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STUDY ON ASSESSMENT OF ZYGOMATICOMAXILLARY COMPLEX FRACTURES WITH GILLIES TEMPORAL APPROACH

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Abstract

Background:
Zygomaticomaxillary Complex (ZMC) fractures are among the most common midfacial injuries, often resulting from road traffic accidents, assaults, and falls. These fractures can impair facial aesthetics and function, necessitating prompt and effective management. The Gillies temporal approach is a widely accepted surgical technique for the reduction of ZMC fractures due to its minimal invasiveness and aesthetic advantages. This study aims to evaluate the clinical outcomes, efficacy, and complication rates associated with the Gillies temporal approach in the management of ZMC fractures.

Materials and Methods:
A prospective clinical study was conducted on 30 patients (22 males and 8 females) aged between 20 and 45 years, presenting with unilateral ZMC fractures. All patients underwent open reduction using the Gillies temporal approach under general anesthesia. Clinical evaluation was done preoperatively and postoperatively using parameters such as malar prominence, mouth opening, infraorbital nerve function, and radiographic alignment. Follow-up was carried out at 1 week, 1 month, and 3 months postoperatively.

Results:
Out of 30 cases, successful anatomical reduction was achieved in 28 patients (93.3%). Mild residual asymmetry was noted in 2 patients (6.7%). Infraorbital nerve paresthesia was observed in 4 patients (13.3%) postoperatively, which resolved within 3 months in all but one case. No major complications such as hematoma, infection, or temporal hollowing were reported. Mean operative time was 45 ± 10 minutes, and hospital stay ranged from 1 to 3 days.

Conclusion:
The Gillies temporal approach is a reliable, minimally invasive, and effective method for treating ZMC fractures, offering satisfactory functional and aesthetic outcomes with minimal complications. It remains a valuable technique, especially in resource-limited settings and for patients prioritizing minimal scarring.

Keywords: Zygomaticomaxillary Complex Fracture, Gillies Temporal Approach, Facial Trauma, Infraorbital Nerve, Facial Asymmetry, Aesthetic Outcomes.

Introduction

Zygomaticomaxillary complex (ZMC) fractures are among the most frequently encountered midfacial injuries due to the prominence and structural importance of the zygomatic bone in the facial skeleton (1). These fractures often result from high-impact trauma such as road traffic accidents, physical assaults, sports injuries, or falls, and typically involve displacement at the zygomaticofrontal suture, zygomaticomaxillary buttress, zygomaticotemporal suture, and infraorbital rim (2). The zygomatic bone contributes significantly to facial width, contour, and ocular protection; thus, any disruption can lead to both functional and cosmetic consequences, including enophthalmos, diplopia, infraorbital nerve paresthesia, and midfacial asymmetry (3).

Various surgical techniques have been described for the reduction and fixation of ZMC fractures, including intraoral, transconjunctival, and coronal approaches. However, the Gillies temporal approach remains a favored method due to its simplicity, minimal invasiveness, and ability to achieve acceptable cosmetic results without external scarring (4). Introduced by Gillies in the early 20th century, this approach utilizes a temporal incision and insertion of an elevator to reposition the zygoma, thereby reducing morbidity while ensuring adequate fracture realignment (5).

Despite its longstanding use, the Gillies technique's effectiveness in terms of stability, aesthetic outcomes, and complication rates continues to be a subject of clinical interest. This study aims to assess the clinical outcomes of ZMC fracture management using the Gillies temporal approach in a tertiary care setting.

Materials and Methods

This prospective clinical study was conducted in the Department of Oral and Maxillofacial Surgery at a tertiary care hospital over a period of 18 months. Ethical approval was obtained from the institutional ethics committee, and written informed consent was taken from all participants prior to inclusion.

Study Population:

A total of 30 patients diagnosed with unilateral zygomaticomaxillary complex (ZMC) fractures were enrolled based on clinical and radiographic findings. Inclusion criteria included patients aged 18–50 years, with isolated ZMC fractures requiring open reduction. Patients with comminuted fractures, associated cranial injuries, or systemic contraindications to surgery were excluded.

Surgical Procedure:

All patients underwent open reduction using the Gillies temporal approach under general anesthesia. A 2–2.5 cm incision was made within the hairline, typically 2.5cm superior and anterior to helix of ear in temporal line. Incision allowed access to temporalis muscle and fascia, with elevator placed between the deep temporal fascia and the muscle. Rowe zygomatic elevator is used to lift the fractured arch into the proper position. Reduction was confirmed clinically and via intraoperative fluoroscopy. No internal fixation was performed unless instability was detected post-reduction.

Figure 1,2: Approach for the Fracture reduction

Postoperative Assessment:

Patients were monitored for facial symmetry, malar projection, mouth opening (inter-incisal distance), infraorbital nerve sensation, and wound healing. Standardized preoperative and postoperative radiographs (Waters and Submentovertex views) were used for assessing zygomatic alignment.

Follow-up visits were scheduled at 1 week, 1 month, and 3 months postoperatively to evaluate outcomes and record complications, if any.

Data Analysis:
Collected data were compiled and analyzed using SPSS version 25.0. Descriptive statistics were used to assess clinical parameters, and postoperative outcomes were reported as frequencies and percentages. Paired t-tests were employed to compare preoperative and postoperative measures, with a p-value of <0.05 considered statistically significant.

Results
A total of 30 patients were treated for unilateral Zygomaticomaxillary Complex (ZMC) fractures using the Gillies temporal approach. Among them, 22 were male and 8 were female, with a mean age of 32.6 years (range: 20–48 years). The most common cause of injury was road traffic accidents (60%), followed by physical assault (23.3%) and falls (16.7%).

Facial Symmetry and Malar Projection
Postoperative assessment revealed satisfactory facial contour restoration in 28 out of 30 patients (93.3%). Two patients (6.7%) presented with mild residual asymmetry, which did not necessitate secondary correction (Table 1).

Table 1. Postoperative Facial Symmetry Assessment

Outcome	Number of Patients	Percentage (%)
Symmetrical facial appearance	28	93.3
Mild residual asymmetry	2	6.7
Severe asymmetry	0	0

Infraorbital Nerve Sensory Changes
Sensory evaluation indicated that 4 patients (13.3%) experienced infraorbital paresthesia immediately after surgery. Recovery was observed in 3 patients within 3 months. One patient had persistent mild numbness at the final follow-up (Table 2).

Table 2. Infraorbital Nerve Sensory Status Postoperatively

Sensory Status	1 Week	1 Month	3 Months
Normal	26	27	29
Mild paresthesia	4	3	1
Complete sensory loss	0	0	0

Mouth Opening (Inter-Incisal Distance)
Functional assessment showed improvement in mouth opening postoperatively. The mean inter-incisal distance increased from 28.4 mm preoperatively to 38.6 mm at 3 months post-surgery, showing a statistically significant improvement ($p < 0.001$) (Table 3).

Table 3. Mouth Opening Measurements (Mean ± SD in mm)

Time Interval	Mean Inter-Incisal Distance (mm)	SD
Preoperative	28.4	3.1
1 Week Post-op	32.7	2.8
1 Month Post-op	36.2	2.3
3 Months Post-op	38.6	1.9

Complications and Operative Parameters

No major complications such as hematoma, infection, or temporal hollowing were observed. The mean operative time was 46 ± 9 minutes, and the average hospital stay was 2.1 ± 0.8 days. Table 4 summarizes the surgical and recovery-related parameters.

Table 4. Operative and Recovery Parameters

Parameter	Mean ± SD / Frequency
Operative Time (minutes)	46 ± 9
Hospital Stay (days)	2.1 ± 0.8
Hematoma	0
Infection	0
Temporal Hollowing	0

The above results demonstrate favorable outcomes with minimal complications using the Gillies temporal approach (Tables 1–4).

Discussion

Zygomaticomaxillary complex (ZMC) fractures represent a significant proportion of facial trauma cases due to the prominent anatomical position of the zygoma, which plays a crucial role in midfacial contour and orbital structure (1,2). The present study aimed to evaluate the clinical effectiveness of the Gillies temporal approach in managing unilateral ZMC fractures, focusing on facial symmetry, sensory recovery, and functional restoration.

Our findings indicate that the Gillies temporal approach provided satisfactory reduction in 93.3% of cases, with minimal residual asymmetry. These outcomes are consistent with previous studies that have demonstrated the approach's ability to restore malar projection and facial harmony without extensive dissection or visible scarring (3,4). The technique's minimally invasive nature, coupled with direct access to the zygomatic arch, allows for effective repositioning with reduced operative time and morbidity (5,6).

Infraorbital nerve paresthesia is a common sequela of ZMC fractures due to the involvement of the infraorbital canal. In this study, 13.3% of patients exhibited postoperative sensory disturbances, most of which resolved within three months. Similar sensory recovery timelines have been reported by Hwang et al. and Kim et al., indicating that transient nerve compression is often reversible following anatomical realignment (7,8). Only one patient had persistent mild paresthesia at the final follow-up, which is within the expected range of complication rates described in the literature (9).

Mouth opening, often compromised due to zygomatic arch impingement on the coronoid process, showed marked improvement postoperatively, rising from a mean of 28.4 mm to 38.6 mm at 3 months. This aligns with previous clinical observations where successful reduction of zygomatic displacement led to improved mandibular function (10,11). Maintenance of adequate inter-incisal distance is essential for mastication and oral hygiene, underlining the importance of functional assessment in postoperative follow-up.

One of the notable advantages of the Gillies approach is the reduced incidence of complications such as hematoma, infection, or visible scarring. In our study, no major complications were recorded, which supports the findings of other clinical trials that emphasize the safety of this method (12,13). The temporal incision, hidden within the hairline, provides both cosmetic and surgical benefits, making it particularly suitable in young patients and those concerned with aesthetic outcomes (14).

Despite its benefits, the Gillies technique may be less effective in managing comminuted fractures or those involving the orbital floor, where rigid fixation and access to multiple buttresses may be necessary. In such cases, alternative or combined approaches may offer superior stability and exposure (15). Nonetheless, for isolated, non-comminuted ZMC fractures, this technique remains a reliable choice with favorable results.

Conclusion

In conclusion, our study reinforces the utility of the Gillies temporal approach in the treatment of ZMC fractures. The method offers a balance between surgical efficiency, aesthetic outcomes, and low complication rates, particularly in cases without extensive bone fragmentation.

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