

## A Case of Contracted Socket Reconstruction in Rural Part India

### ABSTRACT

An empty orbit can result in facial disfigurement and, thereby, has an emotional and psychologic impact on the patient and can lead to an economic setback. Treating the patient with an orbital reconstruction can help the patient to live a normal life and gain acceptance in society. Reconstruction of a severely contracted anophthalmic socket is a challenge for an ophthalmic surgeon as there is shrinkage of orbital tissue with shallow fornices and deep superior sulcus and can give rise to a cosmetic anomaly. In our case, we could correct to a maximum extent the cosmetic defect arising due to enucleation following trauma except some amount of dystopia in a 26-year-old male by dermis fat grafting which gave the patient cosmetic satisfaction. Even though the surgery was performed as per the usual recommended technique, it was a novel surgery for us as it was performed in a rural setup with limited resources and minimal expertise support.

**Key words:** Anophthalmic socket, Contracted socket, Dermis fat grafting, Orbital prosthesis, Orbital reconstruction

### INTRODUCTION

The facial expressions and esthetics of an individual greatly depend on the eyes.<sup>[1]</sup> Following enucleation and evisceration or orbital exenteration, the patient can suffer from psychological stress.<sup>[2]</sup> Rehabilitation of such patients by giving them a normal appearance by reconstruction of the anophthalmic socket is the main goal of an oculoplastic surgeon. Esthetics and facial symmetry can be restored by replacing the empty socket with an artificial implant or prosthesis. This reconstruction can help the patient to have an improved lifestyle.<sup>[3]</sup> There are multiple risk factors involved in the development of a contracted socket which includes failure to wear prosthetic for prolonged periods, radiation exposure, infection, severe injuries (chemical/trauma), prior orbital surgery, poor surgical technique like destruction of conjunctiva, and autoimmune diseases like Stevens-Johnson syndrome/toxic epidermal necrolysis. Difficulties that could be faced while surgically correcting a contracted socket could vary from unacceptable cosmetic appearance, poor fitting of prosthesis, or expulsion of the prosthesis. Management of shallow inferior fornix in a contracted socket can be done by deepening sutures followed by mucous membrane graft, dermis fat grafting (DFG), a tarsoconjunctival inferior fornix fixation, and reconstruction using fascia lata.<sup>[4]</sup>

### CASE REPORT

A 26-year-old male presented with a history of trauma to his right eye with a stick when he was 12-year old, (which was an open globe penetrating type of injury as per Birmingham Eye Trauma Terminology) following which he had pain and discharge in the right eye after which he underwent right eye

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enucleation as the eye was beyond repair at time of presentation and decision of enucleation was taken for the prevention of sympathetic ophthalmia in other eye. Even though patient and his parents were advised regarding immediate enucleation, there was a time lapse between presentation and enucleation of 15 days as the parents of the patient were reluctant for the procedure at first. No prosthesis and no orbital implant to replace the orbital volume were placed at that time. He presented to us with a severely contracted socket, which was dry with loss of all fornices and reduction of palpebral aperture in horizontal and vertical dimension (grade 4 contracted socket as per Krishna *et al.* classification) [Figure 1a]. There was no lagophthalmos and no lid abnormalities. The patient had cosmetic complaints due to absence of the globe. The left eye had a vision of 6/18 and anterior segment and fundus examination was within normal limits. In the right eye, both the fornices were severely contracted with shortening of the cul de sac. Computed tomography scan of the orbits [Figures 1b and c] were ordered which showed severely contracted socket of the right side, while the left side was within normal limits. A written consent was taken before surgery. The help of a prosthodontist was taken to take measurements of the right eye orbital implant and a custom-made orbital implant was ordered. A surgery was

performed as per the usual recommended surgical steps, and hence, it was a tried technique.

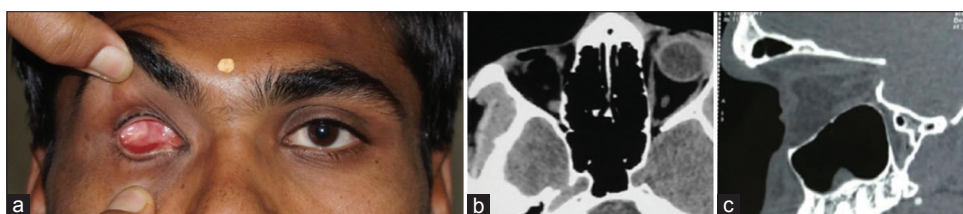
### **SURGERY: PROSTHESIS/IMPLANT PLACEMENT FOLLOWING DFG WITH FORNIX FORMING SUTURES AND BUCCAL MUCOSAL GRAFTING**

Surgery was performed in two sittings; first, dermis fat graft (approximately 50–55% more than the size of the socket) with fornix formation sutures was done. The graft obtained was placed in the orbit and was adequate for expansion of the different dimensions of orbit and orbital rim in our case [Figure 2a-e]; following which an orbital conformer was placed and tarsorrhaphy was done [Figure 3]. Six weeks after the first surgery, a second surgery was performed, in which inferior fornix augmentation was done using buccal mucosal graft harvested from the lower lip [Figure 4a and b] and a customized prosthesis was placed after 8 weeks. A satisfactory cosmesis was achieved [Figure 5]. Each procedure was done under an antibiotic cover (injection cefotaxime 1 g intravenous twice a day) and all necessary precautions were taken to prevent any infection or adhesion formation.

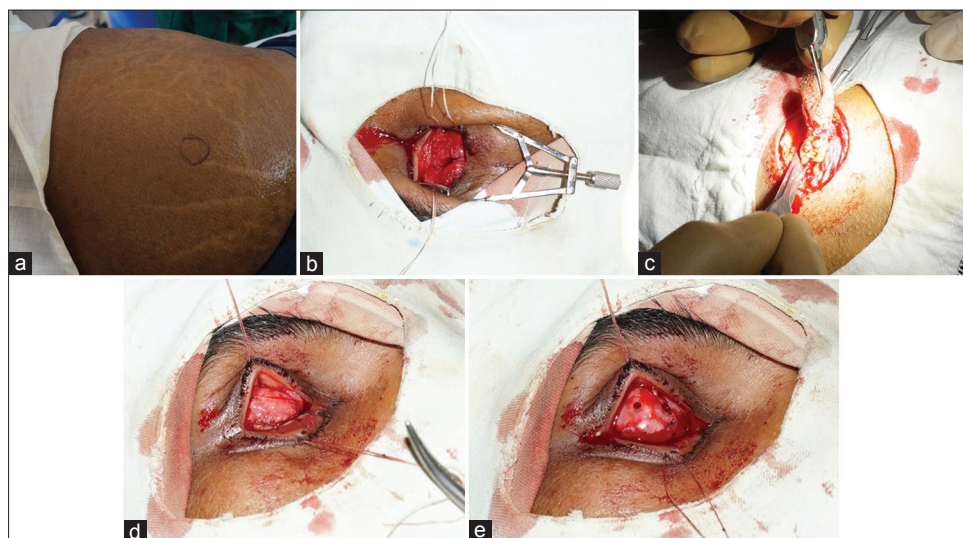
Overall, it was a challenging case for the surgeons as it was performed for the 1<sup>st</sup> time in our institute with minimal expertise in a rural setup, and the outcomes of the surgery were fruitful. The outcome of the surgery was rewarding to the patient as it gave him a whole new level of confidence and acceptance in the society, new job opportunities, and his sole purpose for getting operated for his cosmetic defect to get married was achieved.

### **DISCUSSION**

The clinical features of anophthalmic socket and post-enucleation socket syndrome differ in the following ways that in case of anophthalmic socket, the ocular findings are as follows: Small orbital rim and entrance, reduced size of bony orbital cavity with absence of extraocular muscles and lacrimal gland, small and underdeveloped optic foramen, foreshortening of lids, decrease or absence of levator function and lid folds, contraction of orbicularis oculi muscle, and shallow conjunctival inferior fornix. Whereas, in case of post enucleation socket syndrome, ocular findings are due to orbital volume deficiency and changes in the orbital soft-tissue architecture which includes anophthalmos, an upper eyelid



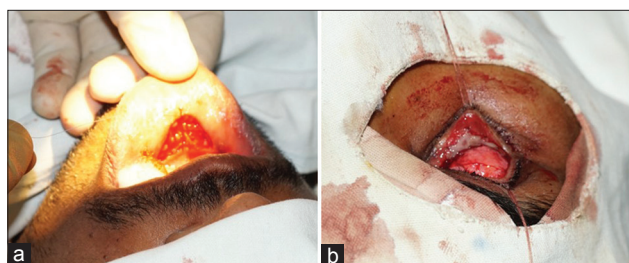
**Figure 1:** (a) The right eye showing severe contraction of upper and lower fornix. (b) Axial section of CT scan showing right-sided contracted socket. (c) The right sagittal section on CT scan showing right-sided contracted socket



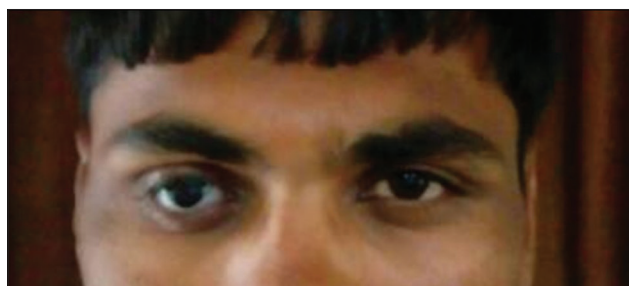
**Figure 2:** (a) Dermis fat graft being harvested from the buttocks of the patient 2.5 times the size of the socket. (b) Contracted upper and lower fornix along with severely contracted socket. (c) The dermis fat graft. (d) DFG being placed inside the right socket and sutured with the surrounding structures. (e) Image showing orbital conformer placement following dermis fat grafting



**Figure 3:** Immediate post-operative picture showing all FFS and tarsorrhaphy sutures in place



**Figure 4:** (a) Buccal mucosal graft being harvested in second surgery. (b) Buccal mucosal graft being placed in the inferior fornix



**Figure 5:** Final post-operative outcome, where the right-sided socket is well-formed and holds the orbital prosthesis

sulcus deformity, ptosis or eyelid retraction, laxity of lower eyelid, and a backward tilt of ocular prosthesis.

An orbital reconstruction involves replacement of an empty contracted socket with an orbital prosthesis.<sup>[5]</sup> Implantation of the anophthalmic socket with autologous material reduces the risk of migration or expulsion of artificial prosthesis. The dermis fat graft has an excellent biocompatibility. The DFG has two components: Subcutaneous fat and dermis. The fat restores the orbital volume and dermis provides vascular support for the graft. The disadvantage of the fat graft is that it needs a second surgical site, results in unpleasant scar, and is more prone for infection, leading to delayed healing and chronic discharge and it can get atrophied over time, leading to sinking of the implant; however, when the epidermis is separated and only the dermis is retained (as done in our case), it increases the graft vascularization and, thereby, decreases the chances of fat atrophy.<sup>[6]</sup> The inflatable soft-tissue expanders have better

orbital bone stimulation and socket enlargement; however, it is difficult to control direction and maintain expansion pressure and chances of displacing conformer and extrusion are more. The hydrogel expanders are now gaining popularity and made of methylmethacrylate and N-vinylpyrrolidone material. These are biocompatible, stimulate growth of conjunctival sac, and eyelids followed by serial implantation for orbital volume with temporal tarsorrhaphy, small soft-tissue incision is needed, no suture related complications and has quicker recovery and can be done as an outpatient procedure; however, they are expensive.<sup>[7]</sup>

The use of DFG for orbital reconstruction has been popular since 1978 due to its easy accessibility from the donor site, cost-effectivity, and less morbidity as it is an autologous graft.<sup>[8]</sup> The chances for graft rejection are minimal.<sup>[9]</sup> In our case, we harvested the DFG from the gluteal region which was approximately 50–55% more than the size of the socket as in a previous study published by Smith *et al.* showed that a DFG of <40% resulted in atrophy.<sup>[10]</sup> Results seen in a study published by Sihota *et al.* showed that the outcomes were better when the grafts were thicker, whereas a study conducted by Galindo-Ferreiro *et al.* used a graft which was 30% more than the size of the defect.<sup>[2,11]</sup>

In cases of post-enucleation and evisceration, DFG can effectively be used for the primary reconstruction and following post-irradiation for secondary reconstruction. However, in cases of compromised orbital vascularity following severe trauma and chemical burns, its use is contraindicated.<sup>[6]</sup>

Forniceal reconstruction can be done ideally using healthy conjunctival or tarsal autograft. If this is not available, a full thickness oral mucous membrane graft is used. Split thickness mucosal grafts contract more than mucosal grafts making them less suitable for fornix reconstruction.<sup>[12]</sup> Amniotic membrane transplant can be a viable option for fornix reconstruction and can be used with high success for reconstruction of moderate fornix shortening in patients who are unable to retain an ocular prosthesis.<sup>[13]</sup> Buccal mucosal graft is the tissue of choice as it has an easy access, is pliable, and has excellent tissue properties with adequate tissue availability. Furthermore, the immunological properties often resist contracture formation and provide a moist ocular surface.<sup>[12]</sup>

The orbital implants which are placed for maintaining the volume of the defect and also improve the mobility of prosthesis are commonly classified as non-integrated and integrated implants. The non-integrated implants consist of PMMA and Silicon implants which are smooth and inert in nature and cause very little host reaction; PMMA being the material of choice among the non-integrated implants. However, no superiority of non-integrated implants over integrated implants was evidenced from the previous studies.<sup>[14,15]</sup>

## CONCLUSION

Anophthalmic socket reconstruction is a challenge faced by the oculoplastic surgeon; however, good cosmetic and



functional results can be attained with organized planning and appropriately selected surgeries. The DFG provides orbital enhancement and the buccal mucosal graft provides forniceal support to the orbital implant. The procedure is economical and requires no special handling with minimal chances of rejection.

## DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other information to be published in the journal. The patients understand that their names and initials will not be disclosed and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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