

PALATAL FRACTURE FIXATION ON SEVERE PANFACIAL FRACTURE: IS THERE ANY CLINICAL SIGNIFICANCE?

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ABSTRACT

Introduction: Fractures of the hard palate are infrequent. They are found in less than 10% of patients with midfacial fractures. They practically never occur in isolation and are usually part of alveolar process fractures or more complex midfacial fractures of the Le Fort type. Treatment of palatal fractures is planned and performed with the goal of restoring the transverse width of the palate, the anteroposterior projection of the maxillary arch, and the patient's pretraumatic occlusal plane, as well as maintaining horizontal stability of the midface.

Case Illustration: Reporting patient female 17 years old with panfacial fracture due to traffic accident. There was slight epidural haemorrhage on frontal area. The fractures are on upper face, midface, and lower face including the hard palate. We performed open reduction internal fixation on palate to correct the arch of the upper jaw. The other fracture site can be corrected easier. The approaches that we done are bicoronal, subsilier, and intraoral.

Discussion: In a case of severe panfacial fracture with upper jaw misalignment and an existing laceration, we opted to use miniplates for palatal fixation without making new incisions. Palate fractures are relatively uncommon and are associated with significant rates of malocclusion and wound complications. These injuries are typically managed with plate fixation of the alveolar ridge with variable approaches to the palatal vault.

Conclusion: The patient was successfully treated using bottom-up and outside-in sequence by accessing all facial injuries. Postoperatively, radiograph examination revealed good reduction and fixation of titanium plates, and physical examination revealed good functional and aesthetic outcomes. However, it's important to note that there's a risk of osteosynthesis material exposure in the future.

Highlights:

1. A panfacial fracture patient received effective surgical treatment, with a primary focus on aligning the upper jaw arch by addressing the hard palate through various surgical methods.
2. Palate fractures, while relatively rare, require plate stabilization and can lead to challenges such as teeth misalignment and wound issues.

INTRODUCTION

Displaced palatal fractures greatly complicate treatment of complex midfacial injuries. They increase the potential for fracture malalignment, especially in cases of concurrent mandibular body-condyle fractures. In such instance it is very hard to

establish the correct width of the dental arches. Fractures of the hard palate are infrequent. They are found in less than 10% of patients with midfacial fractures. They practically never occur in isolation and are usually part of alveolar process fractures or

more complex midfacial fractures of the Le Fort type.¹

For palatal fractures, the complication of malocclusion can be minimized using a simple and effective palatal splint during the open reduction and internal fixation procedure.² The methods of palate fracture repair are variable and include open and closed approaches with wiring, plating, splinting, orthodontic braces, acylated arch bars, and arch bars for maxillomandibular fixation to internal fixation, with plates and screws placed under the palate mucosa and periosteum, together with pyriform aperture or alveolar plating plus LeFort level I buttress reconstruction.^{3,4}

However, the palatine process of the maxilla, or hard palate, is an exception owing to its thick and sturdy osseous stock. Maxillary fractures most often occur in conjunction with other facial fractures and are most often associated with injuries such as lacerations, other facial fractures, orthopaedic injury and neurologic injury. Panfacial fractures are often associated with soft tissue injuries and loss of bone structures. Severe panfacial injuries can lead to complicated facial deformities, malocclusion, and limited facial movement. Sometimes, panfacial injuries can impact the psychological state of the patient or limit social rehabilitation permanently. Management of panfacial fractures has been ensuring a complete anatomical, esthetic, and functional repair of the face, as restoring it to its original dimension.⁵

CASE ILLUSTRATION

Reporting female 17 years old, came to emergency ward due to motorcycle traffic accident. She came with decrease on consciousness and severe elongation of the face. On physical examination, on inspection, there was full thickness open wound between her eyes, maxillary edema, open-bite malocclusion, nasal deviation, periorbital

hematoma, no sign of diplopia. On palpation there was step off on superior and inferior orbital rim, fronto zygomatic, zygomatic arch, and unstable of mandible. The interincisal opening was 20 mm and the interchantal distance was 35 mm.

On CT Scan examination, we found blow out fracture on both side, left zygomatic complex fracture, Le Fort II maxilla fracture, bilateral NOE type III fracture, symphysis of mandible fracture, and sagittal palate fracture.



Figure 1. (A) The Condition of Patient on The First Admission on The Emergency Ward. (B) The Occlusion was Open Bite.

We perform open reduction internal fixation on this patient using bottom-up sequence. The approaches that we used are bicoronal, subsilier, and vestibular. First we done open reduction and internal fixation on mandible with 2-0 miniplate fixation, we applied arch bare before expose all the

fracture lines. Because the arch of the upper jaw was dramatically misalignment, we performed reduction of the palate fracture and done fixation with 2-0 miniplate.



Figure 2. Intraoral Condition at The First Admission



Figure 3. Head CT of The Patient, Show The Panfacial Fracture



Figure 4. Fixation of the palate fracture with 2-0 miniplate

After the arch was corrected, we continued to do reduction on other buttress of maxilla, orbital floor with the orbital mesh, and reduction of the left zygomatic. Due to the severe depress of the nasal, to improve the aesthetic, we perform cantilever graft on the dorsum on the nasal. The donor was from right sixth costae.

The archbar still maintain for 8 weeks and we put MMF to correct the occlusions. Follow up after the surgery at the outpatient clinic, there was no complain. The palate fixation help us to correct the deformity, revealed good functional and aesthetic outcomes.

DISCUSSION

As with all craniofacial trauma, plating systems have become a key component in the treatment of palatal fractures. the bottom-up and outside-in sequence is the most widely used approach in the management of panfacial fractures because some studies suggested and found satisfactory outcomes. Rigid fixation of palatal fractures is performed through mucosal lacerations or incisions placed over the fracture sites. The oral mucosa is elevated to allow placement of two-hole miniplates fixed with 2 mm screws. One or two plates are placed on each side of the

fracture. The fracture is reduced with manual compression and the second screw is placed on the opposite side of the fracture.⁶

Our patient got panfacial fracture with severe misalignment of the arch of upper jaw. She underwent reconstructive craniofacial surgery and got palatal fixation to improve the functional and aesthetic outcome. Treatment of the palatal fracture in dentate patients should center on occlusal reduction with MMF and a facial vestibular approach.⁷

We choose to do fixation the palate with miniplate because there was existing laceration. We easily to elevate the palatal flap and put the plate. There was no new incision for this procedure.

We perform open reduction internal fixation on this patient using bottom-up sequence. Right after the do reduction and fixation on the mandible, we performed reduction on the palate fracture. The corrected arch made us easier to correct the upper side of palate. On severe panfacial fracture, the fixation of palatal fracture with miniplate will help us to do reduction on other site and improve the function and aesthetic.

There is also the possibility of exposure of osteosynthesis material in the mid- or long term. For all these reasons, many authors still recommend the treatment of palatal fractures by using palatal splints, arch bars or maxillomandibular fixation.



Figure 5. Clinical Appearance Right after Surgery

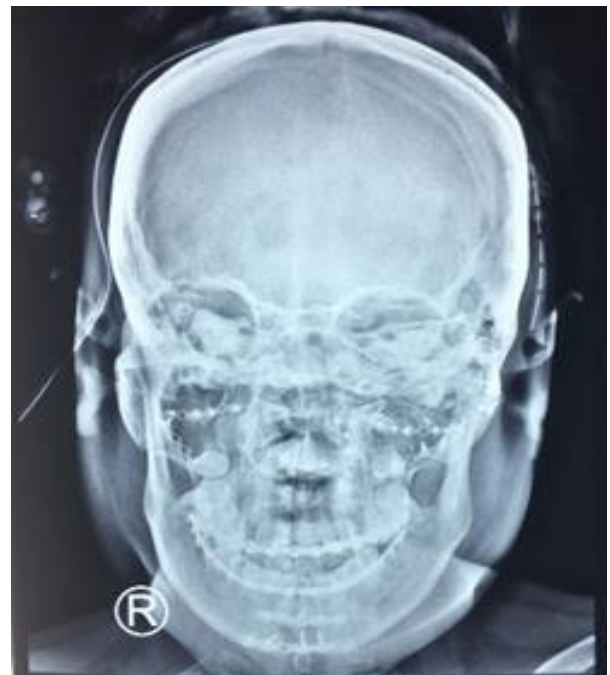


Figure 6. Skull AP X-Ray Evaluation after surgery





Figure 7. Clinical Appearance of 1 Month Follow Up.

The clinical relevance of plating systems in the treatment of palatal fractures, emphasizing their importance in craniofacial trauma management. It provides a detailed description of the procedure, including the use of two-hole miniplates and 2 mm screws for rigid fixation of palatal fractures. This practical information is valuable for medical practitioners and surgeons. The inclusion of a specific patient case with severe panfacial fracture adds a real-world dimension to the discussion, making it relatable to clinical practice.

The article introduces the "bottom-up and outside-in sequence" approach, highlighting its widespread use in panfacial fracture management. This differentiation sets

it apart by discussing a specific approach that some studies have found satisfactory. It mentions that treatment in dentate patients should center on occlusal reduction with maxillomandibular fixation (MMF) and a facial vestibular approach. This approach differentiates it by addressing the specific considerations for this patient population.

The article describes the intraoperative decision to perform palate fixation with miniplates, based on the presence of an existing laceration. This aspect adds a novel perspective, showcasing the importance of adaptability and decision-making during surgery. It highlights the challenges and benefits of performing palatal fixation with miniplates in severe panfacial fractures, emphasizing how this approach can aid in overall reduction and improve function and aesthetics. Mentioning the possibility of osteosynthesis material exposure in the mid- or long term adds a forward-looking aspect, considering potential complications and long-term outcomes.

CONCLUSION

We consider that the use of 2-0 mm locking medium- or high-profile system an excellent option for the treatment of palatal fractures. This system, originally designed as an internal fixator for the mandible, offers mechanical and biological advantages that help provide an adequate stability to palatal fractures while preserving blood supply to the bone and mucosa, with no limitation to the use of the superior vestibular approach in patients with fractures of the maxillary buttresses.

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CONFLICT OF INTEREST

None.

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None.

AUTHOR CONTRIBUTION

ATP conducted a review of medical literature, conducted clinical examinations, and critically revised the manuscript. MRH interpreted diagnostic imaging, prepared figures, contributed to the concept, and edited the case report. LZ provided overall supervision, contributed to the concept, conducted the final review of the manuscript, and granted approval.

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