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Research Article

A Comparison of One Point Versus Two Point Fixation in the Management of Zygomatico-Maxillary Complex Fractures

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Abstract

Background: The zygomaticomaxillary complex (ZMC) fractures are highly frequent injuries. There are a variety of operative techniques for fixation of ZMC fractures, with no consensus about the best technique. We aim to compare one-point versus two-point fixation of tripodal zygomatic fractures.

Patients and Methods: This study was carried out on 34 patients admitted to the trauma unit in Sanjay Gandhi Institute of Trauma and Orthopaedics in the period from September 2022 to August 2023. Patients were divided into two groups (group 1; one-point fixation, and group 2; two- point fixation).

Results: In the one-point fixation group, only 14 patients had substantial stability with a P-value of <0.05 being statistically significant. In contrast, nearly all patients in the two-point fixation group had higher stability. In the two-point fixation group, nearly all patients had a post-operative scar; whereas, in the one-point fixation group, only two patients had the same scar, and the mouth opening was also improved. In two-point fixation, paraesthesia was observed in nearly seven patients, while in one-point fixation, it was present in only two patients.

Conclusion: The one-point fixation technique for tripodal ZMC fractures is considered as effective as the two-point fixation technique; and it offers advantages of scarless operation, reduced operation time, fewer complications, and lower cost.

Keywords: Tripod Fracture; Internal Fixation; Osteosynthesis

Introduction

The zygomatic bone defines the anterior and lateral projection of the face by its articulated relationship with the frontal, sphenoid, temporal, and maxillary bones. The zygomatic complex protects the orbital contents and the mid-facial contour. Zygomatic complex fractures are among the most common facial injuries in maxillofacial trauma, affecting mostly young adult males [1]. The cheek prominence, inferior and lateral orbital limits, and anterolateral aspect of the face are all defined by the unique tetrapod arrangement of the ZMC, which articulates with multiple bones [2,3].

If these fractures are not attended to, they may lead to functional and aesthetic deficits such as;

- Loss of facial symmetry
- Paraesthesia of the infraorbital nerve
- Depressed malar prominence
- Limited mouth opening
- Obstruction of the lacrimal duct, epiphora
- Diplopia, orbital dystopia,
- Enophthalmos, and loss of vision when related to orbital floor fractures.

Variable surgical techniques have been performed to achieve satisfactory outcomes e.g. the Gillies' temporal approach, upper eyelid, lateral eyebrow, sub-ciliary, transconjunctival, and intraoral approaches [1,2].

The zygomatic bone is part of the facial skeleton of mammals, most reptiles, amphibians and birds. But it is absent in living amphibians. In reptiles, the zygomatic bone forms a relatively narrow bar separating the orbit from the inferior temporal fossa. The bone is similarly reduced in birds. Articulation of the zygomatic bone with the squamosal, forms the zygomatic arch that serves as the lateral boundary of the temporal fossa. In non-mammalian species that have no zygomatic arch, the zygomatic bone is called jugal.

The zygomatic bone is derived evolutionarily from the orbital series. In most modern mammals the zygomatic bone forms a large part of the face and usually serves as a bridge that connects the facial skeleton to the neurocranium. Nose and zygoma occupy a prominent portion on the face and so, zygomatic fractures are very common in facial injuries; either the most common facial fractures or the second in frequency after nasal fractures.

Fracture and dislocation of this bone causes cosmetic defects and disrupts other ocular and mandibular functions. Fractures of zygomatic complex causes disruption in articulation of zygomatico-maxillary complex, zygomatic complex proper and orbito- zygomatic complex. Achieving anatomic reduction and stable fixation is the major objective of treatment in order to avoid functional or cosmetic impairments following surgery.

The incidence, cause, age, sex predilection, and educational status of the population was studied. Most studies indicate a male predilection, with a ratio of 4:1 over females. Most authors also agree that the peak incidence of such injuries occurs around the second and third decades of life.

Patterns of facial injury in children differ from those in adults, because of anatomic and physiologic characteristics at different stages of facial development, as well as the extent of paranasal sinus pneumatization and phase of dentition. The overall frequency of facial fractures in children is much lower than that in adults. There is a marked preponderance of boys in the worldwide paediatric population affected by facial fractures. In children, zygomatic complex fractures often are greenstick fractures involving the lateral wall and floor of the orbit.

The causes of zygomatic injury in adults are mostly altercations, whereas in others, motor vehicle accidents account for a more substantial number.

The development of microsystems offered a potential solution to the shortcomings of mini plates. However, the application of microsystems is limited to regions of the craniomaxillofacial region, where loading forces are minimal, especially the thin midfacial region and cranium. In trauma surgery, microsystems have been used for the following regions such as nasoethmoidal fractures of infraorbital area, fractures of the frontal sinus wall, fractures of the mandibular condyle or condylar neck/fractures o the severely atrophic edentulous mandible and reconstruction of the skull.

Only in select Zygomaticomaxillary complex fractures in which severe posterior or lateral displacement is present, zygomatic arch serves as a prime point of alignment. When gross comminution is present at the infraorbital rim or at the zygomatico-maxillary buttress, the zygomatic arch serves as a common denominator for the return of normal anatomic relationships.

The proximal end of the sagitally fractured arch is often too thin and narrow to accommodate 2 mm diameter mini screws. Micro plating systems for craniomaxillary fractures using micro screws to rigidly fixate the sagitally fractured zygomatic arch to the temporal bone as one of the multipoint fixations with bicoronal approach shall be ideal.

Miniplate technique is performed with minimal effort, more convenient access, and less stripping of the surrounding periosteum than necessary for the traditional superior border wire. Because this is a monocortical technique, there is a less chance for iatrogenic damage to adjacent teeth by misdirected wire passing burs. Most importantly less manipulation of the fracture segments is required to provide stabilization. Thus, the chance of

neurovascular injury is decreased and, therefore less postoperative paraesthesia and hematoma formation is likely to occur.

The micro screw or microplate system used is low profile (<0.75 mm). It is fabricated from titanium which unlike stainless steel is extremely biocompatible, non-allergic, lightweight, corrosion resistant and does not interfere with current imaging modalities such as radiographic, MRI, or computed axial tomography. Although this technique is more costly than one using wire osteosynthesis, the advantages outweigh this consideration.

The most common orbital injury is a 'blowout' fracture, usually involving the orbital floor and the medial wall. The malar complex is also commonly fractured in isolation by a blow to that area. The bones are either fractured or dislocated. The strong central part of the bone usually remains intact and the force transmitted to three buttresses, individually or simultaneously (a tripod fracture) resulting in - An infra orbital fracture

- Displacement of the zygomaticofrontal suture
- Fracture of the zygomatic arch

An isolated lateral wall of the fracture of the orbit is rare, as this is the strongest of the orbital walls. Lateral wall fractures are therefore more commonly seen following significant maxillofacial, trauma involving the malar complex too. High impact, blunt trauma to the cheek causes zygomatic fractures; they are easy to overlook and, if displaced, require treating within 10days. Usually, a displaced fracture involves the orbitozygomatic complex

- The inferior orbital rim and orbital floor
- The zygomatico-frontal suture
- The zygomaticomaxillary buttress

A malar fracture is suspected where there is

- Periorbital oedema
- Ecchymosis
- Lateral subconjunctival haemorrhage

Even without a true orbital blowout fracture, entrapment of the orbital contents, enophthalmos, and diplopia with restriction of the eye movement may occur because of the contributions of the zygomatic bone to the orbital floor.

Preorbital and sub conjunctival haemorrhage17,24,33 occur in around 50% of cases. Other features to note:

- Fracture of the zygoma may or may not be painful to palpation and running a finger along the zygomatic arch may give a feel of a depressed fracture or a small dimple
- The cheek may appear flattened; To compare symmetry with the opposite side from behind the patient’s head This is most obvious immediately following trauma or several days later, once swelling has subsided.

Posterior displacement of the fractured fragment may impair movement of the mandible, causing difficulty with chewing. It is imperative to look for decreased range of mouth opening (normal should be >30 mm.

- Forceful nose blowing can produce subcutaneous emphysema as shown by crepitation or proptosis and visual loss from orbital emphysema 23,72,73.
- Forceful nose blowing can produce subcutaneous emphysema as shown by crepitation or proptosis and visual loss from orbital emphysema 23,72,73.

Hence the current study compares the stability and aesthetic outcome of one- point versus two-point fixation of tripodal zygomatic fractures by using miniplates, through assessment of clinical and radiological outcomes.

Aim

To analyze and compare the stability and aesthetic appearance in zygomatic complex fractures after open reduction with single point and two-point fixation.

Objectives

- To evaluate the stability of single point fixation of ZMC fractures.
- To evaluate the stability of two-point fixation of ZMC fractures.
- To evaluate the aesthetic appearance post operatively after open reduction in single- and two-point fixation of ZMC fractures.
- To evaluate the post operative mouth opening and stability of fracture.
- To evaluate the complications, if any.

Materials and Methods

Source of data

The procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000. The study was conducted on subjects reporting to the Department of Faciomaxillary Surgery, XXX. Randomization was carried out using sequentially numbered, opaque, sealed envelopes as the allocation concealment scheme (simple random technique). Each envelope contained the names of either group one or group two to which the patients will be allotted. A thorough verbal and written informed consent was taken from all the subjects who were included in the study which was taken in English, Hindi and Kannada languages.

A prospective study segregating the patients into one point fixation group and two-point fixation group will be done before the proposed procedure. All patients with tripod fractures of the zygoma will undergo computed tomography (CT) scans before and after open reduction and internal fixation (ORIF). Group 1 consisting of 17 patients will undergo open reduction with 1-point (zygomatico-maxillary buttress region) internal fixation through a buccogingival incision, and group 2 composed of another 17 patients will undergo open reduction with 2-point (zygomatico-maxillary buttress and fronto-zygomatic regions) internal fixation through buccogingival and lateral eyebrow incisions. Clinically all the patients will be assessed as a part of follow-up protocol at one week, 3 weeks, 6 weeks after the procedure for the following factors:

- Facial contour, malar symmetry,
- Eye globe position, neurosensory disturbance of the infraorbital nerve,
- Mouth opening and occlusal stability,
- Continuity of the fracture (PNS X-ray or CT scans)

In patients under group 2 (Two point fixation group), lateral eyebrow incision e.g. unsightly scar or keloid formation, and complications of the miniplates e.g. infection and palpability of the plate will also be assessed.

Inclusion criteria

- Patients with tripodal zygomatic fractures that are indicated for open reduction and internal fixation by miniplates and screws.
- Displacement of fracture less than 5mm at the fronto-zygomatic region.

Exclusion criteria

- Patients with Pan-facial fractures
- Patients with associated Le fort I/II/III maxillary fractures
- Patients with Orbital blow-in/out fractures

Preoperative evaluation of patients

This includes clinical examination, radiological and laboratory investigations. All cases were evaluated clinically by taking a full history, general examination and maxillofacial examination for signs of zygomatic complex fractures. Also, assessment of the infraorbital nerve injury and ophthalmological evaluation were documented. Radiological evaluation was done through CT scan of facial bones in three-dimensional (3D) reconstruction film, axial and coronal planes.

Number and name of the groups

- Patients treated with 1- point fixation in zygomaticomaxillary buttress region.
- Patients treated with 2- point fixation in zygomaticomaxillary and frontozygomatic region.

Study parameters

- VC stands for vertical change, which is the bilateral infraorbital rim line's displacement.
- HC: The shift of the bilateral anterior edges of the fossa temporalis line is represented by the horizontal change.

Armamentarium

- Titanium mini plates- 2mm straight 'L' plates
- Titanium miniplates- 1.5mm 4-holed straight plates
- Titanium screws 6 mm, 8 mm
- Surgical Screw Holder, Screw Driver and
- Basic Surgical Instruments
- Plate bender

Results

Distributions of percentages and frequencies were used to express descriptive statistics. For qualitative data, inferential statistics were performed using the chi square test; for the unpaired test, the mean difference between the mouth opening and satisfied score was evaluated. A fixed significance level of 5% ($\alpha = 0.05$) is used. A P-value of less than 0.05 is regarded as statistically significant.

Discussion

One crucial component of the facial structure is the zygomatico-maxillary complex. The orbit, maxilla, and temporal fossa are connected to the zygoma, a centrally located diamond-shaped bone in the face. It has three faces: lateral, orbital, and temporal. The four articulations of the zygoma are the zygomaticotemporal suture, zygomaticomaxillary buttress, infraorbital rim, and frontozygomatic suture (FZS). With the exception of the nose, it sustains injuries more frequently than any other facial feature due to its placement [1,3,4].

The zygomaticomaxillary complex is an essential element of the facial configuration. The zygoma is a diamond-shaped bone located in the middle third of the face, and has relations with the orbit, the maxilla, and the temporal fossa. It has lateral, orbital, and temporal faces. The four articulations of the zygoma include the frontozygomatic suture (FZS), infraorbital rim, zygomaticomaxillary buttress, and zygomaticotemporal suture [3,13]. Because of its location, it is subjected to trauma more often than any other element of the face except the nose.

Although some injuries will involve an isolated orbital rim or antral wall fracture, most injuries will include the zygomatic bone, and thus the term "zygomaticomaxillary". The consequences of such injuries may involve ocular function, orbital shape, facial aesthetics, and mandibular mobility. Trauma of the zygomatic complex constitutes a considerable percentage of all midface fractures and the best treatment time is generally considered to be as early as possible for fractures of the midface. The causes of maxillofacial fractures vary from country to country and it shows that some of the variations can be attributed to social culture and environmental factors. The majority of fractures were sustained by males between 21 and 40 years old, usually resulting from falls, altercations, and motorcycle accidents.

The examination is conducted with a cervical spine precaution protocol since the incidence of cervical spine injuries in patients with facial trauma has been reported to be as high as 3% [4,8].

The examination should be detailed and systematic and should include evaluation of the cranial nerves, eyes, ears, and scalp. The face is then inspected and palpated for asymmetry caused by displaced fragments of the facial skeleton and for areas of oedema, ecchymosis, and lacerations [2,3].

According to classification mentioned earlier in the discussion about the arch fracture, A malar fracture should be suspected if periorbital oedema, ecchymosis of the lower lid, and/or a lateral subconjunctival haemorrhage (blood shot eye) is present.

A flat malar arch is best assessed from behind the patient's head to compare symmetry with the opposite side. This is the best ap-

Stability	One point fixation		Two point fixation	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Yes	14	82.3	17	100
No	3	17.7	0	0
P-value	0.048*			

Table 1: Graph 1 shows the stability among one point and two-point fixation. The stability was present in almost all the patients in two-point fixation whereas only 14 individuals had stability in one point fixation. P-value <0.05 is considered to be statistically significant. The comparison for stability clearly shows that statistically significant difference was seen among one- and two-point fixation. In stability, two-point fixation stands ahead superior than one point fixation.

Scar	One point fixation		Two-point fixation	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Yes	2	8.9	17	100
No	15	91.1	0	0
P-value	0.015*			

Table 2: Graph 2 shows the scar among one point and two-point fixation. The scar was present in almost all the patients in two-point fixation whereas only 2 individuals had scar in one point fixation. P-value <0.05 is considered to be statistically significant. The comparison for scar clearly shows that statistically significant difference was seen among one- and two-point fixation. In scar, one-point fixation stands ahead superior than two-point fixation.

Variables	One point fixation	Two-point fixation
Mean	41.1765	38.9412
Std. Error of Mean	.63729	1.05882
Std. Deviation	2.62762	4.36564
Variance	6.904	19.059
Range	8.00	14.00
Minimum	38.00	32.00
Maximum	46.00	46.00
P-value	0.013*	

Table 3: Graph 3 shows the comparison of mouth opening among one point and two-point fixation. The mean of mouth opening was higher in one point fixation (41.17) than two-point fixation (38.94). statistically significant difference for mouth opening was seen.

Oedema	One point fixation		Two-point fixation	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Yes	0	0	2	8.9
No	17	100	15	91.1
P-value	0.048*			

Table 4: Graph 4 shows the complication among one point and two-point fixation. The complication was present in 2 patients in two-point fixation whereas only no individuals had complication in one point fixation. P-value < 0.05 is considered to be statistically significant. The comparison for complication clearly shows that statistically significant difference was seen among one- and two-point fixation. In complication, two-point fixation stands ahead superior than one-point fixation.

Paraesthesia	One point fixation		Two-point fixation	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Yes	2	8.9	7	41.2
No	15	91.1	10	58.8
P-value	0.021*			

Table 5: Graph 5 shows the paraesthesia among one point and two-point fixation. The paraesthesia was present in almost 7 patients in two-point fixation whereas only 2 individuals had paraesthesia in one point fixation. P-value <0.05 is considered to be statistically significant. The comparison for paraesthesia clearly shows that statistically significant difference was seen among one- and two-point fixation. In paraesthesia, two-point fixation stands superior than one-point fixation.

Variables	One point fixation	Two-point fixation
Mean	8.7059	9.1765
Std. Error of Mean	.14258	.09531
Std. Deviation	.58787	.39295
Variance	.346	.154
Range	2.00	1.00
Minimum	7.00	9.00
Maximum	9.00	10.00
P-value	0.07*	

Table 6: Graph 6 shows the comparison of satisfactory score among one point and two-point fixation. The mean of score was higher in two-point fixation (9.17) than one-point fixation (8.70). statistically significant difference for satisfactory score was seen.

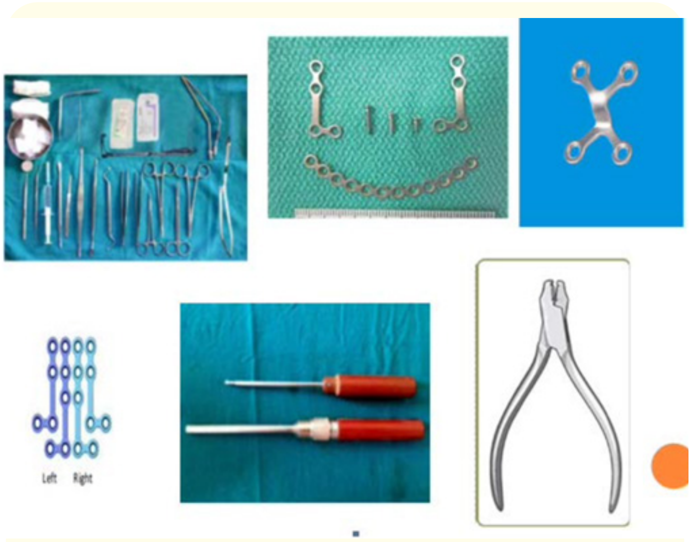


Figure 1: Basic armamentarium for open reduction and internal fixation.

Figure 2: Frontal view of the patient.

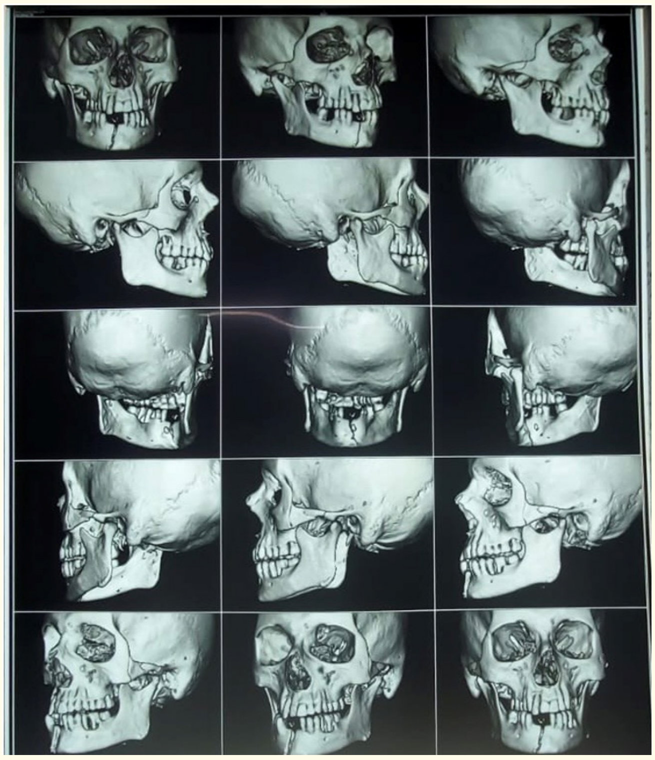


Figure 2(a): Pre-operative 3d Ct scan depicting fracture of right zygomatic-maxillary complex.

Figure 3: Intra operative view of right zygomatico-maxillary buttress showing the fracture line.

Figure 3(a): Depicting reduction and fixation with titanium miniplates and screws of right zygomatico-maxillary buttress.

Figure 3(b): Post-operative 3d CT scans of right zygoamtico-maxillary buttress region.

Figure 4: Frontal view of the patient for two-point fixation.

Figure 4(a): Pre-operative 3d CT scan depicting fracture of left zygomatico-maxillary complex.

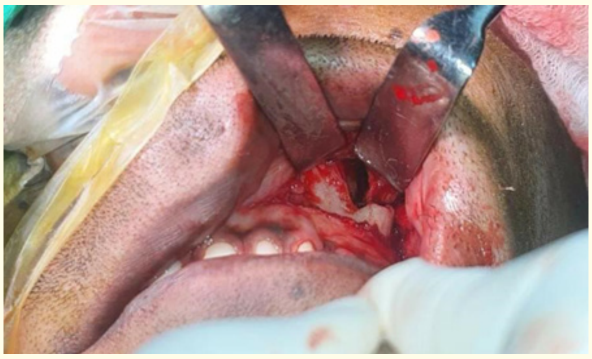
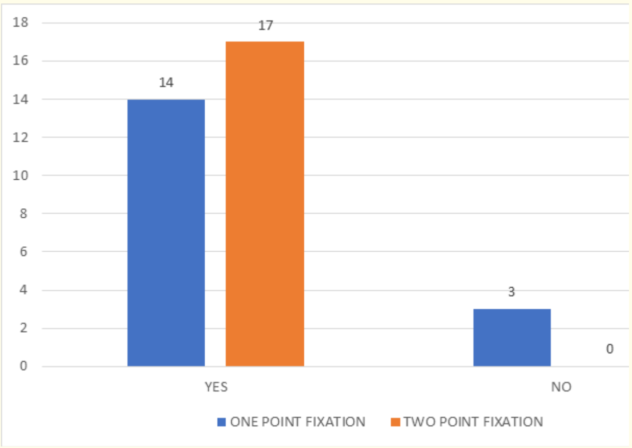


Figure 5: Intraoperative view of left zygomatico-maxillary buttress showing the fracture line.

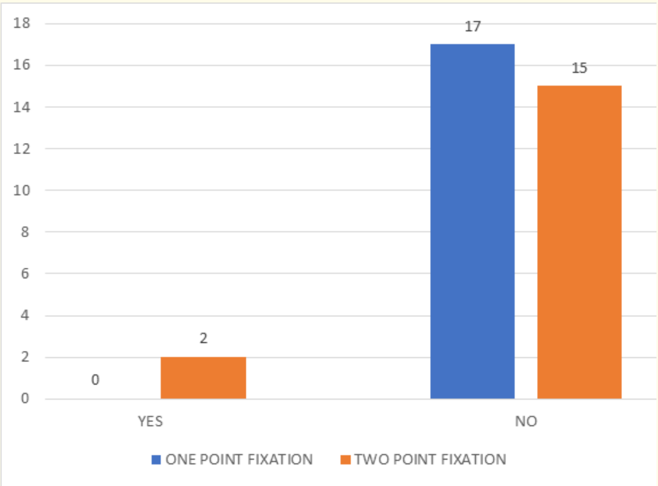
Figure 5(a): Depicting reduction and fixation with titanium miniplates and screws of left zygomatico-maxillary buttress.

Figure 5(b): Intra operative view of fractured left fronto-zygomatic suture/lateral orbital rim

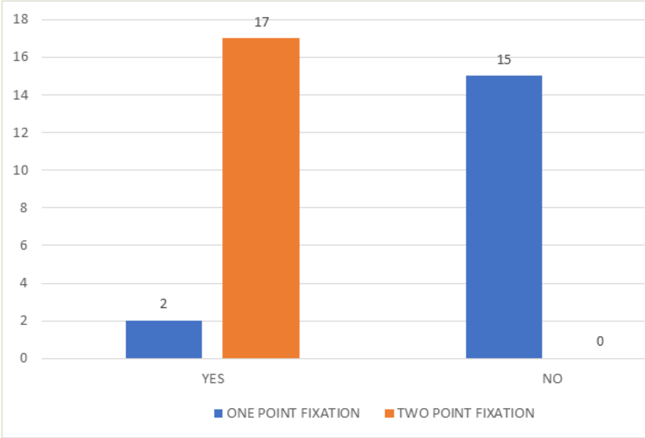
Figure 5(c): Depicting reduction and fixation with titanium miniplates and screws of fronto-zygomatic screws.



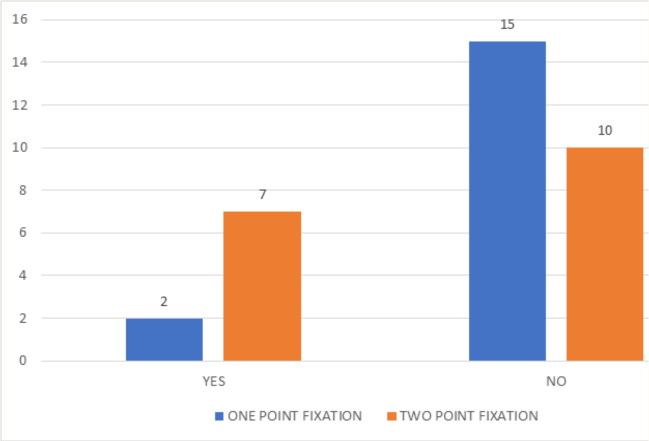
Graph 1: Comparison of stability among one point and two-point fixation.



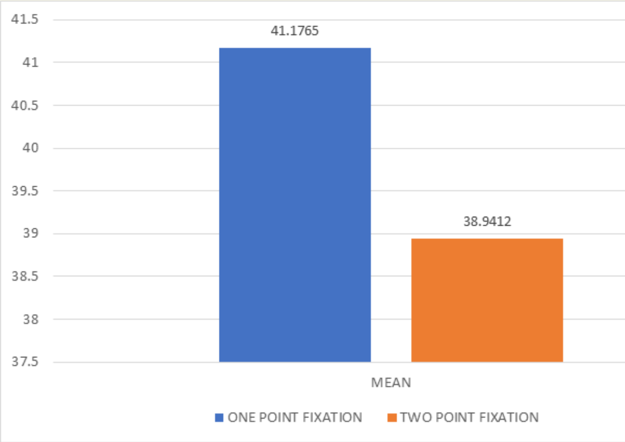
Graph 4: Comparison of complication (oedema) among one point and two-point fixation.



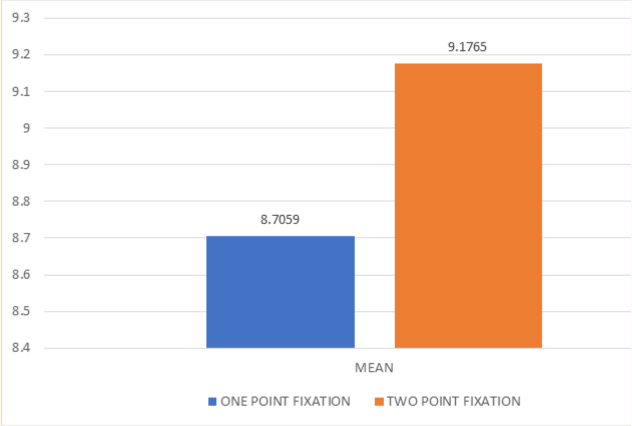
Graph 2: Comparison of scar among one point and two-point fixation.



Graph 5: Comparison of paraesthesia among one point and two-point fixation.



Graph 3: Comparison of mean of mouth opening among one point and two-point fixation.



Graph 6: Comparison of satisfactory score among one point and two-point fixation.

preciated immediately post trauma or a number of days later when the oedema has subsided [1,4].

Zygomatic arch fractures can be clinically difficult to diagnose as the only signs maybe a dimple palpable on the arch, which may or may not be tender, and or a decreased range of mouth opening. The patient's range of mouth opening should be greater than 30 mms. If mouth opening or lateral excursions of the mandible are restricted or cause pain, a malar fracture should be suspected. Palpation of the lateral and inferior rim of the orbit to assess the presence of pain or a step deformity; this may be difficult to appreciate when swollen. To assess if the malar body is tender. Intra orally to assess the malar buttress (bony curve in buccal sulcus above the first and second molar teeth) for tenderness or a step in the curvature again comparing with the opposite side [4-6].

In 1984, an author illustrated modern trends in the therapy of mid-facial trauma, which include the use of miniplates, wire osteosynthesis, and suspension wiring, bone transplantation from the contra-lateral canine fossa for orbital floor reconstruction, as well as the use of lyophilised dura placed over bony defects [11].

- **Osteosynthesis and suspension wiring:** The emphasis in treatment of facial trauma cases has shifted from external suspension to internal suspension and wire osteosynthesis. In certain structural alignments the wire osteosynthesis is replaced by miniplate osteosynthesis.
- **Orbital reconstruction:** It has now unanimously been accepted that surgical intervention is necessary for the inspection and reconstruction of the orbital floor. Artificial material such as Teflon, silicone rubber, etc., was used in the past. But as per this article the author used lyophilised dura more extensively in small defects. Bone transplantation from the iliac crest, from the contra-lateral canine fossa, or from the mandibular ramus, with or without lyodura was indicated in the reconstruction of large comminuted unstable defects. The treatment discussions included in this paper revolved briefly around antral packs, nasal splints, and primary wound care.

In the year 1986 authors described briefly about reconstruction of the buttress to maintain the position of the maxilla in its correct A-P relation and restoration of the vertical height. The methods of fixation range from wires and miniplates to immediate bone grafts. Direct exposure and fixation of all fracture sites was essential to repair. Minimal complication was reported [16].

In 1987 investigators compared the various methods of internal fixation like interfragmentary wiring, mini plate fixation. They divided the internal fixation in to three groups 1) stable, 2) Acceptably stable, 3) unstable. The fixation techniques of interfragmentary wiring, osteosynthesis, and their combinations were compared utilizing in 1- point, 2-point and 3-point fixation. They summarised the stable fixation, 3-point fixation using either mini plate alone or interfragmentary wiring alone conferred the greatest stability all methods of fixation. Mixing wires with mini plates diminished the relative stability of three-point fixation in a manner proportional to the number of interfragmentary wires used. Two-point fixation using osteosynthesis alone conferred a degree of stability comparable to most methods of three-point fixation regardless of the site of application the mini plates. certain mini plate/interfragmentary wire combinations also were stable and were characterized by the inclusion of frontozygomatic suture as one of the points of fixation. Methods of internal fixation providing acceptable stability were summarized. The remaining mini plate/inter fragmentary wire combinations and one point fixation of the orbital rim using mini plates. Some unstable methods of internal fixation were summarized which include two-point interfragmentary wiring of the lateral maxillary buttress and one or another point on the orbital rim, one-point mini plate fixation lateral buttress and one point inter fragmentary wiring [17].

In the year 1987, authors briefly described the methods of fixation with resorbable plates and screws for the unstable zygomatic complex fractures and the results showed the necessity of good stability over a long period to enable undisturbed fracture healing. Resorbable plates made up of Poly alpha-hydroxy acids such as PLLA (Poly L-lactide), PGA (Polyglycolide), PDS(Polydioxanone) The results of the operative treatment were evaluated clinically and radiographically starting immediately after the surgical procedure. Radiographic evaluation started immediately postoperatively and was repeated after three weeks and three months. Quality of anatomic reduction, quality of reduction on the radiographs, sensory disturbance of the infra orbital nerve, diplopia, limitation of the eye movement, limitation of the jaw movement, inflammation or foreign body reaction at the site of the PLLA-plate and palpability of the plate. Result was very much appreciable. Post operative healing of the wound was uneventful with no signs of inflammation or foreign body reaction. All fractures healed satisfactorily based on radiographs [13]. In 1991 authors briefly described about the fixation and complications after doing number of cases. They explained as failure to conceptualize the three-dimensional anatomy and relationships of the zygoma-lateral orbital complex will undoubtedly lead to inadequate reduction of the fractures. First, they thought the three pillars zygomaticofrontal, zygomaticomaxillary buttress and infraorbital rim had to be put in correct position in fracture reduction and fixation. For three-dimensional conceptualization considering the exact alignment of the zygomaticofrontal suture, zygomaticomaxillary buttress and infra orbital rim is crucial. The fracture pattern and the correct adaptation of the fragment borders dictate the necessary point fixation to maintain reduction [11].

In 1992 authors briefly described the classification of zygomatic complex fractures and their optional treatment modalities. They mentioned about the complications after closed or open reduction of zygomatic complex fractures. They listed as infra orbital nerve dysfunction, maxillary sinus dysfunction, minor and major asymmetry due to inaccurate reduction, Enophthalmos with diplopia, complication related to transconjunctival approach such tarsal lesion, corneal abrasion, entropion, ectropion. Finally, they described about the post operative infection and resorption and then materials used for orbital reconstruction [11].

In 1996 few renowned authors studied about isolated, unilateral ZMC fractures with minimum 6 weeks post operative follow up. Demographic information's and methods of treatments collected from the medical records. Quality of reduction was assessed by examination of post operative images Stability of repositioned ZMC was assessed by comparing immediate post operative images. Cosmetic outcomes were assessed by clinical assessment and examination of photographs. They described the adequacy of reduction, stability of fixation, orbital reconstruction and associated complications in treating ZMC fractures [12].

In another study a criterion for selective management of the orbital rim and orbital floor in zygomatic complex and midface fractures. The criteria reported herein allow surgeons to identify the minority of patients with midfacial and ZMC fractures who require an orbital exploration for optimal fracture management. Orbital exploration and its potential complication can be avoided in the majority of patients with ZMC and midface fractures without significantly increasing the risk of morbidity related to the orbital component of their fractures. They concluded that the majority of patients with ZMC or midface fractures did not require an orbital exploration as part of their fracture management. The criteria presented herein for preoperative evaluation of patients with midface trauma allowed us to identify specifically and reliably those patients who did not require an orbital exploration as part of their fracture management and, therefore, spare them the additional operative time and potential complications associated with orbital exploration [12].

In 1998 there was a change in the trends in the treatment of Zygomaticomaxillary complex fractures. He described the evolution of the procedures for treatment of these injuries from wire to miniplate semirigid fixation techniques. The development of plate and screw fixation techniques have made previous methods of fixation. The use of as thin a plate as possible has been found to be a sound principle in the management of fractures in the periorbital area. The soft tissue overlying the orbital rim is very thin, thus necessitating a thin plate to prevent visibility. The choice of a 1mm microplate versus a 1.5 mm or 2.0 mm miniplate is based on the location and displacement of the fracture. Therefore, the thinner, more adaptable, microplates may be used. The low profile of the miniplates makes their placement at the frontozygomatic suture, infraorbital rim, and zygomatic arch advantageous, whereas the miniplate is indicated for use in fixation of the zygomaticomaxillary buttress. The number of plates placed is also an important variable. Knowing whether a single plate at the zygomaticomaxillary buttress was placed via an intraoral approach or three plates (two along the orbital rim and one at the buttress) were needed would add significantly to us understanding in this area [11,12].

While occasional traumas may result in a fracture of the antral wall or orbital rim alone, the majority of injuries involve the zygomatic bone, hence the term "zygomaticomaxillary." the mandibular mobility implications. Most midface fractures are caused by trauma to the zygomatic complex, and for these fractures, early intervention is usually seen to be the best course of action [1,3].

However, external scars, plate palpability, and edema from severed muscle and soft tissue are typically the results of 1-point fixation in the FZ area by a lateral eyebrow incision. Since the soft tissue covering the FZ region is so thin, it is necessary to utilise thin plates in order to block palpability, sensitivity, and visibility. There are no noticeable scars on the outside or discernible screws or plates following one-point fixation in the ZM region. Furthermore, there are no visible scars from a buccogingival incision once plates or screws are taken out. Recurring lateral eyebrow incisions may increase the likelihood of leaving visible scars [2,6,8].

In ZMC fractures, maintaining reduction is the goal of bone repair for both practical and aesthetic reasons. Studies on biomechanics have tried to identify the forces operating on the ZMC and how they can impact fixation methods. Although the masseter is the primary muscle responsible for ZMC displacement, its actual impact on the result of surgery remains a matter of controversy. When a ZMC fracture lasts four to six weeks, Dal Santo., *et al*. showed a substantial reduction in ipsilateral masseteric force. Furthermore, elevating masseteric attachments from the zygoma using an intraoral method to exposure may potentially have an impact on muscle performance. Asymmetry following reduction is found to be between 10 and 13%. Fracture instability is not as likely to be the cause of this malar asymmetry as it is imprecise reduction [2,6,7].

A fragmented zygoma can be stabilised by the superficial musculoaponeurotic system, the skin, and the uninterrupted periosteum, however Tarabichi pointed out that in vitro experiments are misleading since they lack serration along the orbital rim. showed good outcomes for 1-point fixation of malar fractures and transsinus reduction through the comminuted anterior wall of the sinus. According to Fujioka., *et al*. in vivo investigation, 1-point fixation at the zygomaticomaxillary compartment was sufficiently resistant when the fracture was not comminuted and 3-point alignment was established [4,8].

Therefore, if it is not difficult to limit displacement of the F-Z process and a comminuted fracture of the infraorbital rim and zygomatic arch using ultrasonography, 1-point fixation at the ZMB area should be sufficiently robust for tripod fractures. If the lateral orbital rim is comminuted, two-point fixation in the ZMB and an extra lateral canthal incision in the F-Z compartment should be performed.

Conclusion

According to our research, the zygomatico-maxillary complex can be sufficiently stabilised by 1-point fixation at the ZMB without suffering from comminuted fractures of the lateral orbital rim. Additionally, in certain patients with zygomatic tripod fractures, one-point fixation in the zygomatico-maxillary buttress region can prevent ugly scars and provide excellent surgical outcomes.

When there is a small preoperative bone gap in the F-Z area, single point fixation in the ZM area is preferable; however, when there is a large bony gap in the FZ area, two-point fixation is preferable. However, the scar in the FZ area and the palpability of the prosthesis there make the two-point fixation patients unhappy.

In the FZ area, absorbable plates or microplates could be employed to prevent the prosthesis from being palpable. It is an excellent fixation by intraoral maxillary vestibular technique (Balasubramanian's or Keen's Intra oral approach) to prevent multiple surgical incision, probable infection, additional scar, and nerve palsy. For ZMC minimally displaced fractures with little post-operative problems, ZM buttress fixation is considerably superior.

Study Limitations

Since each author's assessment of the parameters was different, it was impossible to standardise them for comparison. Kim., *et al*. (2017) found no statistically significant variations in postoperative stability between the two groups (two-point fixation and three-point fixation) in one research.

Although a few of the authors failed to indicate which type of fixation was superior in their analysis, they concluded that the best way to treat ZMC fractures is to use a safe, facilitated procedure because there are many fixation techniques available.

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