

Original Research Article

MANAGEMENT OF INJURIES OF THE MALAR REGION

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ABSTRACT

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Background: Injuries over the Malar region following Road Traffic accident are a common presentation to the Emergency department. Thin integument, proximity to vital structures like eyes, nose, mouth etc, complexity of the wounds makes the reconstruction in this area challenging. Thorough debridement followed by careful assessment of the wounds and choosing appropriate reconstructive procedure yields good functional and aesthetic outcome. **Aim:** To study the various reconstructive options for the coverage of injuries over the Malar region.

Materials and Methods: This is a Retrospective study, we considered a total of 15 such patients in the age group ranging from 17 to 64 years over a period of 1 year at our institute, taking into account the gender (13 male and 2 female), site, size, associated injuries, type of surgical procedure and outcome.

Results: Among these 15 patients, Advancement flap cover was performed in ten cases (Mustarde's flap (5) and V-Y flap (5)), followed by Anatomical Closure (2), Reading-Man's flap (1), McGregor flap (1) and Fricke [Transposition] flap (1). The most common associated injury was eyebrow injury, noted in 6 cases, followed by forehead injury and Eyelid injury (3 cases each); Minimal incidences of complication noted). Complications were minimal, such as suture line dehiscence, seen in 2 cases and lid lag in one.

Conclusion: Facial injuries due to RTA or any other aetiology involving Malar defects and associated periorbital area injuries need to be meticulously debrided and assessed to plan and choose from a multitude of available procedures from the reconstructive armament of a plastic surgeon to provide reliable, stable soft tissue coverage and to address functional deficit along with adjacent soft tissue distortion to provide appropriate function and cosmesis.

Keywords: Malar injuries, Facial injuries, Aesthetics.

INTRODUCTION

Injury to the face, especially the malar area, is a common presentation to the Emergency department. The most common causal factor is a fall onto the face from an open vehicle such as a motorcycle, either while riding or Pillion riding, onto the roadside or a blunt injury to face while inside a closed vehicle, both as a result of a road traffic accident. Traumatic injuries of the malar region and adjacent facial subunits such as lateral aspects of upper and lower eyelids, forehead, eyebrow, temple, cheek, and external ear are a common presentation from a fall from a motorcycle and drag along the roadway resulting in varying depths of injury.

The malar area, being one of the prominent aesthetic subunit of the face, often referred to as the malar region or zygomatic area, is the anatomical area overlying the cheekbone (zygomatic bone) and a portion of the maxilla. It is one of the four main aesthetic subdivisions of the cheek region, lying superolaterally, contributing to the most recognisable features of the midface contour and prominence termed the 'malar eminence'.

Malar (from modern Latin malaris, from Latin mala: 'jaw' or 'cheekbone') is located on the upper, lateral, and anterior prominence of the cheek, bounded superiorly by the infraorbital rim (lower eyelid-cheek junction) and zygomatic arch, and medially by the nasolabial fold with an underlying bony prominence of the zygomatic bone (malar eminence) and the

overlying subcutaneous fat pad. The zygomaticus major and minor muscles, which are crucial for facial expression (smiling), arise from this area. Skin over this area is thin, and as it is directly over the bony prominence is more prone to avulsion injury with subject to shearing, crushing, and frictional force from the point of contact. Contamination by roadside dirt and gravel needs thorough wound Debridement followed by meticulous repair. A variety of local flap procedures, such as Advancement (V-Y, Y-V, Mustarde, Reading man flap), Rotation, Transposition, or combination, are employed, depending on the anatomic location, wound width, and wound depth. Malar injuries: most cases present with associated injuries (abrasions or lacerations) of the forehead, Eyebrow, Eyelids, Lateral canthus, Cheek, Lateral Nasal wall, lips, and Commissure of the mouth. There may be an associated bony injury Displaced / Undisplaced Fractures of the zygoma, maxilla, or Infraorbital rim, which are addressed accordingly to maintain symmetry of the face (cosmesis) as well as functionality. The repair of injuries over the malar region is often challenging. Potential complications of reconstructions in these areas include displacement or retraction of adjacent structures.

MATERIALS AND METHODS

This is a retrospective observational study of all the patients with Malar area injuries presented to the Department of Plastic and Reconstructive Surgery, Siddhartha Medical College, Vijayawada during the period of One year that is from March 2025 to March 2026.

Inclusion Criteria

- All patients with Malar injuries with or without other associated injuries.

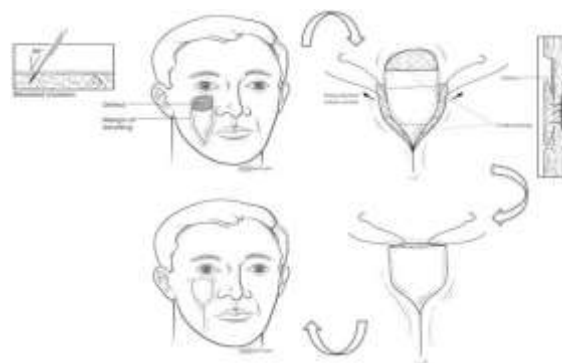
Exclusion Criteria

- Cases of polytrauma
- Immunocompromised patients.

In this study, thirteen of the fifteen cases are male, and two are female; the youngest is seventeen years old, and the oldest is sixty-four (mean age of 35.6 years). There are five cases with injuries on the left side of the face and ten with injuries on the right. The range of defect sizes is 1.8 cm x 1.0 cm to 3.6 cm x 0.8 cm. The most popular technique is the Advancement flap cover in ten cases [Mustarde's flap (5) and V-Y flap (5)], followed by Anatomical Closure (2 cases), Reading Man's flap (1), McGregor flap (1) and Fricke flap (1). The most frequent related injury was an eyebrow injury noted in 6 cases, which was followed by an eyelid injury (3 cases) and a forehead injury (3 cases). Minimal complications were noted, such as Suture line dehiscence observed in two cases and Lid lag in one case.

Operative Methods V-Y advancement flap can transpose the lower cheek tissue reservoir upward, preserving cosmetic units of the mid-face. The technique involves advancing a broadly based

triangular flap of skin toward the defect while maintaining its vascular supply. The “V” shape is incised, and upon advancement, the tissue is sutured into a “Y” configuration.^[1]



Design of the V-Y advancement flap. (*Above, left*) Limbs of the V are drawn such that the medial limb is oriented immediately adjacent to and in parallel with the nasolabial fold. The subcutaneous dissection is bevelled slightly outward at approximately 30 degrees. (*Above, right*) Both the leading and trailing edges of the flap are undermined for a short distance, allowing the flap to be freely mobile on its subcutaneous pedicle. The inferior portion of the donor site is closed, forming the base of the Y. A staircase pattern of deep dermal suturing is then performed, alternating between both limbs of the flap to advance it superiorly. (*Below, right*) The leading edge of the flap is closed to the superior margin of the defect under no tension. (*Below, left*) Final appearance of the flap after inset.^[2]

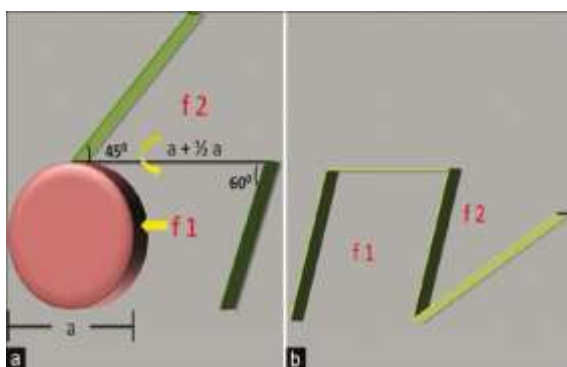
When using the Mustardé-technique, the skin is incised from the cranial defect pole laterally along the zygomatic arch and then downwards along the preauricular skin. The generously mobilized flap is then rotated medially into the defect and in addition, fixed at the lateral upper corner to avoid tensile stress perpendicular to the lid. If needed, a compensatory triangle is removed caudally to the primary defect. The Mustardé technique is a modification of the cheek rotation flap according to Esser (1918). In Esser's flap, the incision runs infraorbitally from the lateral defect edge into the temporal region. The incision is continued along the lateral hairline towards the preauricular region. In contrast to the Mustardé technique, the incision ends submandibularly. Temporal, preauricular or mandibular skin can be resected with a Burow triangle.

The Mustardé technique, used since 1964, involves a rotational flap from the cheek to resurface the anterior lamella of the lower eyelid. This flap provides excellent skin match in terms of texture and color given the proximity of donor tissue, as well as robust vascularity and a minimized risk of flap necrosis. It is particularly advantageous for elderly patients or those with significant lower facial skin laxity, where cheek advancement is more easily obtained. Another great advantage of this technique is its ability to be

executed in a single stage. It can also be performed in combination with canthopexy. Also, it can be combined with other techniques which address the reconstruction of the posterior lamella and provides full-thickness restoration. However, drawbacks include potential flap bulkiness, ectropion due to poor planning and insufficient recipient site coverage, distortion of the malar contour, and damage to the facial nerve with consequent facial asymmetry.^[14]

The modified Fricke's cheek flap represents a regional adaptation of the classical forehead-based Fricke flap, designed to provide better colour and texture match, improved flap mobility, and reduced donor-site deformity. Assessment of the size, location, and orientation of the periorbital defect, flap marking, followed by planning of flap length to equal or slightly exceed the horizontal dimension of the defect to avoid tension during the inset. Flap width is matched to the vertical defect height to ensure adequate coverage. The flap is outlined horizontally along the infraorbital or cheek crease in accordance with relaxed skin tension lines (RSTL) to optimize scar placement. The base of the flap (medial or lateral) is based on the most favourable vector of transposition and tissue availability. A broad pedicle was preserved to protect perforators. The length-to-width ratio was maintained at a maximum of 4:1, and flap width limited by the feasibility of primary donor-site closure.^[3]

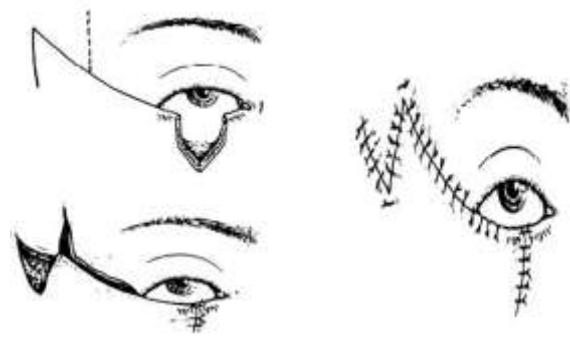
Reading Man's Flap cover -After determination of the relaxed skin tension lines in the defect area, two skin flaps are designed in an unequal Z-plasty manner. Once its direction was decided, the central limb of the unequal Z-plasty was drawn as an imaginary tangential line passing through the margin of the defect. The length of the central limb of the Z-plasty was designed to be 50% longer than the diameter of the circular defect. Beginning from the free end of this line another imaginary line is drawn with an angle of 60°. Then beginning from the other end of the central limb our third imaginary line was drawn with an angle of 45°. The two skin flaps were elevated as fasciocutaneous flaps and one flap was moved to the defect and the other was transposed to cover the first flap's donor site.^[5,15]



For Mc Gregor flap, a lateral incision following the curvature of the eyelid, which extended to the anterior region of the pre-auricular hairline, with the length of

the incision being dependent on the width of the defect to be compensated. The curvature of the incision was important to provide a vertical length appropriate to the flap.

“Z” plasty was performed at the lateral end of the incision, with the width of the defect corresponding to the central limb of the Z. The lateral descending limb and the ascending limb of the Z had the same length as the common limb and formed an angle of 60° with the latter. The detachment of the flaps followed the subcutaneous dissection plane. Lateral canthotomy was performed for advancement of the flap and covering of the eyelid defect. After interpolation of the flaps, any excess skin was trimmed.^[13]



Eyelid reconstruction following subtotal resection of the upper or lower eyelid. Adapted from McGregor IA. Br J Plast Surg. 1973;26(4):346-54



Patient with a Malar defect and Forehead Laceration

A 36-year-old male presented with right sided forehead laceration along with Right malar injury sustained due to fall from a fast-riding motorbike while pillion riding. Thorough wound debridement carried out followed by V-Y Advancement flap coverage, postoperative healing is good with no complications.



Patient with a Malar defect, Eyebrow laceration and forehead laceration

A 44-year-old male patient presented with an associated right eyebrow and forehead laceration along with right malar injury sustained due to assault with a wooden stick. Thorough wound debridement carried out followed by Mustarde' flap coverage performed, no postoperative complications were noted.



Patient with Malar defect with no associated injury

A 64-year-old male patient presented with right malar injury due to fall from a motorbike. Thorough wound debridement carried out and the defect was covered using a V-Y Advancement Flap cover, postoperatively wound healed well with minimal scar and with no complications.



Patient with a Malar and lower eyelid laceration

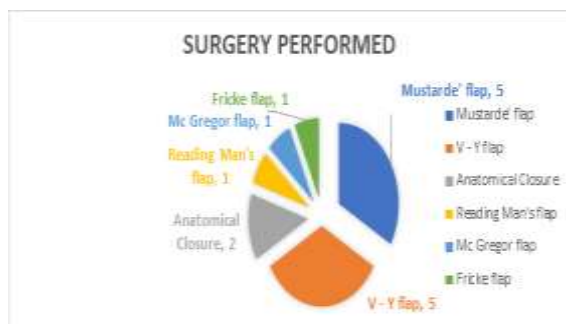
A 36-year-old male patient presented with an associated eyelid laceration along with right malar injury sustained due to road traffic accident. Wound debridement carried out followed by McGregor flap coverage performed. No postoperative complications were noted.



Patient with a Malar and lower eyelid defect

A 37-year-old male patient presented with an associated lower eyelid defect along with right malar injury sustained due to road traffic accident. Wound debridement followed by Fricke (transposition) flap was planned for soft tissue defect. No postoperative complications were noted, immediate postop picture is as shown

S No	Age (years)	Sex	Side	Defect Size(cm)	Associated Injury	Surgery Performed	Complications
1	64	M	Right	2.8 X 1.5		V-Y flap	
2	48	M	Right	2.4 X 1.2		Mustarde' flap	Suture line Dehiscence
3	19	F	Right	2.2 X 1.4	Forehead laceration	V-Y flap	
4	44	M	Right	3.2 X 1.2	Eyebrow laceration	Mustarde' flap	
5	38	M	Left	1.8 X 1.1	Eyebrow laceration	Mustarde' flap	
6	36	M	Right	1.8 X 1.0	Temple defect and Forehead abrasion	Reading Man's flap	
7	35	F	Left	3.0 X 1.6	Scalp defect	Mustarde' flap	
8	28	M	Left	2.6 X 0.9		Anatomical closure	Trapdoor effect
9	24	M	Right	3.6 X 0.8	Nose lateral walls and Eyebrow laceration	Anatomical closure	Suture line Dehiscence
10	43	M	Right	1.8 X 1.4	Forehead and Eyebrow laceration	V-Y flap	
11	24	M	Left	2.0 X 1.2	Eyebrow and Eyelid laceration	Mustarde' flap	Lid Lag
12	26	M	Right	2.1 X 1.8	Eyebrow laceration	V-Y Flap	
13	36	M	Right	1.6 X 1.2	Eyelid laceration	Mc Gregor Flap	
14	37	M	Right	3.2 X 2.4	Lower eyelid defect	Fricke [Transposition] Flap	
15	34	M	Left	3.0 X 2.0	Forehead Abrasions	V-Y Flap	



Complications - "Trap door" deformity, dog ear formation, ectropion, and side bun displacement

DISCUSSION

Several studies have explored techniques for closing defects in the malar region of the face. In 2011, Mehmet Mutaf et al. reported using unequal Z-Plasty (Reading Man procedure) in 18 patients (11 male, 7 female) over five years.^[4] The following year, Cecchi R et al. published a letter on the Reading Man flap for circular defect closure in a study of 12 patients (7 male, 5 female).^[5] In 2015, Pradeoth Korambayil Mukundan et al. shared their experience with the McGregor flap in 9 patients (7 male, 2 female) over a period of one year.^[12] Our study treated 15 patients (13 male, 2 female) over a period of one year using various methods such as Advancement flap cover in ten cases {V-Y flap (5), Mustardé flap (5)}, Anatomical Closure in two, Reading Man's flap (1) and Mc Gregor flap (1), Fricke [Transposition] flap (1) to ensure stable coverage of raw areas in the malar region.

CONCLUSION

The most frequent cause of facial injuries is still road traffic accidents. The common presentation of these injuries is of mixed variety, where there can be tissue loss, grazed abrasion, crush component, avulsion of the soft tissue, tissue retraction and detachment from the periosteum. A plastic surgeon must show good judgement and acumen while assessing and designing a surgical plan for such injuries. There are a multitude of measures available to give stable and reliable soft tissue coverage for a malar defect and associated raw area in facial injuries, which aid in simultaneously addressing both functional deficit and distortion of the adjacent tissue. Major factors to consider while choosing a particular method are the size of the defect in all dimensions, shape and location of the defect, viability of surrounding tissues, tissue deficit and laxity of available surrounding soft tissue. Thorough debridement followed by evaluation of these factors, design planning, occasionally with modifications, and maintaining a backup to handle potential issues are crucial.

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