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Case Report

OCULAR PROSTHESIS FOR RADIATION-INDUCED SEVERELY CONTRACTED ANOPHTHALMIC SOCKET: A CASE REPORT

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ABSTRACT

Patients who present with severely contracted anophthalmic socket often experience several functional effects, along with significant psychological effects associated with this cosmetic deformity. Immediate replacement of the lost eye is necessary to promote physical and psychological healing for the patient and to improve social acceptance. One of the main goals of contracted socket rehabilitation is the ability to retain and comfortably support an ocular prosthesis. Various surgical procedures are used for the management of contracted sockets.

When surgical correction is contraindicated, unavailable, unsuccessful or unaffordable, the alternative techniques should be used to enhance esthetics. This paper describes the ocular prosthesis for a patient with severely contracted anophthalmic socket induced by post surgical irradiation.

Keywords: Contracted Socket, Anophthalmic Socket, Sunken Socket, Ocular Prosthesis.

INTRODUCTION

A contracted socket poses a management dilemma for the physician and is often a major aesthetic concern for the patient. Contracted socket can be defined as shrinkage of the fornices of the eye¹. Contracted sockets can be either congenital or acquired. Contracted sockets can be classified as mild, moderate and severe and depends on the severity of the shrinkage. Infection, Cicatricial conjunctival diseases, post enucleation radiation, absence or poor fitting conformer, absence or migration of implant, faulty technique of enucleation and evisceration rotation of inferior tarsus, sagging of lower lid, cicatricial ectropion, pre enucleation trauma (chemical, thermal burns) congenital condition all contribute to form contracted sockets².

Acceptable cosmetic correction can be achieved by socket expansion followed by prosthesis fitting. Various surgical procedures are performed to increase the volume of the socket. When surgical correction is contraindicated, unavailable, unsuccessful or unaffordable, the ocular prosthesis which is made in the contracted socket is small as compared to the contralateral eye and the esthetics of the patient is compromised. This paper describes the use of spectacles with magnifying glass on left contracted socket with ocular prosthesis to camouflage the asymmetry for a patient with

severely contracted anophthalmic socket induced by post enucleation irradiation.

CASE PRESENTATION: A 65 year old male patient reported to the Department of Prosthodontics, P.M.N.M Dental College, Bagalkot, Karnataka, for prosthetic replacement of missing left eye (Fig. 1).



Figure 1: Patient with missing left eye.

History revealed that the patient had undergone enucleation of left eye for a retinoblastoma 60 years back. The left eye was enucleated and the socket was post surgically irradiated. On

general examination it was noticed that the patient had severely contracted anophthalmic socket (Grade- IV). The conjunctiva covering the posterior wall of the anophthalmic socket was healthy and elicited synchronous movements.

TREATMENT PLAN:

The patient was seeking artificial eye replacement to enhance the facial esthetics, social acceptance and boost this self-appraisal. The aim of the treatment plan was to provide a well fitting ocular prosthesis so as to normalize the appearance of the patient and allowing him to lead a life without drawing attention in public. It was observed that the left socket was very much contracted as compared to the right eye. So it was planned to fabricate an ocular prosthesis and to correct the asymmetry by using spectacles with magnifying lens on the left eye so that both the eyes seemed to be symmetrical in size. The treatment plan was discussed with the patient and an informed consent was signed to ensure his willingness for fabrication of ocular prosthesis.

TECHNIQUE

Impression procedure:

Impression of the socket was made using the technique developed by Allen and Webster³ in which the acrylic resin impression tray shaped like an ocular prosthesis and have a hollow handle that accommodates an impression syringe (Fig 2).



Figure 2: Acrylic resin impression tray attached to syringe.

While making impression the patient was instructed to tilt the head backward and the eyebrow and eyelashes on the defect side were lightly lubricated using petroleum jelly (Biolin, Biopharm laboratories, Bangalore, lot no-21012). The socket was cleaned by injecting cooled saline solution into it and dried with cotton pellets. Medium body polyvinyl siloxane impression material (Aquasil, dentsply Caulk, lot no-100901) was injected into the eye socket through the syringe. Once filled, the head was moved back to the vertical position and patient was asked to move eye to the right then to the left, then up and down and finally in a circular motion, so that the functional impression of the defect could be obtained. Patient was asked to look at a distant spot at eye level with gaze maintained in a forward direction till the impression material sets. (Fig 3) After the material was set impression is retrieved from the socket and examined for completeness, any voids or defects (Fig 4).

Boxing of the impression was done and the cast was poured in two layers to get a split cast. The first layer was poured in type III dental stone (Gold stone, Asian chemicals, Gujarat, lot no-1959/200) and after setting, multiple grooves were made over the set first layer for the orientation of the second layer. After

application of Biolin (Biopharm laboratories, Bangalore, lot no-21012) the second layer was poured to get the split cast. Usually a split cast is prepared so that there are no undercuts and the wax pattern can be easily retrieved (Fig 5).

Wax pattern fabrication and Positioning of the Iris:

A wax pattern was fabricated by flowing molten modelling wax (Maarc,shiva product ,Mumbai, lot no-711) into the mold. Stock eye shell matching the patient's natural iris in color and size was selected. The eye shell borders were trimmed so that it is confined within the borders of the cast. The orientation of the iris was done as suggested by Satyabodh S. Guttal et al⁴ using a grid paper (Fig 6).



Figure 3: Making the impression of the defect.



Figure 4: Medium body elastomeric impression of the defect.



Figure 5: Split cast mould.



Figure 6: Grid used to orient the iris position.

Wax pattern try in:

The wax pattern was tried in the patient's ocular defect for comfort, stability, proper orientation in vertical and horizontal plane, motility, iris and sclera colour. It was observed that the left eye was looking small as compared to the right eye (Fig 7).



Figure 7: Asymmetry in size between right and left eye.

So to correct this asymmetry in size magnifying lens (Sieko, Japan) of 15x magnification with a refractive index of 1.56, specific gravity of 1.28g/cc was selected. This magnifying lens was attached on the left side. The magnification selected was 15x because at this magnification both the eyes seemed to be symmetrical. The patient was asked to perform various eye movements and retention of the wax pattern was checked. The position, gaze and esthetics of the prosthesis was shown to the patient and got approved.

Flasking and curing:

Wax pattern was flaked in a crown flask to create a split mold. After dewaxing 0.5–1mm of the surface layer of scleral portion of the stock eye shell was trimmed. Characterization of iris and shade matching of sclera was done using acrylic resin based pigments and nylon fibrils separated from denture acrylic resin were incorporated to replicate the blood vessels to match with the contralateral normal eye (Fig 8).



Figure 8: Final prosthesis.

Once the artwork was completed, heat cured clear acrylic resin (DPI, batch no-7102, 2010) was mixed and packed into the mold and thin layer was also placed on the characterized sclera and the iris. The stock eye shell was put back into the mold and the flask was closed. The curing was done as per manufacturer's instructions. After processing, prosthesis was

recovered and finishing and polishing was to get a high shine. The prosthesis was disinfected and stored in water for 24 hours before insertion.

Insertion:

Prosthesis was inserted into the socket and evaluated for comfort of the patient. The spectacle with magnifying glass on the left eye was used and esthetics was evaluated and found to be satisfactory (Fig 9).



Figure 9: Spectacle with magnifying glass of 15x on left eye.

The patient was educated to insert and remove the prosthesis. Regular follow up appointments were given along with instructions regarding maintenance of the prosthesis.

Post insertion care and maintenance of the prosthesis:

The patient was informed that, during the adjustment period there will be an increased volume of secretions and it is better to wear the prosthesis as long as it remains comfortable and is non-irritating. The prosthesis should be handled with care and with clean hands. Prosthesis should be removed at least once a day and washed properly. The prosthesis should never be cleaned with a dry cloth, abrasive soap or toothpaste. Cleaning is best done by hand with a simple liquid surfactant such as baby shampoo or soap with neutral pH. If the prosthesis is scratched in any way it should be repolished before wearing. Prosthesis should be stored in water when not in use to avoid shrinkage. The patient should be recalled for regular follow up.

DISCUSSION

Contracted sockets offer difficulty in management problems for the ophthalmic surgeon and for the maxillofacial prosthodontist. The management is best approached as a team and it is crucial to understand the mechanics and anatomy of both the normal and contracted socket. Krishna G⁵ classified the contracted sockets as

1. Grade 0: The socket is lined with a healthy conjunctiva and has deep and well-formed fornices
2. Grade 1: The socket is characterized by a shallow lower fornix or shelving of the lower fornix. In this case, the lower fornix is converted into a downwards sloping shelf that pushes the lower lid down and out, preventing retention of an artificial eye.
3. Grade 2: The socket is characterized by the loss of the upper and lower fornices.
4. Grade 3: The socket is characterized by the loss of the upper, lower, medial, and lateral fornices.

5. Grade 4: The socket is characterized by the loss of all fornices and reduction of the palpebral aperture in horizontal and vertical dimensions.

6. Grade 5: In some cases, there is recurrence of contraction of the socket after repeated trial of reconstruction.

Adhikari R K et al² stated that amongst the various causes of contraction of socket radiotherapy contributed 5.1% of all the cases reported. Nasser QJ et al¹ did a study on management of radiation induced severe anophthalmic socket contracture in patients with uveal melanoma, he found severe socket contracture and inability to wear a prosthesis in approximately 40% of patients who received radiotherapy.

One of the main goals of contracted socket rehabilitation is the ability to retain and comfortably support an ocular prosthesis. Satisfactory socket expansion and cosmesis can be achieved by graduated conformers followed by custom made ocular prosthesis fitting in cases with mild to moderate contracted sockets.

Surgical corrections can be done by procedures like minimal cautery, incision of the cicatrix without extensive excision, use of various graft materials like dermis fat, oral mucous membrane & nasal mucous graft. When surgical treatment is contraindicated, unavailable, unsuccessful or unaffordable, the prosthetic management is an appropriate alternative.

The patient presented here showed reduced vertical and horizontal dimension of his left palpebral fissure preventing fitting of an adequately sized ocular prosthesis. As the patient was not willing for surgical widening of the palpebral aperture and increasing the volume of socket it was decided to use a small sized ocular prosthesis along with the use of a spectacles

with magnifying glass attached on the left side so as to camouflage the asymmetry.

CONCLUSION

In contracted sockets with reduced volume, surgical expansion of the socket is the desired treatment. But when surgical correction is not possible alterations in the prosthesis be made. So an ocular prosthesis with a smaller size is suggested in such cases, but this hampers the cosmetics of the patient. So to minimize the attention to this disfigurement use of spectacles with magnifying glass attached on the affected side is suggested as an alternative.

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