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CLINICAL REPORT

Prosthodontic and Surgical Management of Anophthalmia: A Case Report

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Abstract True Anophthalmos is an extremely rare condition and can cause psychological problems due to not only the absence of an eye but also from the disfigurement of the orbital socket and the eyelids. The present case shows the multidisciplinary approach in the treatment of a patient with anophthalmos. He needed an ocular plastic surgery for correct prosthesis insertion. The disfigurement caused by the loss of ocular content when restored with prosthesis maintains the facial symmetry there by improves the esthetics as well as anatomic and physiological function.

Keywords Anophthalmos · Microphthalmos · Conformers · Ocular prosthesis

Introduction

Rehabilitation of mutilated structures to their approximate natural form has been the primary aim of clinicians in the field of reconstruction. Eyes are generally first features of face to be noticed. The absence or unfortunate loss of an eye may be caused by congenital defect, irreparable trauma, tumor etc. The quality of the life of the patient can be improved with a multidisciplinary approach involving ophthalmologist, maxillofacial surgeon and prosthodontist. The contribution of each will complement each other.

The disfigurement associated with the absence or loss of an eye can cause significant physical and emotional problems [1]. Most patients experience significant stress, due to primarily adjusting to the functional disability caused by eye loss and to social reaction to facial impairment. Rectification of this deformity at the earliest is necessary to promote physical and psychological healing for the patient and to improve social acceptance. A multidisciplinary approach and team efforts are essential in providing accurate and effective rehabilitation and follow-up care for the patient.

In True or primary anophthalmos there is complete absence of the ocular tissue within the orbit which is very rare [2]. Extreme microphthalmos is a common condition where a very small globe is present within the orbital soft tissue [3].

Anophthalmia occurs when the neuroectoderm of the primary optic vesicle fails to develop properly from the anterior neural plate of the neural tube during embryological development [4]. Secondary anophthalmia and micropthalmia may occur due to arrest of development of the eye at various stages of growth of the optic vesicle.

Case report

A 28-year-old male patient came to department of Prosthodontics with a history of left congenital anophthalmos. He had no history of prior socket surgery and he desired cosmetic correction for the anophthalmic socket. On examination the left orbital rim was acorn-like in shape with reduced size of bony orbital cavity. The extra ocular

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Fig. 1 Pre-operative

muscles were absent. The Palpebral fissure appeared closed and contracted with shortening of eyelids in all directions (Fig. 1). The horizontal palpebral aperture was 15 mm mediolaterally and 14 mm superioinferiorly. No recognizable structures could be identified with in the left eye. Socket and fornices were shallow but well formed. Based on the above findings a diagnosis of primary anophthalmos was made. Patient was advised cosmetic surgery in the form of conformer.

The management of this condition requires an ophthalmologist and prosthodontist. After evaluating the patient, a management plan was developed. Surgical widening of Palpebral fissure was done. After widening, a solid conformer was placed in the orbit. The function of the conformer is to enlarge the orbital cavity in an attempt to attain normal proportions. Later a definitive ocular prosthesis was planned to improve the appearance.

Procedure

1. A facial moulage impression was made with irreversible hydrocolloid impression material (Tropicalgin, Zhermack,Italy) in a runny consistency by adding 1.5 parts of hot water to 1 part powder [5]. Model plaster (Kaldent, Kalabhai) was poured on top of the alginate to stabilize the alginate material.
2. The set impression was removed and used to pour a cast mold that was used to fabricate the acrylic resin conformer.

Fig. 2 Conformer

3. Facial measurements were drawn on the cast and evaluated and compared to the patient's right side orbit.
4. Conformer was fabricated using a prefabricated ocular shell, with shape and size matching with the contralateral eye. The borders and posterior surface of the ocular prosthesis was filled with modeling wax (Hindustan modeling wax) approximately by using the measurements drawn on the cast. This helped us to achieve appropriate anterior/posterior dimensions, Palpebral fissure curvature and position.

The diameter of the conformer was critical. Three conformers with mild variations in diameters were planned (first conformer is 24 mm mediolaterally, 19 mm superioinferiorly, 4.5 mm anteroposteriorly, second conformer is 25 mm mediolaterally, 20 mm superioinferiorly, 4.5 mm anteroposteriorly, third conformer is 26 mm mediolaterally, 21 mm superioinferiorly, 4.5 mm anteroposteriorly). In addition to that the prosthodontist can also trim the size of the conformer at the time of the surgery so that it

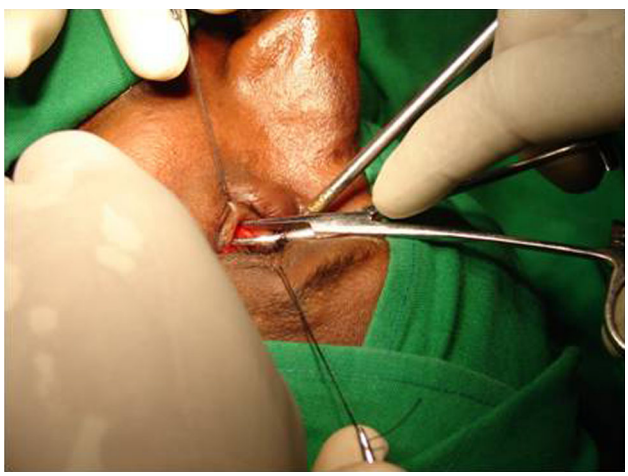

Fig. 3 Surgical expansion of palpebral fissure and conjunctiv

Fig. 4 Placement of conformer in the expanded socket

Fig. 5 Postoperative (immediately after surgery)

proportionately best augments the orbital volume [6]. Our goal was to place a conformer of the largest diameter that best fits the socket with least stress and provides space postoperatively for fitting ocular prosthesis proportionate with the contralateral eye.

Once this was achieved, elevated drops of wax were placed on the upper and lower borders of the anterior portion of the conformers. This prevents the rotation of the conformer. It also assists in insertion and removal of the conformer.

After the wax up procedure was done, the conformers were processed with heat cure clear acrylic (DPI heat cure acrylic). Then they were polished, disinfected and kept ready for insertion during surgery (Fig. 2).

Surgical widening of Palpebral fissure was followed by expansion of the conjunctival sac to increase the existing volume (lateral canthotomy and lateral cantholysis) (Fig. 3). The conjunctival sac plays a crucial role in the

Fig. 6 Postoperative (4 weeks after surgery)

maintenance and mobility of the ocular prosthesis, though it is perhaps the most vulnerable structure in the orbit [7]. To prevent shrinkage of dilated conjunctival sac the appropriate sized conformer (24 mm mediolaterally, 19 mm superioinferiorly, 4.5 mm anteroposteriorly) was selected and placed immediately to preserve the volume (Figs. 4, 5). The upper and lower eyelids were closed with sutures.

Patient was examined for the first 2 days. Eyelid sutures were removed on the 6th day. Patient was reviewed every week for 8 weeks.

On 8th week there was adequate formation of cul-de-sacs (lid pockets) that will hold the prosthesis in place. The socket volume was not lost during the healing process. The upper eyelid was droopy in appearance which could be corrected in the final prosthesis. Patient was able to open and close the lids normally. Orbital inflammation was subsided and eye socket tissue healed adequately.

After a satisfactory healing period of 8 weeks a conventional definitive ocular prosthesis was manufactured. (Fig. 6).

A duplicate of the conformer in wax can be used as a template for the definitive prosthesis [8].

Discussion

Anophthalmia occurs when the neuroectoderm of the primary optic vesicle fails to develop properly from the anterio neural plate of the neural tube during embryological development. The more commonly seen microphthalmia can result from a problem in development of the globe at any stage of growth of the optic vesicle [9]. Proper growth

of the orbital region is dependent on the presence of the eye, which stimulates growth of the orbit, proper formation of the lids and the ocular fornices. Commonly, a child born with anophthalmia has a small orbit with narrow palpebral fissure and shrunken fornices. Hypoplasia of the globe affects the bony orbit (micro-orbitism), the conjunctival sac, and eyelids (microblepharism). Because of the ocular adenexa (eyelids and conjunctiva) the therapeutic challenge of conventional prosthetic design and placement will be difficult. Surgical enlargement of Palpebral fissure and conjunctival sac and placement of custom-made conformer followed by placement of conventional ocular prosthesis provides excellent function, appearance and symmetry of patient's face [10].

Placement of a conformer minimizes changes in the socket size and prevents scar tissue contractures from distorting the socket bed. It also allows for clinical assessment of retention, eyelid competence and residual muscle movement. Conformers often settle and sink into the socket in the first few weeks after being fitted, which may cause sagging of lower eyelid. This is exacerbated by the weight of the prosthesis as well as the contraction force of the upper eyelid. Appropriate sized conformer that passively fits in the socket with least stresses prevents the problem of settling [11, 12]. The presence of custom-made conformer and its close approximation to the tissues in the socket stimulates the eyelid muscles to move, thus, exercising them and preventing disuse atrophy [13].

Summary

The dynamic relationship between ocular prosthesis and soft tissues in the orbit needs surgical correction of the ocular cavity to achieve adequate symmetry of the face. The treatment option of surgical enlargement of conjunctival sac, and Palpebral fissure and placing a custom-made ocular conformer followed by a definitive prosthesis, is an invaluable aid in treating adult patients with anophthalmia. A custom-made conformer during tissue healing maintains an optimal orbital volume and serves as a diagnostic aid to evaluate the esthetics of the definitive ocular prosthesis.

Anophthalmia may lead to serious problems from childhood due to not only the absence of a seeing eye but also the secondary disfigurement of the orbit, the lids, and the eye socket. Early treatment with various expanders or surgery, when necessary, will help decrease the orbital asymmetry and cosmetic deformities.

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