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# COMBINED TRANSCONJUNCTIVAL AND TRANSCARUNCULAR APPROACH FOR REPAIR OF LARGE ORBITAL FLOOR AND MEDIAL WALL FRACTURE: A CASE REPORT

**Dr. Neha Umakant Chodankar[1], Dr. Vikas Dhupar[2], Dr. Francis Akkara[3]**

*1. Resident, Department of Oral and Maxillofacial Surgery, Goa Dental College and Hospital, Bambolim Goa- 403202*

*2. Professor and head, Department of Oral and Maxillofacial Surgery, Goa Dental College and Hospital, Bambolim Goa- 403202*

*3. E*

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**Corresponding author**
**Dr. N. U. Chodankar***
Corresponding author

**ABSTRACT**

A variety of approaches have been documented in the literature for accessing the orbital floor and medial wall fractures. Several transcutaneous approaches were used traditionally, to access these regions. However, significant postoperative complications associated with these approaches have been reported. The transconjunctival approach was introduced to overcome these complications. However, the medial wall of the orbit was found to be difficult to gain access to, due to the vital structures in this area. The Lynch incision was the conventional approach of choice for access to the medial wall of the orbit. However, since 1998 the transcaruncular approach kept gaining popularity. The combined transconjunctival and transcaruncular approach to gain access to these fractures have recently been reevaluated. We present a case of a patient with orbital floor and medial wall fractures secondary to trauma where a combined transconjunctival and transcaruncular incisionweres used.

**CASE REPORT**

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## INTRODUCTION

The selection of any surgical approach depends upon the type of injury, availability of equipment and surgeons' experience. Traditionally, transcutaneous approaches were introduced for gaining access to orbital floor and medial wall fractures(1,2). However, these approaches have been associated with a significant number of complications reported in the literature, which include ectropion, scleral show, and eyelid retraction(3). Tenzel and Miller first employed the transconjunctival incision to gain access to small orbital floor fractures. However, with the progressive use of the transconjunctival incisions, there was a drastic reduction in the rate of complications(3).

Gaining access to the medial wall of the orbit is a daunting task due to the existing structures in this area. Since the last decade,

the transcaruncular approach described by Garcia et al has gained popularity over the traditional Lynch incision, as a safe, scar-free approach to the medial orbit while providing excellent exposure(4). The transcaruncular approach may be easily combined with the transconjunctival approach. These two approaches can be combined in large orbital blowout fractures where wide access to the medial orbit and orbital floor is required(5). We present a case of a patient with a large orbital floor and medial wall fracture where a combined transconjunctival and transcaruncular approach was used.

**CASE PRESENTATION**

A 34-year-old male patient reported to our patient department with the alleged history of a road traffic accident. He reported sustaining a direct collision of his two-wheeler with a truck 15 days prior to presentation, resulting in an impact to his head and face. He was not wearing a helmet at the time of impact. He gave a history of loss of consciousness, vomiting and limb injury at the time of presentation. He also gives history of being admitted under Neurosurgery followed by Orthopaedic departments for treatment of the same. The patient was then referred to us once deemed fit to undergo surgical management under general anesthesia. A detailed ophthalmic examination revealed no gross visual disturbances.

On extraoral examination, we noted a swelling over the left zygomatic region. Multiple healed lacerations were noted over the infraorbital region and forehead. We found no obvious subconjunctival hemorrhage, or chemosis. Gross ocular dystopia was noted (Fig 1). An enophthalmos of >5mm was noted using a Hertels exophthalmometer(Fig The patientient complained of diplopia in the primary and left lateral gazes but exhibited normal ocular movements in all gazes(Fig 3).

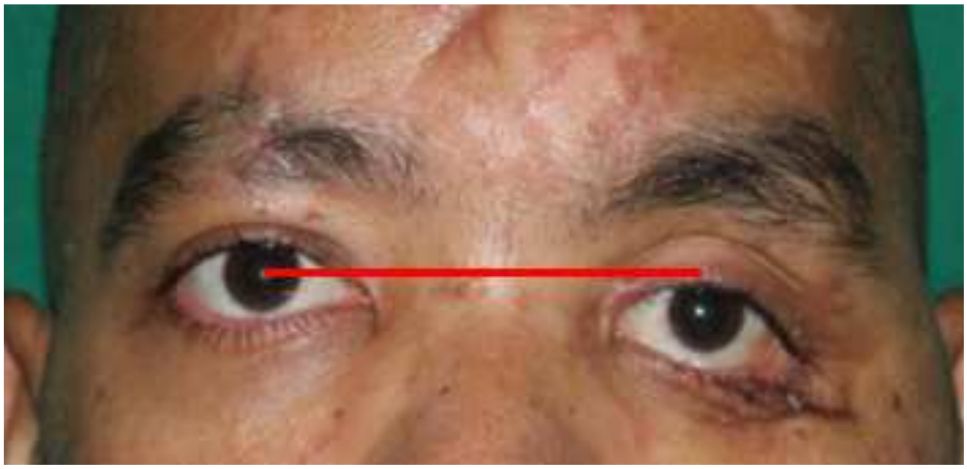

**Fig no 1:** Frontal view photograph showing asymmetry and ocular dystopia

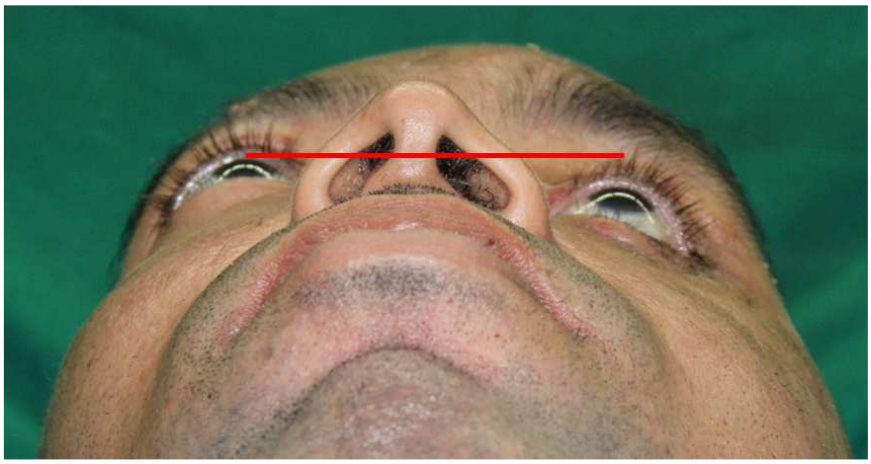

**Fig no 2:** Worms eye view photograph showing Enophthalmos and loss of malar

**Fig no 3:** Normal ocular movements in nine gazes

An intraoral examination revealed a normal occlusion; we saw no signs of fracture. The temporomandibular joint movements were normal, and there was no restriction in Mouth opening. We noted tenderness and step deformity in the left zygomaticomaxillary buttress, frontozygomatic region, and infraorbital rim.

A computed tomography scan revealed a frontal bone fracture and fractures of his left ZM buttress, infraorbital ri,m and F-Z regions. A large orbital floor and medial wall fractureweres also noted (Fig 4-7).

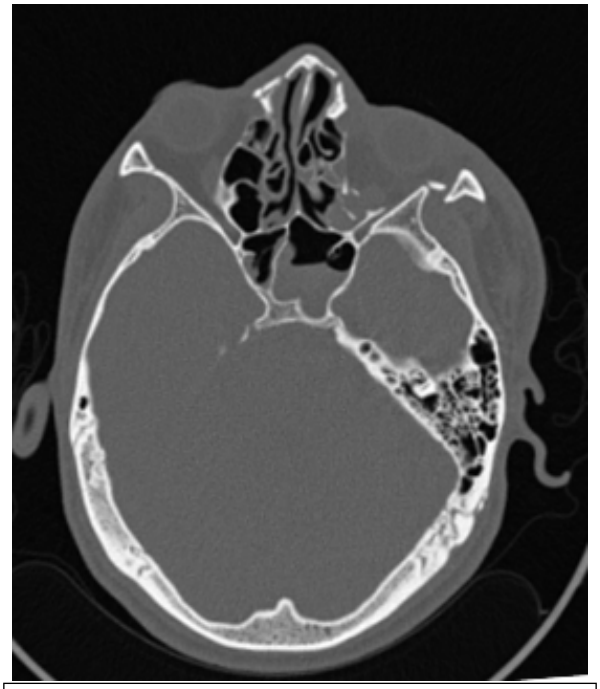

**Fig no 4:** Axial section of CT scan showing Left Medial and lateral orbital wall fracture

**Fig no 5**- Sagittal section of CT scan showing orbital floor defect

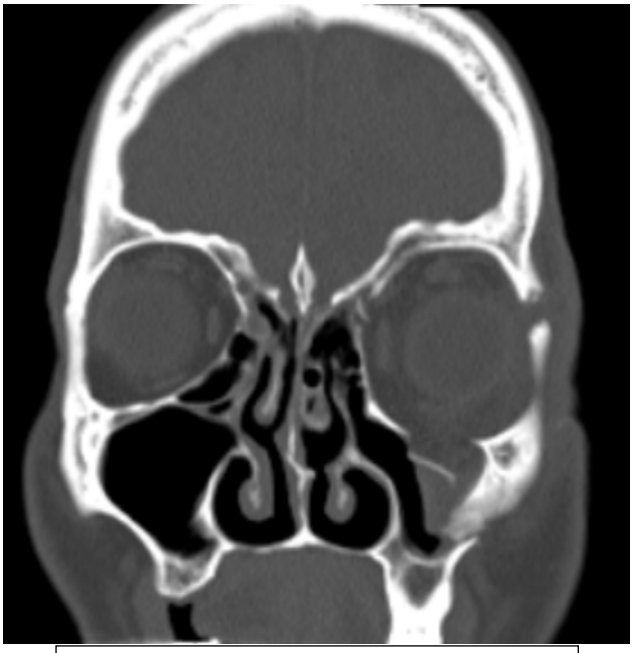

**Fig no 6-** Coronal section of CT scan showing orbital floor defect

**Fig no 7**- 3D reconstruction of CT scan

Open reduction and internal fixationweres doneabouto the frontal bone fracture and left ZMC fracture under general anesthesia. A 0.5 cm linear incision was made in the skin in lateral the crease of the eye followed by subcutaneous tissue dissection until the orbicularis oculi muscle was identified. Lateral canthotomy and cantholysis of the inferior limb were formed with Stevens scissors. A corneal shield was placed to protect the eyeball. The inferior rectus muscle was tagged. A swinging lid incision was made along the inferiofornicalal conjunctiva and was extended medially along the transcaruncular approach (Fig 8-10). Dissection was done in the retroseptal plane to reach infraorbital rim. Periosteum was incised and subperiosteal dissection was done to expose infraorbital rim fracture (Fig 11).

Subperiosteal dissection was carried out along the floor and medial orbital wall. The extent of the fracture was identified. Prolapsed orbital tissues were released. Dissection was continued posteriorly along the junction of floor and medial wall to expose the Posteromedial ledge. A preformed orbital mesh plate was placed along the defect and was stabilized over the posteromedial ledge. The position of the implant was checked along the floor and medial wall. Implant was secured using two 1.5mm titanium screws. Corneal shield and inferior rectus tagging suture was removed (Fig 12-15).

Periosteum was sutured with 6-0 Vicryl sutures and conjunctiva was not sutured. Lateral canthopexy and lateral canthus was reformation was done using 6-0 Vicryl sutures. All skin incisions were closed with 5-0 Ethilon suture after suturing muscle layer. Eyelid traction suture was removed(Fig 16).

**Fig no 8**- Lateral Canthotomy followed by marking of Transconjunctival Incision

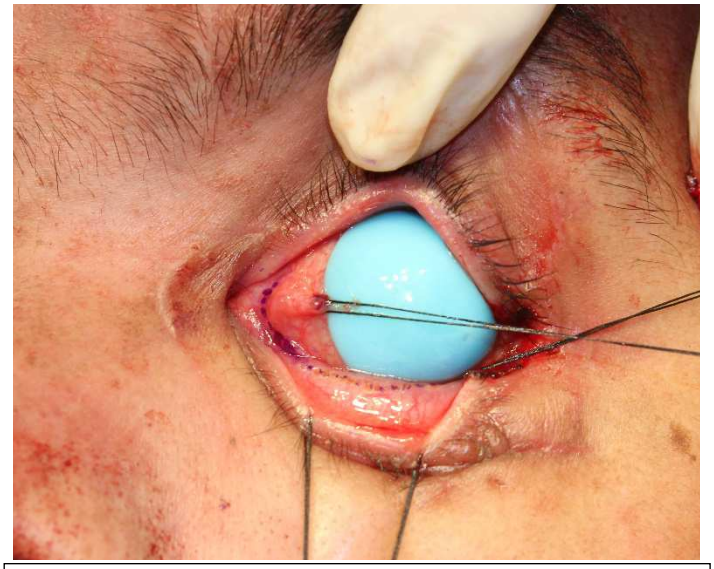

**Fig no 9**- Marking of Transconjunctival and Transcaruncular Incision

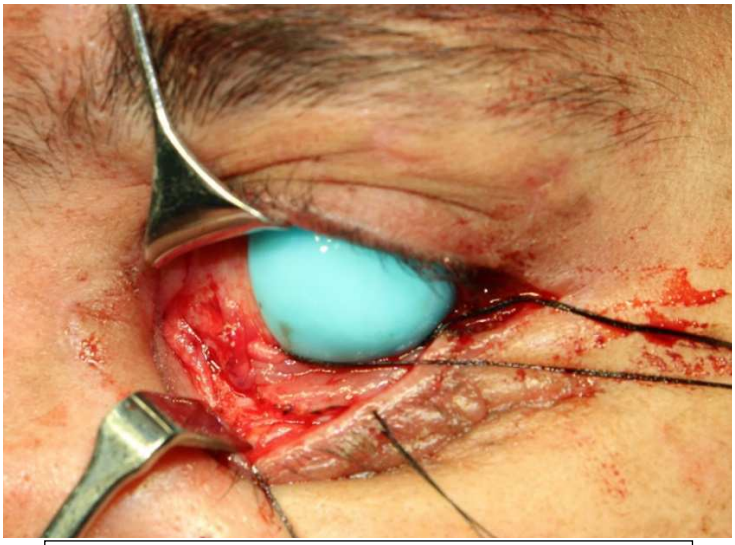

**Fig no 10** - Transconjunctival with Transcaruncular incision

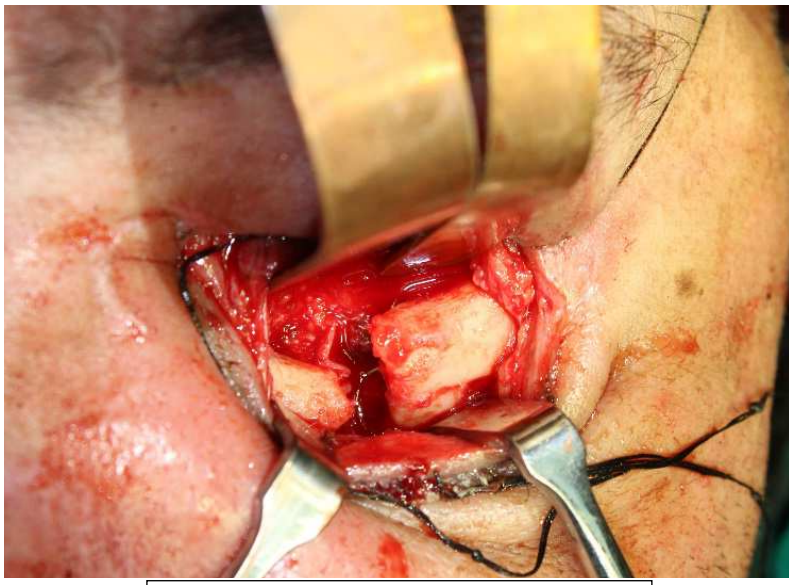

**Fig no 11-** Exposure of infraorbital rim fracture

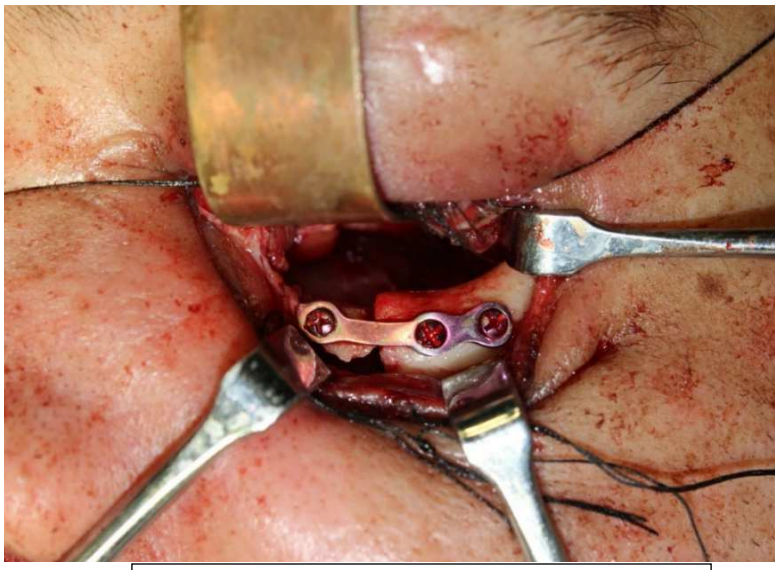

**Fig no 12**- Fixation of Infraorbital fracture

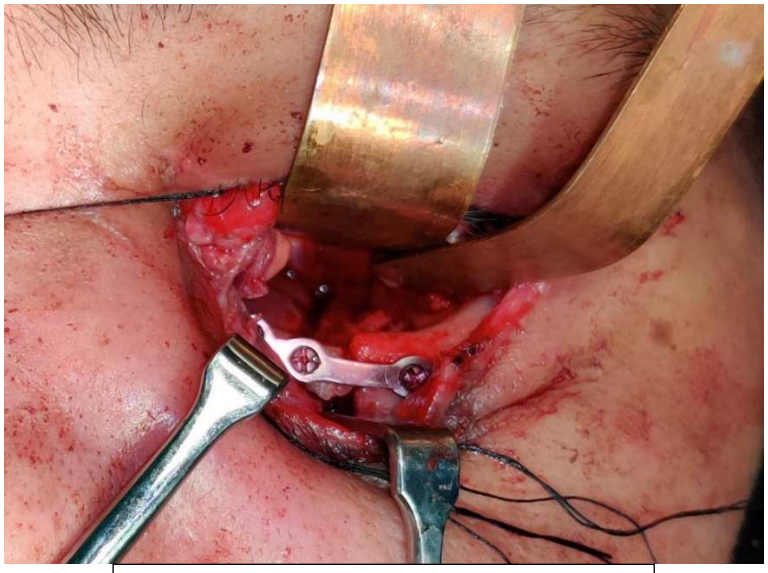

**Fig no 13**- Orbital floor fracture

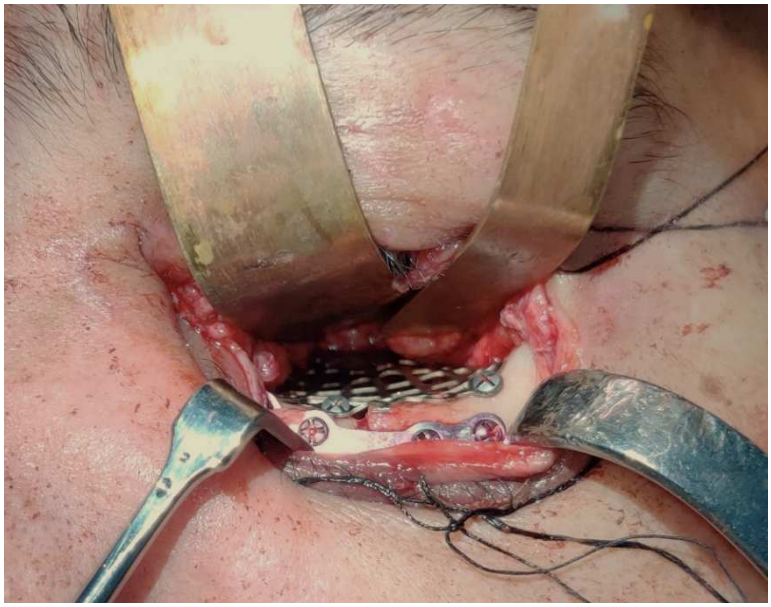

**Fig no 14**- Orbital floor defect reconstruction

**Fig no 15**- Medial wall reconstruction

**Fig no 16**- Closure

**Fig no 17-** Postoperative frontal photograph showing improvement of ocular dystopia

**Fig no 18**- Postoperative Worms eye view showing improvement of enophthalmos

**Fig no 19-** Postoperative nine gaze positions


**Fig no 20-** Axial section of CT scan showing repair of medial wall defect


**Fig no 21-** Sagittal section of CT scan showing repair of orbital floor defect

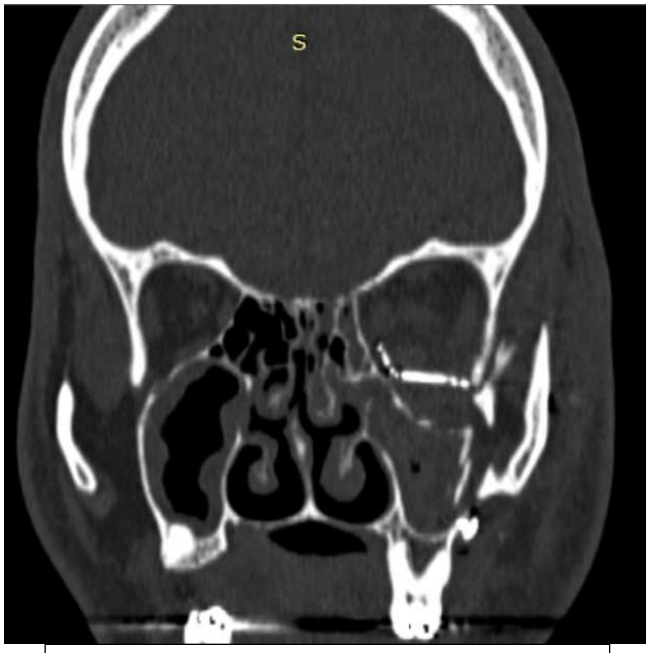


**Fig no 22**- Coronal section of CT scan showing repair of orbital floor defect

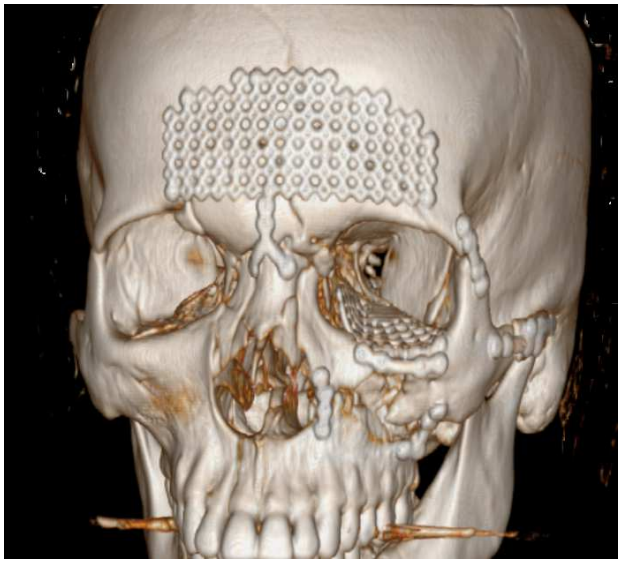

**Fig no 23-** Postoperative 3D reconstruction of CT scan

## DISCUSSION

Transcutaneous approaches to the orbital floor include the subciliary, subtarsal, and infraorbital approaches while the traditional approach to the medial wall was by the Lynch incision(1,2). Werther advocated the use of the infraorbital incision for cases with marked edema which could hinder the

accurate placement of subciliary or subtarsal incisions(6). However, a higher incidence of scleral show and ectropion has been reported with a subciliary incision than with a transconjunctival approach by Patel et al. and Appling et al(7,8). The subtarsal incision has its own advantages in terms of speed and easy access, nevertheless, obvious scarring and persistent edema have been reported(9).

We used a combined retroseptal transconjunctival and transcaruncular approach for access in this case. In the preseptal approach, the orbital septum is incised below the tarsus and followed down to the orbital rim(3). A lateral canthotomy incision may be added for exposure of the lateral wall. This allows 270 degrees of dissection along the medial, inferior, and lateral walls of the orbit along with access to the F-Z suture(2,10). This approach avoids the violation of the orbital septum, hence reduces the chances of lower eyelid malposition.

The amount of exposure was enough to repair the large defect. The greatest advantage was that it provides a scar-free, direct access. The patient was evaluated six weeks postoperatively and we found no overt complications. However, the patient exhibited 2 mm of scleral show and mild ectropion which we attributed to contracture of the overlying scar. There were no visual complaints. Enophthalmos and hypoglobus were corrected adequately. Diplopia was corrected. Postoperative CT scan revealed acceptable reconstruction of the defect.

This technique is anatomically safe and efficient, with a superior cosmetic result. Without adequate exposure, insertion and placement of the large orbital implant over the fracture may be limited and difficult. Another benefit of the approach is that the inferior platform, on which the orbital implant is placed, can be visually confirmed during the operation. A transcaruncular extension of the incision preserves the integrity of the lacrimal system while providing as much exposure to the medial orbit as the Lynch approach. Nonetheless, this approach is technique sensitive and has a steep learning curve.

## CONCLUSION

The combined transconjunctival and transcaruncular approach prove to be an effective and esthetic surgical approach to access large orbital floor and medial wall fractures. It allows satisfactory exposure for repair of large orbital defects with minimal postoperative morbidity. Adequate training, sound knowledge of the applied orbital anatomy and meticulous surgical handling are crucial in executing this technique. This technique could be the mainstay approach in the future for accessing large orbital medial wall and floor fractures.

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