

Current Concepts and Trends in the Management of Zygomatic Arch Fractures

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Abstract

Fractures of the zygomatic arch compromise 10% to 15% of all facial fractures and are typically the result of a direct blow to the face.² These fractures can result in trismus, pain,³ and loss of convexity in the zygomatic arch region.⁴ Various approaches to the zygomatic maxillary complex have been well described in literature.¹ Along with these approaches, various reduction instruments and stabilization techniques have been employed in the management of isolated zygomatic arch fractures.⁶ The aim of this study is to present a review of current concepts and trends in the management of zygomatic arch fractures, highlighting the main surgical approaches and recent advances.

Keywords: *Zygomatic Fractures; Zygomatic Arch; Zygoma; Maxillofacial Injuries*

Introduction

The zygomaticomaxillary region (ZM) is the third most commonly fractured facial area. Certainly, zygomatic bone fractures are common injuries of the facial skeleton.¹ However, fractures of the zygomatic arch compromise 10% to 15% of all facial fractures and are typically the result of a direct blow to the face.² From an epidemiological perspective, the majority of the zygomaticomaxillary fractures occur in men. These injuries are most commonly seen in the second to third decades of life and are most associated with road traffic accidents.¹

These fractures can affect mastication through impingement by a depressed zygomatic arch on the temporalis muscle and coronoid process of the mandible and this can result in trismus and pain with mastication.³ In addition, isolated zygomatic arch fractures generally result in a loss of convexity in the zygomatic arch region and the patients may also present with edema and subconjunctival ecchymosis.⁴

There are several controversies as regards the best technique and treatment of these fractures, such as closed versus open reduction.⁵ Various approaches to the zygomatic maxillary complex have been well described in literature.¹ Therefore, the two most common approaches are the Gillies temporal approach and the Keen intraoral approach.² Along with these approaches, various reduction instruments and stabilization techniques have been employed in the management of isolated zygomatic arch fractures. There is currently no clinical consensus regarding the optimal method of reduction in these cases.⁶

Therefore, the aim of this study is to present a review of current concepts and trends in the management of zygomatic arch fractures, highlighting the main surgical approaches and recent advances.

Methods

A literature search was performed in electronic databases, covering relevant studies published in English and Portuguese. The search strategy included combinations of the following keywords: Zygomatic Fractures; Zygomatic Arch; Zygoma; Maxillofacial Injuries. Articles, including reviews and case reports, were selected based on their relevance to the topic. Priority was given to recent publications and studies with significant clinical contributions.

Discussion

Isolated zygomatic arch fractures remain a relevant topic in maxillofacial trauma due to their functional and aesthetic implications. According to Adam AADM et al., inadequate treatment of these fractures may result in persistent trismus, facial asymmetry, and aesthetic deformities, emphasizing the importance of accurate diagnosis and proper surgical management.

The literature demonstrates that the treatment of zygomatic arch fractures is primarily influenced by fracture displacement, functional impairment, surgeon experience, and aesthetic considerations. Among the available techniques, the Gillies temporal approach and the Keen intraoral approach remain the most commonly described and widely accepted methods for closed reduction of isolated arch fractures. Kumar J et al., in their systematic review, reported satisfactory functional and aesthetic outcomes for both approaches, with low complication rates when properly indicated.

The Gillies approach continues to be particularly popular because of its simplicity, rapid execution, and minimal visible scarring. Ates O et al. described successful closed reduction of isolated zygomatic arch fractures under local anesthesia using minimally invasive techniques, reinforcing the practicality and effectiveness of temporal access in selected cases. Through a temporal incision and subfascial dissection, the depressed zygomatic arch can be elevated with adequate mechanical leverage. Furthermore, Cohn JE et al. highlighted that the Gillies technique provides effective reduction while avoiding extensive surgical exposure and reducing postoperative morbidity. However, despite its effectiveness, inadequate dissection planes may increase the risk of injury to adjacent neurovascular structures and incomplete reduction, making detailed anatomical knowledge essential. Moreover, as previously reported in studies, this approach may result in dead space formation and subsequent hematoma development, potentially increasing the risk of postoperative infection.

In contrast, the Keen approach offers an intraoral alternative that completely avoids external scars and the possibility of dead space formation. Souza Carvalho ACG et al. emphasized that the intraoral approach may be advantageous in patients with significant aesthetic concerns due to the absence of visible facial incisions. Through a maxillary vestibular incision, instruments can be advanced toward the internal surface of the zygomatic arch to achieve reduction. Nevertheless, compared with extraoral techniques, intraoral access may provide more limited visualization and reduced mechanical control in severely displaced fractures.



Figure 1. Intraoperative view of the Gillies approach.



Figure 2. Intraoperative view of the Keen approach.

Alternative approaches, including coronal and preauricular incisions, have also been described in the literature. According to Junquera S et al., these approaches may be particularly useful in complex fractures associated with coronoid impingement or additional facial injuries requiring broader surgical exposure. Although these techniques provide excellent visualization and facilitate fixation procedures, they are associated with increased morbidity, longer operative time, and a greater risk of complications such as alopecia, facial nerve injury, and visible scarring. Therefore, they are generally reserved for more extensive or comminuted fractures.

Recent trends in the management of isolated zygomatic arch fractures have focused on improving reduction stability and minimizing postoperative displacement. Cohn JE et al. discussed different stabilization strategies and external fixation techniques aimed at maintaining fracture reduction in unstable cases. Additionally, some authors, such as Shinohara EH and Carvalho JP, have reported that repeated mobilization of the fractured segments, intercalated with reduction maneuvers to displace blood clots from the fracture line, may facilitate more accurate anatomical repositioning and produce a firmer reduction by reducing interfragmentary interference. However, this technique eliminates the need for a protective splint or Foley's Balloon Catheter which has traditionally been used to protect the reduced zygomatic arch and maintain postoperative stability, as described by Fonseca RJ et al. Cohn JE et al. e Kumar SRR et al. on their studies.

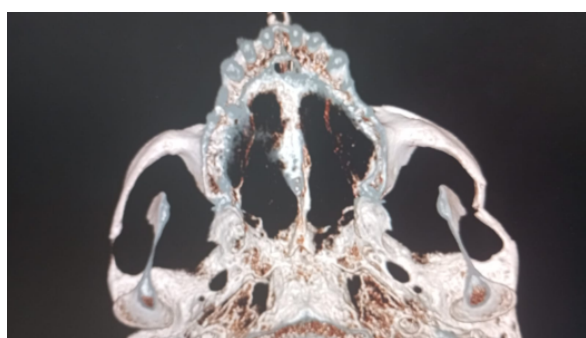


Figure 3. Computed tomography image demonstrating a left zygomatic arch fracture.

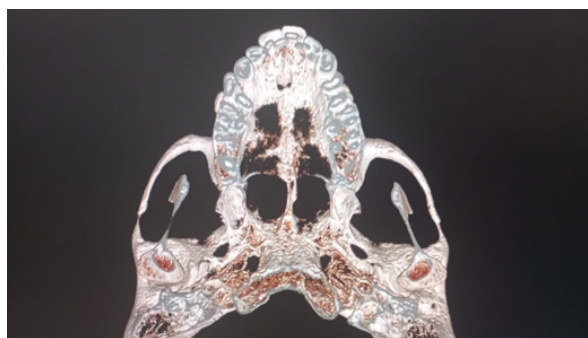


Figure 4. Postoperative computed tomography image demonstrating successful reduction of the left zygomatic arch fracture through a Keen approach.

Several instruments have been described in the literature for the reduction of isolated zygomatic arch fractures, reflecting the continuous evolution of minimally invasive management techniques. Cohn JE et al. reported that different elevators and external fixation devices may be used to improve reduction stability and postoperative maintenance of fracture positioning. According to Kumar J et al., the choice of reduction instrument depends mainly on fracture displacement, surgical access, surgeon preference, and the need for stabilization after reduction.

Overall, current evidence supports individualized treatment planning based on fracture morphology, degree of displacement, functional limitation, and aesthetic demands. Both the Gillies and Keen approaches remain reliable and effective techniques, while recent advances in reduction maneuvers and stabilization strategies continue to refine the management of isolated zygomatic arch fractures with the aim of achieving predictable functional and cosmetic outcomes while minimizing morbidity.

Conclusion

The management of isolated zygomatic arch fractures requires accurate diagnosis and appropriate surgical planning to achieve satisfactory functional and aesthetic outcomes. Both the Gillies and Keen approaches remain effective and reliable treatment options, with low complication rates when properly indicated.

Recent advances in reduction maneuvers and surgical instruments have also contributed to improved fracture stability and anatomical repositioning. Therefore, treatment should be individualized according to fracture characteristics and surgeon experience.

Conflict of Interest

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