

CASE REPORT

Prosthetic rehabilitation with artificial palpebra of an ocular defect with contracted socket

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ABSTRACT

Keywords: Contracted sockets, Eye socket, Maxillofacial prosthesis

Eyes are one of the most important organs of the body which are set inside the protective orbital bone. Loss of an eye can be caused by congenital defects, trauma, or tumors. The removal of the eyeball (enucleation) may cause a massive impact on the self-image, confidence, and personality of an individual. Acceptable cosmetic results usually can be obtained with an ocular prosthesis which is an artificial maxillofacial prosthesis to replace the lost eye. This paper describes the prosthetic rehabilitation of a 71-year-old male patient with a left ocular defect accompanied by a contracted socket caused by the poorly fitting old prosthesis which results in subpar cosmesis. The soft tissue around the eye is normal, but the palpebral conjunctiva forms an abnormal adhesion to the eye socket. An impression was made using a custom tray and alginate in the defect area, followed by filling the impression with gypsum type 3 to get a working model, from which a wax model was made and adjusted to the patient. Sclera and ocular acrylic prostheses were made on the basis of an adjusted wax model. The prosthesis was then polished and colored according to the contralateral eye, followed by the manufacturing of an artificial palpebra made of silicone for a more aesthetic result. The custom-made eye prosthesis with silicone palpebra is an artistic solution for the treatment of ocular defects with contracted sockets. This technique was able to improve the patient's psychological and emotional status. (IJP 2024;5(1): 70-72)

INTRODUCTION

The human eye is a sense organ which aids in vision and is an important component of the face. The eye consists of sclera, pupil, iris, limbus, collerate, and eye muscles.¹⁻⁵ Removal of this organ may be indicated in cases of congenital abnormality, severe trauma, or disease such as an infection, tumor, or malignancy. Contracted socket is the one of the unfavourable complications of anophthalmos which refers to shrinkage of orbital tissue accompanied by a reduction in the volume along with a decrease in the forniceal depth. It eventually results in an inability to sustain a prosthesis which leads to significant functional and psychosocial disability.²

Based on Gopal Krishna classification,² the grade of the contracted socket of this patient is categorized as grade III where all four fornices (superior, inferior, lateral, and medial) is involved. Patient refused approval for medical treatment to undergo a symblepharectomy surgery due to age and time related factors. Therefore, the alternative management was carried out to improve the patient's aesthetics by making an artificial palpebra on the

left eye prosthesis from silicone materials.

Rehabilitation due to eyeball loss can be divided into 2 types, which are orbital implants and eye/ ocular prostheses.³ Ocular prostheses are also divided into 2 categories, namely fabricated and non- fabricated (customized) prosthesis. The advantage of fabricated eye prostheses is that they require minimal manufacturing time because there are no laboratory stages needed. Fabricated eye prosthesis has 3 sizes and colors.³ However, this eye prosthesis may cause discomfort and infection due to its lack of fitness in the socket, resulting in a water sac which becomes a place for bacteria to grow. Another disadvantage is the esthetic problems caused by the mismatch in iris color. On the other hand, the customized prosthesis can be adjusted to the existing eye and is more suitable in the patient's orbital socket.⁴

The purpose of this article is to describe the rehabilitation treatment with a customized ocular prosthesis.

CASE

A 71-year-old male patient came to RSGM UGM Prof.

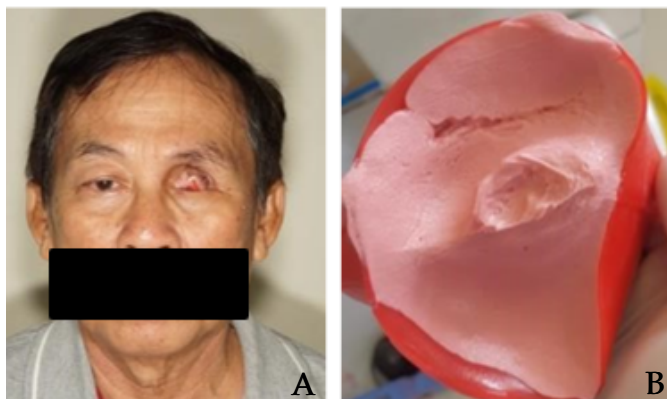


Figure 1. A. Pre-treatment, B. Study model impression

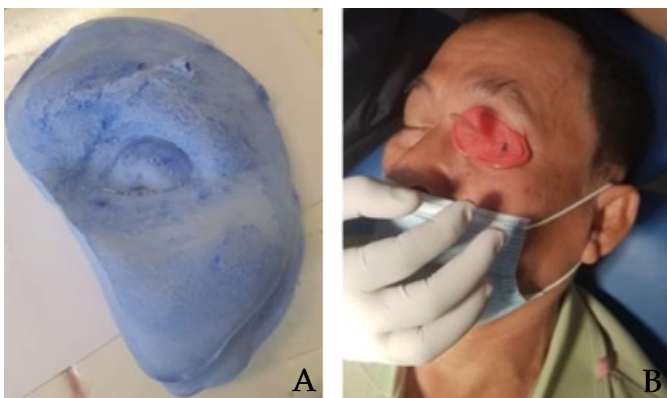


Figure 2. A. Study model, B. Functional impression

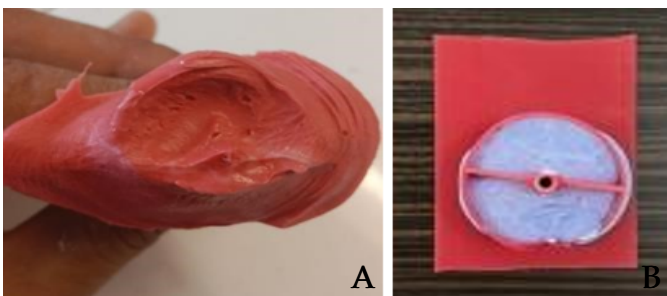


Figure 3. A. Functional impression, B. work model

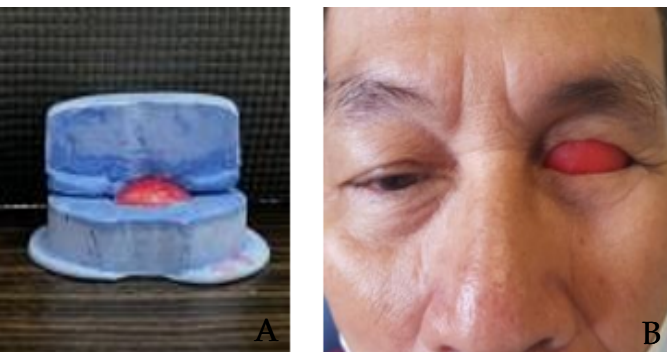


Figure 4. A. Wax pattern sclera, B. wax sclera try-in

Soedomo wearing a fabricated ocular prosthesis. The patient lost his left eyeball due to trauma from a metal bottle cap which occurred 50 years ago and has undergone surgery to remove the eyeball (enucleation). Patient complained that the previous prosthesis looked bulky, disproportionate, thus disturbing the esthetic appearance.

Objective examination was carried out and it was found that there is no eyeball on the left side, no infection and no inflammation. However, the eyelid muscle is pulled inward and is attached to the orbital floor (symblepharon), which is categorized as grade III contracted socket [figure 1A](#). The patient was unable to open and close his left eyelid, thus an artificial palpebra is required to restore the periorbital region. The first appointment was for anamnesis, objective examination, and to collect data of the patient's profile. The diagnosis of this case was anophthalmia bulbus oculi sinistra with contracted socket. The treatment plan was to manufacture non-fabricated ocular prosthesis from acrylic resin with artificial palpebra made of silicone.

Management

The patient was asked to close his eye during individual tray fabrication which used irreversible hydrocolloid impression material around the eyes [figure 1B](#). The impression was then filled with dental stones [figure 2A](#). The hardened stone was used as a working model to make individual trays using a selfcuring acrylic resin.

The Impression Procedure

A light body polyvinyl siloxane impression material was injected into the eye socket, to which an individual tray was attached. The patient was instructed to move his eye muscles to obtain a functional impression of the defect [figure 2B](#). After setting, the impression material was removed from the socket and it was examined thoroughly for any void [figure 3A](#). The impression then was boxed and was poured in three parts to get a split cast by using type III dental stone [figure 3B](#).

The wax sclera try-in

A wax pattern was fabricated by allowing molten modelling wax to flow into the mold [figure 4A](#). Afterwards, the wax pattern was tried in the patient's eye socket to check for comfort, stability, and retention [figure 4B](#). Furthermore, the sclera color was recorded using photography of the patient's real eye. The smoothed sclera wax pattern and sclera color notes were sent to the laboratory for packing.

The acrylic sclera try-in and determine positioning iris

The patient was instructed to look straight and keep all their facial muscles relaxed. The acrylic sclera was tried in the patient's eye socket to analyze the comfort, stability, and retention [figure 5A](#). After that, the iris and the pupil were designed based on the other eye using a pencil. The diameter of an iris usually range from 10mm, 10.5 mm, 11 mm, 11.5 mm, and 12 mm. The iris diameter was designed by direct measurement using a sliding caliper [figure 5B](#). Then the acrylic sclera was sent to the laboratory for iris coloring.

Ocular Prosthesis Fabrication and Palpebral Wax Contouring

The ocular prosthesis was fabricated and it was evaluated for the morphology and esthetic result [figure 6A](#). The palpebral wax was carved and adjusted to the contralateral eye portion. [figure 6B](#).

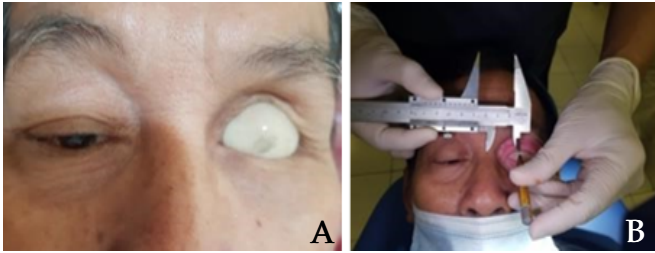


Figure 5. A. Acrylic sclera try-in, B. Iris positioning

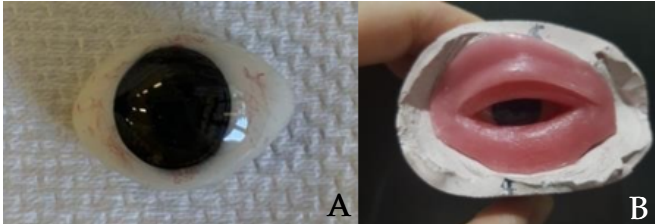


Figure 6. A. Resin sclera fabrication, B. Palpebral wax carving

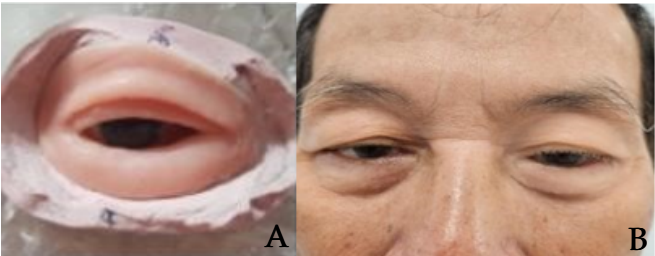


Figure 7. A. Dorsal view of finished prosthesis, B. Orbital rehabilitation (final outcome).

Palpebral wax and silicone try-in

The palpebral wax was tried in around periorbital region. The medical-graded silicone material was mixed, a mix of white, brown, and light red pigment stains were blended into the base color of silicon for intrinsic staining based on shade match with the patient's skin color [figure 7A](#). Silicone was packed and cured at room temperature for 24 h according to manufacturer's instructions. A slit was made on the silicone extending from the medial canthus of the eyelid to the lateral canthus of upper and lower eyelid, and artificial eye lash was inserted between it and adhered for natural appearance [figure 7B](#).

DISCUSSION

The fabrication of a custom acrylic eye provides more esthetic and precise results because an impression establishes the defect contours and the iris and the sclera are custom fabricated. Prosthetic rehabilitation of anophthalmic patient with contracted socket has been explained in this case report. Contracted socket due to eyelid adhesions (symblepharon) had occurred within the last 30 years. This is thought to be because the patient never had control over replacing the eye prosthesis, resulting in a trauma process that caused adhesion to the conjunctival surface of the patient's left eyelid.

The management of symblepharon is symblepharonectomy and surgical reconstruction of the eyelid to improve aesthetics and restore the normal anatomical structure of the eyelid.¹

However, the patient refused approval for medical treatment due to age and time-related factors. Therefore, manufacturing an artificial palpebral on the left eye from silicone material is chosen.

To build the periorbital region medically graded silicone was used, since it had proven desirable material properties including flexibility, biocompatibility, ability to accept intrinsic and extrinsic colorants, chemical, and physical inertness, and moldability.³ Various methods of auxiliary retention for orbital prostheses include eyeglass and silicone adhesive. The retention of the orbital prosthesis was achieved by adhering the silicone base to the acrylic and to the skin. This technique is a simple, cost effective, and easy way for fabrication and rehabilitation of an orbital defect using silicone prosthesis providing better esthetic and psychological outcome. This article explains some of the basic principles associated with the fabrication of the custom ocular prosthesis with artificial palpebrae made of silicone. A properly fitted and acceptable custom ocular prosthesis has the following characteristics: reconstruct the shape of the defect socket, restore normal palpebral anatomy similar to the natural eye, mimics the colorations and proportion of the natural eye, has a gaze similar to the natural eye.

Making the sclera and painting the iris were adjusted to the opposite eye using photography of the patient's eye. This method might reduce the patient's treatment time because usually the sclera and iris are painted in front of the patient. The advantage of making an eye prosthesis is that it can restore the patient's appearance to that of a normal eye. By restoring the appearance, the self-confidence can be enhanced so that the patient could feel more accepted in social life. The orbital rehabilitation not only restore patient's visual function, but also reduce the psychological trauma caused by an eyeball loss.

Anophthalmic socket with grade III contracted socket may be corrected with modifications to the prosthesis, instead of reconstruction surgery. In this case, manufacturing of artificial palpebra made of silicone which has similar shade with natural skin of the patient and fabricating the acrylic resin ocular prosthesis produced satisfactory results

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