation is unsuitable, tracheostomy is the alternative technique.

Despite advances in diagnostic and evaluation methods, the surgeon's primary task remains the same: to fully restore the face’s anatomy, function, and aesthetics to its original three-dimensional form. Reconstructing the soft tissues, with consideration of the facial soft tissues as an important fourth dimension, is crucial. Panfacial reconstruction begins by addressing the vertical, horizontal, and sagittal buttresses, typically starting from the upper third of the face and moving downward, or from the lower third and working upward. In some cases, a combination of these approaches is necessary for ideal facial contour restoration. In our study, the bottom-to-top sequence was the most commonly used .. Regardless of the chosen sequence, the surgical approach to facial fractures should focus on achieving proper vertical, horizontal, and transverse alignment of the facial framework, along with restoring the orbital, oral, and nasal cavities.

Seventeen research that documented the "bottom-top and outside-in" sequence were highlighted in the literature study. As the longest and most strong bone in the face, the mandible provides a base and sturdy framework for reconstructing the craniofacial skeleton [6,10,15].In bottom- top technique the measurements for lower half of face is determined by using mandibular structures as landmarks[8,11,16]. Additionally, the mandible connects to the maxilla and occludes the base of the skull via the temporomandibular joint, maintaining continuity between the bottom third and the entire facial skeleton [5]. After the bottom-to-top anatomic reduction, the midface was corrected according to the outside-in concept [14]. For fractures involving midface, fixation is done from ZMC to NOE .Because ZMC has more well defined landmarks when compared to NOE.

Pau et al. [12] adopted a bottom-top and inside-out sequence in their reduction method due to dislocation of nasal bone into anterior part of cranium.

In three experiments, the top-bottom order was adopted, and the outcomes were positive. In a few uncommon instances involving frontal bone fractures close to the nasofrontal junction, Kim et al. [18] employed a top-bottom sequence and favoured the inside-out method. They started the reduction from the centre of the frontal bone through laceration in

cases where there were open wounds close to the location of the frontal bone fracture but no comminuted fracture in the NOE area. Using the top-bottom strategy, Vasudev et al. [19] determined that this method permits the appropriate restoration of both form and function.

Due to their prior experience with midface reduction, Yun and Na [20] inserted arch bars first, reduced the frontal bone fracture, then treated the midface and mandible fractures in that order. In three research [21–23], "top-bottom, inside-out" and "bottom-top, outside-in" sequences were both described. Degala et al. [21] and Jae Hee Yoon et all [24] compared the results of the top-bottom, outside-in sequence and the bottom-top, inside-out sequence for the management of Panfacial fractures.In many instances included in these study, comparable clinical outcomes were seen.

For treating PFF single way of approach is not possible.So when treating a pan facial fracture the first thing to keep in mind is to align the bones which determine the contour of face and then to reduce the fracture segments.

REFERENCES

1. Gruss JS, Bubak PJ, Egbert MA. Craniofacial fractures: an al- gorithm to optimize results. Clin Plast Surg 1992;19:195-206.
2. Tullio A, Sesenna E. Role of surgical reduction of condylar fractures in the management of panfacial fractures. Br J Oral Maxillofac Surg 2000;38:472-6.
3. Singh A, Singh VK, Tiwari R, Thanvi G. Management of pan-facial trauma: a case report. J Med Sci Clin Res 2019;7:691-5.
4. Prasetyo AT, Hutagalung MR, Zarazade L. Palatal fracture fixa-tion on severe panfacial fracture: is there any clinical signifi- cance? Jurnal Rekonstruksi dan Estetik 2018;3:21-5.
5. Abouchadi A, Taoufik H, Nacir O, Arrob A. Pan-facial frac- tures: a retrospective study and review of literature. Open J Sto- matol 2018;8:110-9.
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. Ramanujam L, Sehgal S, Krishnappa R, Prasad K. Panfacial fractures: a retrospective analysis at MS Ramaiah Group of Hospitals, Bangalore. J Oral Maxillofac Surg Med Pathol 2013;
25:333-40.
8. Mall BB, Kandel L, Mishra R, Kandel S. Panfacial trauma: a flexible surgical approach. J Univ Coll Med Sci 2014;2:41-4.
9. Koraitim M. Panfacial fractures management. J Craniofac Surg 2020;31:e329-31.
10. Asnani U, Sonavane S, Baig F, Natrajan S. Panfacial trauma: a case report. Int J Dent Clin 2010;2:35-8.
11. Sharma S, Dhanasekaran V. Surgical approaches and manage-ment of panfacial trauma: a case report. J Clin Diagn Res 2015; 9:ZD13-4.
12. Pau M, Reinbacher KE, Feichtinger M, Navysany K, Karcher H. The mandibular symphysis as a starting point for the occlusal-level reconstruction of panfacial fractures with bicondylar frac- tures and interruption of the maxillary and mandibular arches: report of two cases. J Craniomaxillofac Surg 2014;42:e51-6.
13. Choi JW, Kim MJ. Treatment of panfacial fractures and three- dimensional outcome analysis: the occlusion first approach. J Craniofac Surg 2019;30:1255-8.
14. de Melo WM, Sonoda CK, Shinohara EH, Garcia IR Jr. Using the “bottom-up and outside-in” sequence for panfacial fracture management: does it provide a clinical significance? J Cranio- fac Surg 2013;24:e479-81.
15. 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.
16. Tang W, Feng F, Long J, Lin Y, Wang H, Liu L, et al. Sequential surgical treatment for panfacial fractures and significance of biological osteosynthesis. Dent Traumatol 2009;25:171-5.
17. Kelly KJ, Manson PN, Vander Kolk CA, Markowitz BL, Dun- ham CM, Rumley TO, et al. Sequencing LeFort fracture treat- ment (Organization of treatment for a panfacial fracture). J Craniofac Surg 1990;1:168-78.
18. Kim J, Choi JH, Chung YK, Kim SW. Panfacial bone fracture and medial to lateral approach. Arch Craniofac Surg 2016;17: 181-5.
19. Vasudev S, Debnath PP, Sahana MS, Nooreen S. Management of panfacial fracture using “top to bottom” approach. J Adv Clin Res Insights 2020;7:59-62.
20. Yun S, Na Y. Panfacial bone fracture: cephalic to caudal. Arch Craniofac Surg 2018;19:1-2.

21. Degala S, Sundar SS, Mamata KS. A comparative prospective study of two different treatment sequences i.e. bottom up-in- side out and topdown-outside in, in the treatment of panfacial fractures. J Maxillofac Oral Surg 2015;14:986-94.
22. Daniels JS, Albakry I, Braimah RO, Samara MI, Albalasi RA, Begum F, et al. Experience with airway management and se- quencing of repair of panfacial fractures: a single tertiary healthcare appraisal in Najran, Kingdom of Saudi Arabia: a retrospective study. Ann Maxillofac Surg 2020;10:402-8.
23. Roochi MM, Hajiani N, Nezaminia S. Reference point and confirming points two important guides in treatment of panfacial fractures of panfacial Fx: a case report. J Craniomaxillofac Res 2021;8:84-90.
24.Yoon JH, Kang DH, Kim H. Sequencing of panfacial fracture surgery: a literature review and personal preference. Arch Craniofac Surg 2022;23(6):256-261.