Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 32s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Surgical Management of Malunited Zygomaticomaxillary Complex Fracture: A Case Report

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Cite this paper as: Vivek Chauhan, Dr. Gaurav Chaudhary, Dr. Sapna Tandon, Dr. Himanshu Chauhan, Dr. Anjali Tripathi, Dr. Pranami Baruah, (2025) Surgical Management of Malunited Zygomaticomaxillary Complex Fracture: A Case Report. *Journal of Neonatal Surgery*, 14 (32s), 5975-5979.

ABSTRACT

Introduction: The zygomaticomaxillary complex (ZMC) is a critical structural component of the midface, contributing to both facial aesthetics and function, particularly in maintaining orbital integrity. Fractures of the ZMC are common in high-impact trauma, such as road traffic accidents, and can lead to significant cosmetic and functional deficits if not managed appropriately.

Case Presentation: An 18-year-old male presented to the Department of Oral and Maxillofacial Surgery with complaints of facial asymmetry and restricted mouth opening following a road traffic accident 20 days prior. Clinical and radiographic examination revealed a frontozygomatic suture fracture, infraorbital rim fracture, and malunion of the zygomatic arch. Surgical correction was carried out using a lateral brow incision, intraoral vestibular approach, and a stab incision over the arch. The malunited segments were re-fractured, anatomically reduced, and fixed with titanium miniplates.

Discussion: Accurate diagnosis, surgical planning, and proper access to fracture sites are crucial for optimal results in ZMC fracture management. Literature supports multi-point fixation and emphasizes minimal scarring with intraoral approaches. Surgical expertise and tailored treatment plans significantly influence functional and aesthetic outcomes.

Conclusion: Timely intervention with appropriate surgical techniques can effectively restore facial symmetry and function in ZMC fractures. Rigid fixation using miniplates and strategic incisions offers a reliable approach to managing complex malunited midfacial injuries.

Keywords: *Zygomaticomaxillary complex fracture, Facial asymmetry, Rigid internal fixation, Frontozygomatic suture, Malunion correction, Maxillofacial trauma*

1. INTRODUCTION

The zygomaticomaxillary complex (ZMC), a crucial structural and aesthetic component of the midface, influences the width, form, and structural soundness of the face's orbital floor and rim. ZMC fractures, which are frequently brought on by high-impact trauma such auto accidents, domestic abuse, or falls, are among the most frequent midfacial injuries treated in maxillofacial trauma care. Important anatomical articulations that are displaced in these fractures include the zygomaticofrontal suture, zygomaticotemporal junction, zygomaticomaxillary buttress, and zygomaticosphenoidal suture. Disruption at these sites can result in both functional inadequacies (e.g., decreased ocular movement, diplopia, and altered sensation due to infraorbital nerve damage) and cosmetic abnormalities (e.g., malar flattening and facial asymmetry).

In addition to exact anatomical knowledge, a skilled surgeon's clinical judgment, experience, and manual competence are necessary for the effective therapy of ZMC fractures. A strong surgeon needs to be able to evaluate fracture patterns, predict problems, and perform surgeries that restore function and form with the least amount of morbidity. The capacity of the surgeon to make intraoperative decisions in a variety of difficult and tissue-damaging situations is directly related to the outcome of fracture reduction and stabilization.

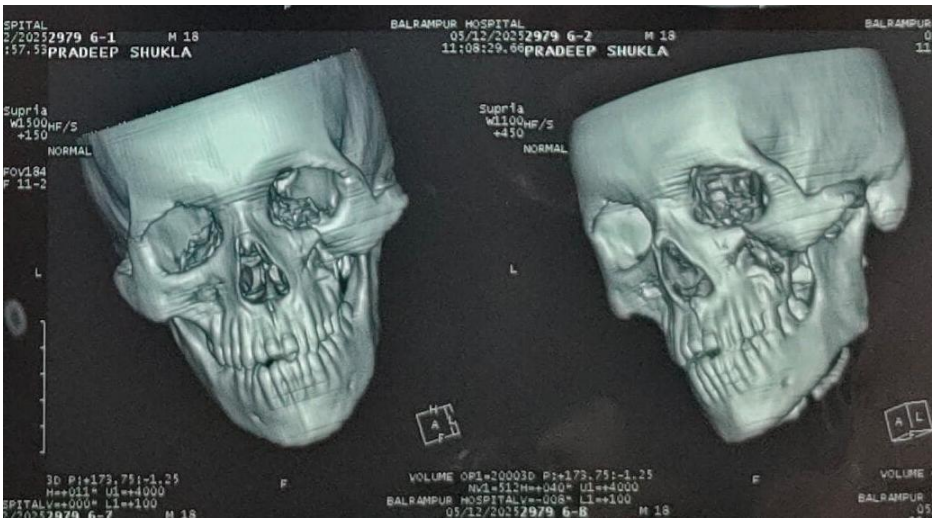
Furthermore, maintaining facial symmetry, minimizing postoperative complications, and managing related soft tissue injuries all demonstrate the wider range of skills a maxillofacial surgeon possesses. In this situation, surgical skill continues to be the primary component of successful ZMC fracture care, impacting both immediate healing and long-term patient satisfaction.

2. CASE REPORT

A 18 years old boy came to the department of oral and maxillofacial surgery of private dental college with a chief complaint of asymmetry on the left side of the face followed by a road traffic accident happened 20 days back while patient met a road traffic accident and had a fall facing left side of the face. On physical examination left side of the face revels facial asymmetry with gross protuberance in malar region. On palpation step deformity present in the left infraorbital region with mild tenderness.intraorally, occlusion was intact but with restricted mouth opening of 16 mm. CT face was done which interpreted fronto zygomatic fracture and infraorbital rim fracture and malunion of zygomatic arch and fractures respectively.

3. PRE-OPERATIVE

4. CT SCAN WITH 3D SECTION



A lateral brow incision was placed to expose FZ suture along with a stab incision over the zygomatic arch. Also an intraoral high vestibular incison was given to expose the zygomatic buttress.after full thickness mucoperiosteal flap reflection, all the malunited ie FZ suture, zygomatic arch and buttress were re-fractured,reduced,repositioned and fixed by miniplates respectively. The surgical site was sutured in layers.

5. POST OPERATIVE (14 DAYS)

6. DISCUSSION

Many surgeons concur that the conservative management of ZMC fractures involves close monitoring for displacement and a soft, non-chewable diet for two to six weeks if there is no movement of the fracture segments. For esthetic and functional rehabilitation, rigid fixation is advised if the ZMC fracture is displaced and/or the patient has a substantial opthalmological or cosmetic deformity ZMC fractures require individualized treatment based on displacement and cosmetic or functional concerns. Solanki R et al qouted that rigid fixation using plates and screws is preferred in displaced cases for optimal aesthetic and structural restoration. Various surgical approaches exist, with the gingivobuccal incision offering internal access without external scarring. Accurate reduction and fixation ensure better outcomes with minimal complications.[1]

Kumar A et al advocated that effective anatomical and functional restoration is provided by two-point fixation in ZMC fractures, which involves the zygomatic buttress and frontozygomatic suture. The problems associated with infraorbital rim exposure are avoided with this method, which guarantees facial symmetry, durable fixation, and less scarring. Literature highlighting the method's biomechanical stability and cosmetic benefit supports it. Preventing orbital problems still requires ophthalmologic evaluation. More complicated fractures could need more fixation points, even though just one worked well in this instance[2].

In this case report by **Salles LDS** et al , titanium mesh was used effectively for orbital floor reconstruction, ensuring structural support and minimizing complications. Proper imaging and surgical planning were essential for accurate diagnosis and successful treatment. The chosen materials and techniques provided excellent postoperative outcomes in terms of both function and facial appearance[3].

A case reoprt by **Sasankar S** et al quoted that functional and aesthetic deficits can occur in zmc fractures if not promptly diagnosed and managed. Accurate imaging, especially CT, is essential for understanding fracture patterns and planning surgical intervention. Improper reconstruction can lead to complications like enophthalmos, diplopia, and orbital deformities. Early multidisciplinary evaluation improves outcomes and reduces long-term complications. This case highlights the importance of timely diagnosis, surgical repair, and postoperative care in ZMC trauma[4].

7. CONCLUSION

Facial symmetry, orbital integrity, and normal function must be restored through precise diagnosis and timely surgical intervention due to the anatomical and functional significance of zygomaticomaxillary complex (ZMC) fractures. This case illustrates the importance of proper preoperative imaging, surgical planning, and execution, including multi-point fixation and strategic incisions, in resolving malunion and attaining optimal outcomes. The stab, intraoral, and lateral brow incisions might be used to successfully re-fracture and realign the malunited segments. Rigid fixation with miniplates produced stable, visually pleasing, and functionally beneficial results. According to the research, successful ZMC fracture therapy still necessitates both surgical competence and a tailored approach based on the particulars of each fracture.

8. CONFLICT OF INTEREST

None

9. ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to **Dr. Hemant Mehra**, Head of the Department of Oral and maxillofacial surgery, for his invaluable guidance, constant support, and encouragement throughout the course of this research. His insightful suggestions and leadership have played a crucial role in the successful completion of this work.

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