

CONTRACTED SOCKET

Dr. Vikas Menon DNB, FLVPEI

Centre for Sight, Safdarjung Enclave, New Delhi, India

Abstract: Management of contracted anophthalmic socket requires understanding of various causative factors, assessment of key areas of tissue deficiency in the socket, a clear mental classification of what needs correction and how much correction is possible. A detailed discussion with the patient about likely benefits or limitations of procedures is very important to keep expectations realistic. The following text details various factors that go into planning any reconstructive procedure for an anophthalmic socket and also elaborates some commonly used surgical techniques.

Loss of an eye is a big psychological trauma for anyone who has to deal with this unfortunate situation. With facial cosmesis becoming very important in our current social environment, it becomes vital for ophthalmologists to understand proper management of an anophthalmic socket. All anophthalmic sockets undergo some sort of contraction as a result of fibrosis of orbital tissues, which maybe mild and unnoticeable most of the times. However, it usually draws attention when the individual is unable to retain a prosthesis, or there is significant asymmetry compared to the contralateral eye. Contracted socket is best prevented by following proper surgical technique at the time of primary enucleation or evisceration.

Common factors responsible for contraction of an anophthalmic socket are:

1. Poor surgical technique of primary surgery.
2. Fibrosis resulting from multiple surgeries.
3. Implant related complications: migration, exposure etc.
4. Socket left without prosthesis / conformer for a long time.
5. Using inappropriately made / Ill fitting prosthesis.
6. Trauma.
7. Cicatrising conjunctival diseases.
8. Chronic inflammation.
9. Chemical Injury.
10. Radiation.

CLINICAL PRESENTATION

Contraction of soft tissues in an anophthalmic socket presents with shallowing of fornices, irregular fibrosis, atrophy of orbital fat and volume redistribution within the orbit (Figure 1). Together, these factors lead to appearance of a hollow or deep superior sulcus, enophthalmos and eventually an inability of socket to retain an ocular prosthesis in place (Figure 2).

Examination revolves around assessing the principal deficiency in socket, which may be a deficiency of surface only, or compounded by a deficiency in volume of orbit as well. In more severe cases, shortening of palpebral aperture can also be seen (Figure 3).

Evaluation of a contracted socket includes an assessment of:

- a) *Size of palpebral fissure:* Both horizontal and vertical fissure height need to be assessed and compared with the



Figure 1: Shallowing of fornices, irregular fibrosis, atrophy of orbital fat and volume redistribution within the orbit.

normal side. Any pre-existing ptosis must be given due consideration.

- b) Tone of Orbicularis, lower lid laxity or ectropion.
- c) Depth of fornices.
- d) Surface character: Dry or moist, vascularised, healthy or pale.
- e) Volume deficiency: Assessment of enophthalmos and deepening of superior sulcus.
- f) Presence of obvious cicatricial bands.
- g) Extra ocular muscle function.
- h) Presence of confounding factors such as concurrent orbital fracture or bony contractures.

CLASSIFICATION

Gopal Krishna's¹ classification of contracted sockets as mentioned below is probably the most widely accepted one:

Grade-0: Socket is lined with healthy conjunctiva and has deep and well formed fornices.

Grade-I: Socket is characterised by shallow lower fornix, preventing retention of an artificial eye.

Grade-II: Socket is characterised by loss of upper and lower fornices both.

Grade- III: Socket is characterised by loss of the upper, lower, medial and lateral fornices.



Figure 2: Hollow, deep superior sulcus and enophthalmic appearance in a case of contracted socket.



Figure 3: Shortening of horizontal palpebral aperture in a severely contracted socket.

Grade-IV: Socket is characterised by loss of all the fornices, and reduction of palpebral aperture in horizontal and vertical dimensions.

Grade-V: Recurrence of contraction of socket after repeated trials of reconstruction.

Another system of classification has been described by Tawfik et al² as follows:

Grade 1: Minimal or no actual contraction. Patients complain of inability to retain the prosthesis for a long time. Horizontal lid laxity is often observed in these patients, with subsequent prolapse or retraction of the inferior fornix. Patients with an unusually large or anteriorly displaced implant also fall in this category.

Grade 2: Mild contracture of the inferior and/or the superior fornix. Patient either complains of inability to wear the prosthesis or may complain of a cosmetic disfigurement due to rolling-in of the upper and lower eyelid margin.

Grade 3: More advanced scarring than grade 2. Cicatrisation generally involving the entire upper and lower fornices. Wearing the prosthesis is impossible.

Grade 4: Severe phimosis of the palpebral fissure both vertically and horizontally. Recurrent cases and irradiated sockets are also included in this category.

MANAGEMENT

Primary aim of management is to create a healthy socket which is able to hold a stable ocular prosthesis along with reasonable symmetry of palpebral apertures, canthal angles and superior sulci.

Treatment planning is based on the severity of cicatrisation. Due consideration must be given to the etiology of contraction. As for any cosmetic procedure, a detailed discussion

with patient and family is very important regarding the expected outcome and to understand the patient's expectations from the procedure.

Not all cases of socket contraction require surgery, it may just be sufficient to modify the prosthesis in very mild cases. Cases where the fornices are unable to hold prosthesis due to excessive lid laxity require horizontal lid tightening with or without fornix formation sutures.

Fornix formation sutures: are non absorbable double armed sutures that are passed through the respective fornices and exteriorised on the skin side along inferior and superior orbital rims. The sutures are retained for approximately two weeks and an adequate sized conformer is placed to ensure that the socket retains necessary space for holding a prosthesis subsequently.

Patients with shortening of the posterior lamella causing entropion require lengthening of posterior lamella with the help of scleral or cartilage graft in addition to fornix formation³.

Moderately contracted sockets where there is mainly surface shortening and no volume deficiency with a moist vascularised surface can be treated with either Amniotic membrane graft or mucous membrane graft.

Mucous membrane graft: remains the preferred choice of surgery for moderate contractures. Autologous oral mucosa from lip and cheek can be easily harvested and is generally taken up well by the socket⁴ (Figure 4).

An incision is given through the centre of socket from lateral to medial canthus. Blunt dissection is carried out superiorly and inferiorly to release the scar tissue and to allow deepening of fornices. Fornix formation sutures are then passed from superior and inferior fornices. Central area of conjunctival deficiency is measured. Full thickness

mucosal graft is harvested from oral cavity either lip or cheek, measuring approximately 40-50% larger than the deficiency in socket to accommodate for subsequent graft contracture. Submucosal tissue is trimmed and graft sutured to free edges of incised conjunctiva with absorbable sutures. An adequate sized conformer is finally inserted to keep the fornices deep. The donor site can be closed by direct suturing or left alone to heal spontaneously.

Secondary Orbital Implant: Situations where the surface tissue is adequate, but there is volume deficiency only because of absence of an orbital implant, can be managed by placing an appropriately sized orbital implant secondarily in the posterior orbit. Choice of implant may vary depending on individual surgeon's experience and preference.

Dermis Fat Graft: More severe cases of contracted socket where there is significant shortening of surface as well as volume of socket are best managed with an autologous dermis fat graft. However, its use should be avoided in patients with severe or recurrent scarring, as insufficient socket vascularity compromises the success of composite grafts⁵.

Initial steps of opening up the conjunctiva and deepening of fornices are the same as described above for mucous membrane graft. The upper and outer quadrant of hip is considered safe for harvesting dermis fat graft. The superficial epidermis is removed carefully and an oval shaped block of dermis with fat globules attached to its undersurface is removed from the the hip. The graft is placed in socket carefully, it should neither be too small nor too big for the size of host socket. Muscle stumps of recti, if available can be attached to the edges of dermal component of graft with absorbable sutures. Free edges of

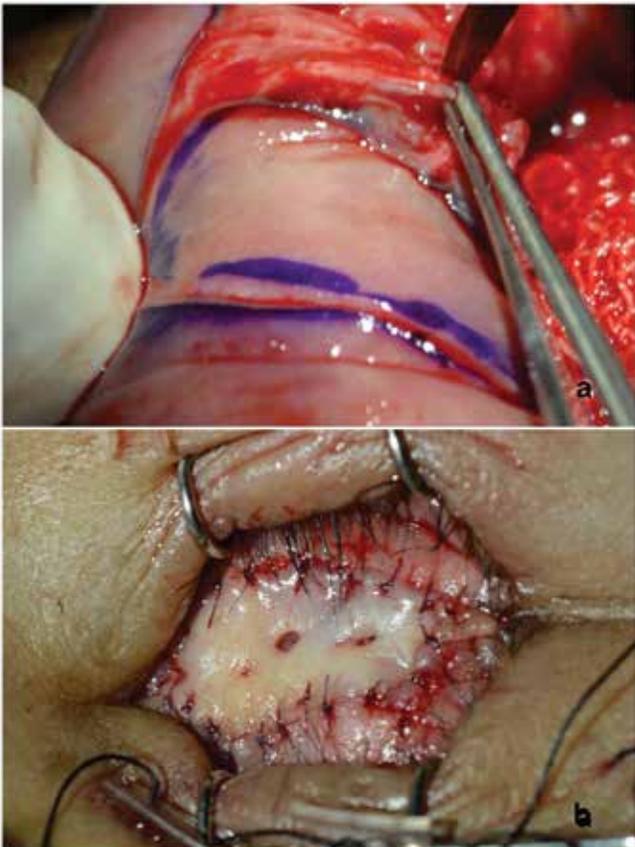


Figure 4: Oral mucosa is a good source of mucous membrane for reconstructed a contracted socket. (a) Mucosa being harvested from lower lip. (b) Final appearance at the end of surgery with mucous membrane contributing to expansion of surface in a contracted socket.

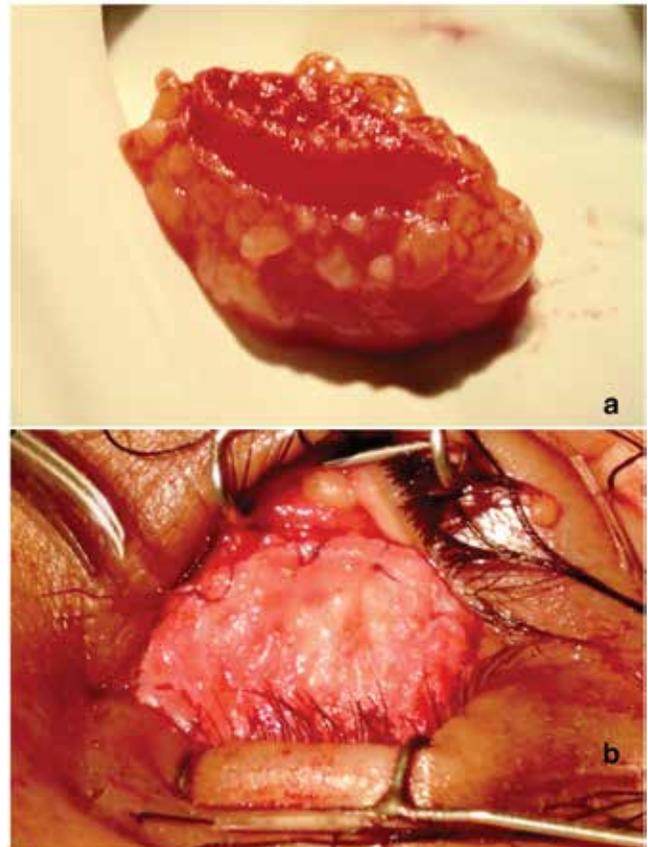


Figure 5(a): Dermis fat grafted harvested from gluteal region (b) A well fitting dermis fat graft in a contracted socket.

conjunctiva are also sutured all around to edges of dermis (Figure 5).

Radial forearm free flaps have been described in correcting extreme form of contractures such as those that present in post radiotherapy sockets or multiple failed surgeries^{6,7}. Alternately, pedicle temporalis muscle flap can be used to provide volume and also serve as a vascular bed for autologous dermis fat graft⁸.

Recalcitrant cases with dry parched surface or post multiple unsuccessful surgical procedures can be managed by spectacle mounted or stick-on orbital prosthesis. Other optical methods to enhance cosmesis include using plus powered lenses to magnify a microphthalmic socket and using prisms to change appearance of malpositioned prosthesis or socket.

Complications that need to be watched for while dealing with flaps / grafts:

1. Poor vascularisation or graft ischemia.
2. Loss of graft (mucous membrane / Dermis Fat) due to necrosis or poor uptake.
3. Cyst formation in the socket.
4. Hair growth and discharge in socket.

5. Erratic growth of fat graft leading to prosthesis extrusion.
6. Donor site complications: Wound infection, poor healing, scar formation.

CONCLUSION

Proper technique of Enucleation/Evisceration and use of an appropriately sized orbital implant during primary surgery is the best way to prevent the unpleasant sequelae of contraction of an anophthalmic socket. Most useful step in managing contracted sockets is to first evaluate the contracture in terms of surface or volume deficiency or both, and then choose an appropriate surgical technique for best possible outcome.

REFERENCES

1. Krishna G. Contracted sockets -I (Aetiology and types). Indian J Ophthalmol. 1980;28:117-20.
2. Tawfik HA, Raslan AO, Talib N. Surgical management of acquired socket contracture. Curr Opin Ophthalmol. 2009;20:406-11.
3. Smith RS, Malet T. Auricular cartilage grafting to correct lower conjunctival fornix retraction and eyelid malposition in anophthalmic patients. Ophthal Plast Reconstr Surg. 2008; 24:13-18.

4. Bowen Jones EJ, Nunes E. The outcome of oral mucosal grafts to the orbit: a three and a half year study. Br J Plast Surg. 2002; 55:102-104.
5. Bhattacharjee K, Bhattacharjee H, Kuri G, Das JK, Dey D. Comparative analysis of use of porous orbital implant with mucus membrane graft and dermis fat graft as a primary procedure in reconstruction of severely contracted socket. Indian J Ophthalmol. 2014;62:145-53.
6. Antia NH, Arora S. 'Malignant' contracture of the eye socket. Plast Reconstr Surg. 1984; 74:292-294.
7. Suh IS, Yang YM, Oh SJ. Conjunctival cul-de-sac reconstruction with radial forearm free flap in anophthalmic orbit syndrome. Plast Reconstr Surg. 2001;107:914 - 919.
8. Bosniak et al. Temporalis muscle transfer: A vascular bed for autogenous dermis fat orbital implantation. Ophthalmology 1985; 92:292-6.



Correspondence to:
Dr. Vikas Menon
Centre for Sight,
Safdarjung Enclave, New Delhi, India.