

THE GILLIES TEMPORAL APPROACH FOR ISOLATED FRACTURE OF ZYGOMATIC ARCH- REPORT OF TWO CASES

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ABSTRACT

Several methods exist for treating fractures involving the zygomatic complex.

They include open reduction, intra-oral elevation (Keen's Approach), antral packing, and extra-oral elevation (Gillies method).

However, when reviewing the literature, it would appear that marked differences exist in the method most frequently used, and this would appear to be dependent on the country in which the patient is treated. For example, in the United States open reduction is favoured, whereas European countries appear to favour closed reduction.

The Gillies approach, is frequently used because of the short duration of general anaesthesia and minimal morbidity, does not appear to be used frequently in the United States, perhaps due to a lack of familiarity with the procedure and its versatility.

However, in India, specially in tertiary care centres like ours with a heavy patient load, the Gillies Temporal Approach, a relatively simple and less time consuming procedure is frequently performed.

KEY WORDS

Gillies Approach, Zygomatic fracture

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INTRODUCTION

One of the most common midfacial fractures is fracture of the zygomaticomaxillary complex. The fracture is also known as isolated zygoma fracture, malar fracture, or "classic tripod fracture," more often anatomically correctly classified as a tetrapod fracture. The epidemiology, fracture pattern, treatment, and complications have been extensively described in the literature.^(1,2)

Controversy exists regarding the most appropriate method of reduction of this type of fracture. Some clinicians favour minimal exposure of the fracture site, whereas others favour open reduction and fixation. Marked differences in clinical practice exist about which method is most frequently used because of local traditions and the country for the patient's treatment.⁽¹⁻³⁾

Weisenbaugh⁽⁴⁾ reported the treatment of 59 zygomatic fractures, of which only three were treated using this method. Chuong and Kaban⁽⁵⁾ reported 69 patients, six of whom were treated by the Gillies approach and 63 who required open reduction.

Conversely, Larsen and Thorsen⁽⁶⁾ reported 115 zygomatic fractures requiring treatment, of which 87 were successfully treated using the Gillies method alone.

Kristensen and Tvetera⁽⁷⁾ judged the Gillies method to be successful objectively in 88% of cases, and subjectively so in 96% of cases (26 cases). In Great Britain, Ellis et al' reported 1,521 fractures of the zygomatic complex requiring treatment. Of these, over two thirds (933 cases) were successfully treated using the Gillies method.

Some investigators have reserved the Gillies approach solely for zygomatic arch fractures⁽⁸⁾, whereas still others feel that all zygomatic fractures are unstable and require further fixation⁽⁹⁾.

The versatility of the Gillies method is not confined to fresh injuries. As zygomatic fractures are also associated with neurological injuries in majority of cases, more than 50% of the cases, (including the two cases presented) reported no sooner than 7-21 days after the initial injury. The fractured ends were still capable of binding to one another, although the longer the delay in treatment, the less likely this is.

SURGICAL PROCEDURE

The criteria used to determine the need for surgical

correction consisted of a combination of one or more of the following clinical signs and symptoms: restricted mandibular movement with limited mouth opening, palpable step deformity over the zygoma, tenderness at the fractured points, and visible depression of the prominence of the cheek.

The Gillies method⁽¹⁰⁾ involves a straight incision (approximately 2 cm long) made at an angle 30 degrees to 45 degrees to the horizontal, approximately 2.5 cm antero-superior to the helix of the ear within the hairline. It is crucially placed at the junction of the frontal and parietal branches of the superficial temporal artery, which can be palpated and before the splitting of the temporal fascia.

Following blunt dissection and avoidance of the superficial temporal vessels, the temporalis fascia is uncovered. An incision is made through this fascia and then a flat instrument (such as a Howarth's nasal raspator) is introduced.

This defines the correct plane, since the fascia extends down to the zygomatic arch, while the temporalis muscle inserts on the coronoid process of the mandible. An instrument such as the Rowe's elevator then replaces the raspator.

Once the instrument is under the body of the

zygomatic bone, it is used to lift the bone back into its correct position. An audible click and fullness of the cheek, together with palpation for normal contour of the zygomatic bone and orbital rim, usually heralds a successful stable manipulation of the bone.

Originally, Gillies et al. (1927) described using the side of the skull as a fulcrum against which the displaced zygoma is levered into place. More recently, the possibility of fracture of the parietal bone during this procedure has been avoided using the Rowe elevator whereby no force is applied to the side of the skull but instead the displaced zygoma is 'lifted' directly back into position (Rowe & Killey, 1968). In either approach, the reduction of the fracture entails the introduction of an elevator into the infra-temporal fossa.

CASE REPORT 1

A 28 year old female patient presented to us with a chief complaint of inability to open mouth and pain in the right side of the face since 20 days. She gave a history of suffering a blow on the right side of her face 20 days back.

CASE REPORT 1- PRE OPERATIVE PHOTOGRAPHS



FRONT VIEW



BIRD'S EYE VIEW



**INTER INCISAL OPENING
12mm**



PRE OP CT SCAN



MARKING THE INCISION LINE



EXPOSURE OF



CLOSURE



POST OP INTER INCISAL



POST OP BIRD'S EYE VIEW

On examination, there was a slight depression over the right molar region with associated tenderness. Interincisal opening was limited (12mm). No paresthesia was present.

CT scan revealed a typical 'V' shaped depressed fracture of the zygomatic arch.

Zygomatic arch reduction was performed using the Gillies Temporal Approach under Local Anaesthesia.

Inter incisal opening increased to 30mm and there was visible fullness over the right malar region in the immediate post operative period.

CASE REPORT 2

A 33 year old male patient reported to our department of Oral & Maxillofacial Surgery with a chief complaint of limited mouth opening and pain on the right side of his face since 10 days. He gave a

history of RTA 10 days back. On examination he had markedly depressed and tender right malar prominence and limited inter-incisal opening (9mm). There was no associated paresthesia.

CT scan revealed a 'V' shaped depressed fracture of the right zygomatic arch.

Like the previous case, reduction of the fracture was done using the Gillies Temporal Approach under Local Anesthesia

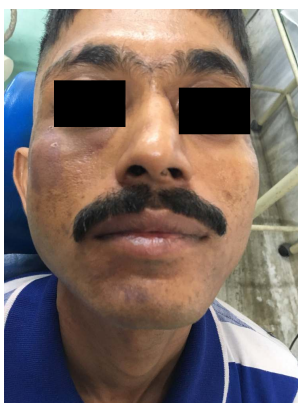
In the immediate post operative period the inter incisal opening increased to 30mm and there was marked reduction of the depression over the right malar prominence.

Both the patients were warned to avoid further pressure over the region of injury and instructed to perform active jaw exercises.

In the follow up period, no decrease in the inter-incisal mouth opening was reported and both the patients were adequately satisfied with their facial aesthetics.

CASE REPORT 2-

PRE OPERATIVE PHOTOGRAPHS



FRONT VIEW



BIRD'S EYE VIEW



**INTER INCISAL
OPENING 9 mm**



PRE OP CT SCAN



MARKING THE INCISION LINE



EXPOSURE OF TEMPORALIS MUSCLE CLOSURE



CLOSURE



POST OP BIRD'S EYE VIEW



POST OP INTER INCISAL OPENING 30mm

DISCUSSION

The Zygomatic bone fracture susceptibility was explained by Markus Zing et al in 1992⁽¹¹⁾. Zygoma is most commonly fractured next to nasal bone as stated by Vernard and Jackson. Fractures of the zygomatic complex are common and are usually caused by horizontal blows to the front and sides of the face, received in assaults, road traffic accidents and in sporting and industrial accidents (MacLennan, 1977). The body of the zygomatic bone is strong and is rarely fractured, its four processes, however, are more fragile and are usually the sites of fracture. A small percentage (6 per cent) of these fractures are undisplaced and usually require no treatment. Displaced fractures may occur with or without rotation and are invariably depressed. (Knight & North, 1961)

The traditional closed reduction via different approaches in isolated zygomatic arch fracture can be achieved with digital palpation alone. The result depends on the operator's experience. Occasionally this closed reduction becomes difficult in cases with

callus formation between the fracture segments because of delayed management after trauma. Re-displacement of fracture segments may also occur due to mastication or external pressure to the arch area after this surgery.⁽¹²⁾

The Gilles Approach was first reported in 1927 by Gillie's, Kilner Landstone⁽¹⁰⁾. Open reduction has the potential for increased morbidity compared with that of the Gillies method. Larsen and Thomson⁽⁶⁾ reported malunion in a third of their patients receiving transosseous wires. This complication was not reported by Chuong and Kaban⁽⁵⁾. The Gillies method offers the advantage of being quick, decreasing the possibility of facial nerve damage or direct trauma to the globe by instruments inserted to protect the eye, and not being associated with a visible scar (the scar from the Gillies method being within the hairline). According to a recent survey, the practising fellows of British association of oral and maxillofacial surgeons⁽¹³⁾, the Gillie's approach was followed in 74% cases of severely displaced fractures. Dae Hyun Lew et al in 1997⁽¹⁴⁾ described a method which begins with Gillie's approach for reduction and internal

Kirschner's wire fixation. G.R. Ogden et al in 1991⁽¹⁵⁾ studied 105 cases treated with Gillie's approach for ZMC fractures. The author recommends this technique as it is quick, decreased the possibility of facial nerve damage, not associated with visible scar.

Pablo Rosado and Juan C de Vicente in 2012⁽¹⁶⁾ used Gillie's approach for closed reduction in their study of orbital fractures.

S. Taicher et al., in 1993⁽¹⁷⁾ found out the recovery of paresthesia of infra orbital nerve is higher in Gillie's approach. Out of 104 cases of ZMC fractures, Gillies approach was followed in 65 cases in the study of E.T. Adebayo et al in 2003⁽¹⁸⁾.

However, because so many zygomatic fractures can be treated by only the Gillies method, it represents a logical starting point in most cases.

CONCLUSION

The routine use of open reduction and miniplate fixation is generally safe, but is not totally without morbidity. Infective complications associated with miniplates range from 0.5-1.5 percent. Miniplates may dislodge, migrate or extrude, and use of miniplates may result in local touch or cold hypersensitivity. Aesthetic problems related to the plate and scars resulting from the access incisions are not uncommon.

Gillie's approach is a meticulous technique as it can be performed even under Local Anaesthesia or involves short duration of general anaesthesia (if used) and decreased possibility of facial nerve damage. The scar is not visible.

Hence we can conclude that Gillie's temporal approach is a versatile technique for the management of ZMC fractures.

REFERENCES

1. Ellis E, El-Attar A, Moos FK: An analysis of 2,067 cases of zygomatico-orbital fracture. *J Oral Maxillofac Surg* 43:417, 1985
2. Tadj A, Kimble FW: Fractured zygomas. *Aust N Z J Surg* 73:49, 2003
3. Kaastad E, Freng A: Zygomatico-maxillary fractures: Late results after traction-hook reduction. *J Cranio Maxillofac Surg* 17:210, 1989
4. Weisenbaugh JM: Diagnostic evaluation of zygomatic complex fractures. *J Oral Surg* 28:204. 1970

5. Chuong R, Kaban LB: Fractures of the zygomatic complex. *J Oral Maxillofac Surg* 44:283, 1986

6. Larsen OD, Thomsen M: Zygomatic fractures. II. A follow-up study of 137 patients. *Stand J Plast Reconstr Surg* 12:59, 1978

7. Kristensen S, Tveteras K: Zygomatic fractures: Classification and complications. *Clin Otolaryngol* 11:123. 1986

8. Pozatek ZW, Kaban LB, Guralnick WC: Fractures of the zygomatic complex: An evaluation of surgical management with special emphasis on the eyebrow approach. *J Oral Surg* 31:141, 1973

9. Dingman RO, Natvig P: *Surgery of Facial Fractures*. Philadelphia, PA, Saunders. 1976, p 218

10. Gillies HD, Kilner JP, Stone D: Fractures of the malar-zygomatic compound with a description of a new x-ray position. *Br J Surg* 14:651, 1927

11. Markus Zing et al in., Classification and treatment of zygomatic fractures : A review of 1025 cases- *journal of oral and maxillofacial surgery*: 50 : 778-790 (1992).

12. Guven O. Self-curing acrylic in treatment of unstable zygomatic arch fracture. *J Nihon Univ Sch Dent* 1988; 30: 141-144.

13. P M Cloghlin, M. Gilhooly, G. Wood in The management of zygomatic complex fractures- Results of a survey- *British journal of oral and maxillofacial surgery*. 32: 284-288 (1994).

14. Thangavelu et al., Fronto Temporal Approach for the management of Zygomatic complex fractures – A case report - *Journal of Maxillofacial and Oral Surgery* 6(2) : 11-13 (2007)

15. Eric J Dierks et al- The cardinal bends of the zygomaticomaxillary buttress- A technical note - *Journal of oral and maxillofacial surgery*., 67 : 1149 - 1151 (2009)

16. Pablo Rosado and Juan DE Vicente: Retrospective analysis of 314 orbital fractures: *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology* 113(2): 168-171 (2012).

17. S Taicher, L Ardekian, N Samet, N Shoshan and I Kaffe in., Recovery of the Infra orbital nerve after Zygomatic complex fractures: A preliminary study of different treatment methods- *International journal of oral and maxillofacial surgery* : 22: 339- 341 (1993).

18. Adebayo et al., Analysis of the pattern of maxillofacial fractures in Kaduna, Nigeria *British journal of oral and maxillofacial surgery* volume 41(6) :Pages 396-400