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CASE REPORT

Ocular prosthesis modification with permanent soft liner in anopthalmic socket post evisceration

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Keywords: Custom ocular prosthesis, Evisceration, Permanent soft liner

ABSTRACT

Enucleation and eviseration are surgical procedures often used for the removal of the eye. Some post-eviserated patients have complaints of discomfort when using conformer or ocular prosthesis. Ocular prosthesis modified with permanent soft liner (PSL) on the intaglio surface is an alternative to reduce the discomfort. This case report aims to explain the use of PSL in the manufacture of custom ocular prostheses in post-eviscerated patient. A 72-year-old male patient came to RSGM USU complaining of difficulty to socialize because he lost his eye and wanted to make a prosthetic. The patient had evisceration 4 months ago and was given a silicone surgical conformer. Tearing was the common complaint, followed by itchiness, soreness and uncomfortable when the conformer is fitted. Custom ocular prosthesis is modified using PSL on the intaglio surface. The use of PSL provides comfort to patients because it acts as a shock absorber and shock distributor that can distribute pressure more evenly so that the tissue in the eye socket receives less impact force. Fabrication of new ocular prosthesis with PSL is a novel way to minimize trauma to underlying supporting tissues so it can reduce the discomfort of the patient. (IJP 2025;6(1):35-39)

Introduction

The eyes play an important role as one of the six senses in human. Loss of an eye in an individual will cause functional disability and discomfort that will affect physical, social and emotional aspects. The cause of eye loss can be due to trauma, damage from birth or surgical disposal. The surgical approach is carried out depending on the severity of the case, namely eviction, enucleation and exenteration.[1] Evisceration has gained popularity in recent decades. It is based on the perception that exertion provides superior functional and cosmetic results compared to enucleation.[2,3]

Evisceration is a surgical approach in which the removal of the globe (cornea, iris, lens, vitreous and retina) is removed but leaves the sclera and extraocular muscles. The optic nerve is also not removed or cut in this procedure.[1,4] The nerves and soft tissues that are still left behind in surgical procedures are sometimes compressed or experience excessive trauma, causing several problems when patients are made custom ocular prostheses such as pain, irritation, pressure sensations and watery eyes. Custom ocular prosthesis with permanent soft liner is a new way to minimize trauma to the underlying support tissue.[5-8]

Permanent soft liner is a soft, resilient and elastic material that can form all or part of the surface of the prosthesis. Permanent soft liners distribute strength more evenly and can absorb energy. It provides comfort to the tissue under the prosthesis by providing a cushioning effect.[9] Today, most patients are rehabilitated with ocular prostheses that are conventional and made of hot polymerized acrylic resin. However, some patients are maladaptive in their ability to tolerate conventional ocular prostheses, especially older patients with more sensitive eye tissue. In patients with anophthalmic sockets, the blinking reflex and tears do not function normally leading to problems such as discomfort, irritation, bacterial infection and mucus deposition which all make the prosthesis uncomfortable. Permanent soft liners are used to minimize direct pressure to soft tissues and as an even distribution of pressure. Permanent soft liner materials are processed in dental laboratories in a similar way to hot polymerized acrylic resin materials.[6]

The purpose of writing this case report is to explain the use of permanent soft liner on custom ocular prosthesis to provide better comfort and function for patients with post-eviserated anopthalmic socket.

Case Report

A 73-year-old male patient came to USU General Hospital in October 2022 complaining of embarrassment and difficulty socializing because he lost his left eye and wanted to make a prosthetic eye. The patient came to RSGM USU after surgery on his eye 4 months ago. The patient said that the patient's eye surgery was caused because his eyes hurt, sore and could not shed tears anymore since 2 years ago. Patients hope that with the presence of prosthetic eyes, patients can be more confident and carry out activities as usual. Figure 1.

The patient undergoes surgery or eviseration in Penang, Malaysia on July 4, 2023. Additional advice and advice from the

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Figure 1. Patient's look before treatment

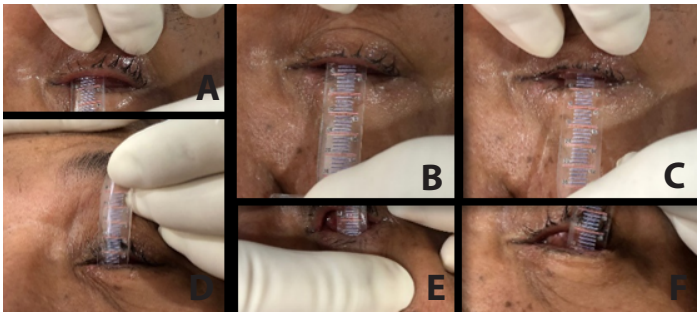

Figure 2. A-B. Measuring superior fornix palpebral depth with FDM, D-F. Measuring inferior fornix palpebral depth with Fornix Depth Measurer (FDM)

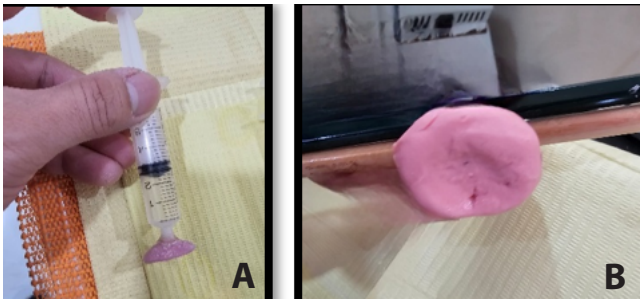

Figure 3. A. Anatomically tray that has been fixed on a syringe tip, B. Result of anatomical impression

Figure 4. Anatomical wax sclera

patient's ophthalmologist is to perform eyelid removal surgery to improve the patient's eye condition before making a custom occular prosthesis. The patient refused the operation because the patient's health condition did not allow him to go abroad repeatedly so the patient chose to make a custom occular prosthesis without surgery. The condition of the patient's eye socket and the depth of the fornix are adequate, so it was decided that the patient can immediately make a custom ocular prosthesis. The depth of the fornix is measured using the fornix depth measurer (FDM). Figure 2 Anatomical tray are made using a tray that has been adjusted to the size of the patient's eye socket using self-cured acrylic material by perforating the center of the tray so that the syringe tip from the alginate printing material can be fixed properly. Figure 3 The patient's eyelashes are smeared with vaseline then anatomicál impression is performed, the patient is instructed to move his eyes in all directions to get the border of the edge of the eye area on the printing sat.

The result of anatomical impression was casting using stone type IV to obtain molds used in making anatomical wax sclera which will later be used as a guide in making physiological tray. Figure 4.

The anatomical wax sclera is then tested into the patient's eye socket and adjusted according to the size and contour of the patient's original eye profile and the results will guide the creation of a physiological tray. Figure 5.

Then make a physiological tray from polyethylene sheet material to obtain a physiological mold using the size guide and convex contour of the anatomical wax sclera where the center of the tray is perforated for fixation of the mixing tip of the polyvinyl siloxane light body impression material and a few additional holes on the tray for retention of the impression material. The patient is instructed to move his eyes to obtain accurate edges of the eye. Figure 6.

The physiological molds will be made a working model with the split cast technique, namely by planting the intaglio surface in a type IV cast using a plastic cup and and key holes are made on the superior and inferior sides before the cast hardens. From the results of anatomical impression, a mold will be obtained for the manufacture of physiological wax sclera which will later become a custom ocular prosthesis. Figure 7.

On the next visit, try-in physiological sclera wax experiments and sclera color matching were carried out using shade guides and taking photos with smartphones in sunlight. Then the results of the photo are used as a guide or control for staining of the patient's sclera.

After that, a try-in sclera was carried out accompanied by iris positioning using a pupillary distance ruler and caliper.[10] The patient is instructed to look forward at one point, then measure the distance of the patient's glabela to the midline of the patient's normal iris, then match the size to the patient's left eye for which a custom occular prosthesis will be made. Measurement of the diameter of the patient's iris using the help of a caliper. The patient's normal iris is measured using a caliper and then the size is used as a guide in determining the iris diameter in the patient's custom occular

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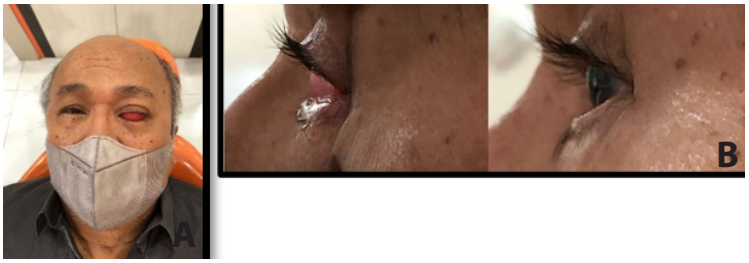

Figure 5. A. Try-in anatomical wax sclera-front view, B. Try-in anatomical wax sclera-side view

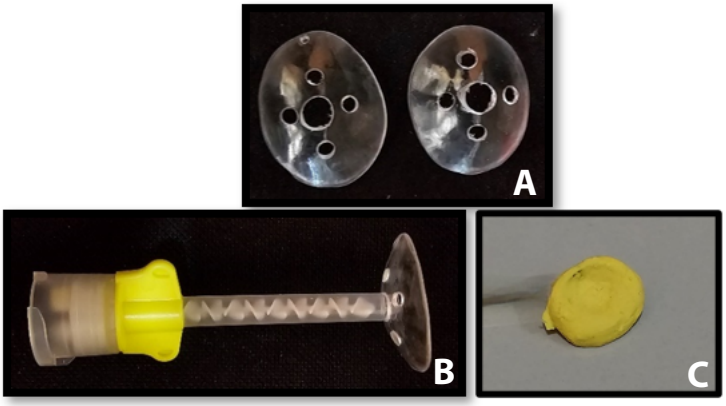

Figure 6. A. Physiological tray made from polyethylene sheet, B. Physiological tray that has been fixed on a syringe tip, C. Physiological impression results

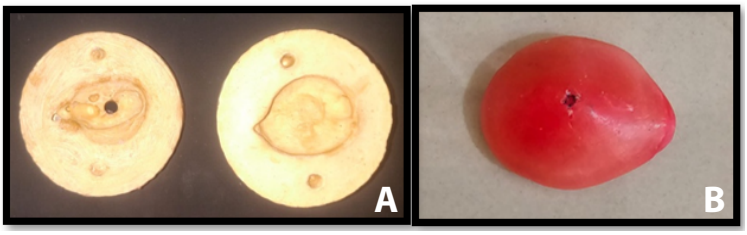

Figure 7. A. Physiological mold, B. Physiological wax sclera

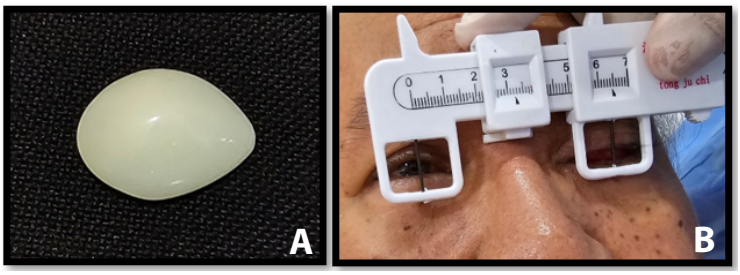

Figure 8. A. Photo of sclera made of resin, B. Photo of iris determination using pupillary distance ruler

prosthesis. Figure 8.

After that, make a putty index as a guide when placing clear acrylic for a clear lense effect. Then a reduction of sclera resin as deep as 4 mm according to the diameter of the iris that has been predetermined is carried out, colored according to the color of the patient's iris using acrylic paint, wait for it to dry with 1 hour according to the manufacturer's instructions, then coat it with UV resin and light using UV light. Figure 9.

Reduce sclera with putty index guidance then proceed with characterization of blood vessels in acrylic sclera using red thread. After that, curing the sclera again using clear acrylic. After finishing the curing, reduce the intaglio custom ocular prosthesis by about 2 mm, clean, apply adhesive primer, apply soft denture liner (Molloplast B), then press the cuvette for 10-15 minutes with a strength of 100 kPa using a hydraulic press, and rub with a temperature of 950C for 2 hours. The next step is polishing using polishing burs and pumice on the outer surface of the custom ocular prosthesis. Figure 10.

Custom ocular prosthesis is placed in the patient socket then appropriateness, aesthetics, and coordination of movements with the contralateral eye are evaluated. Post insertion instructions are given to the patient, regarding how to insert and maintain a custom ocular prosthesis. Figure 11 and figure 12.

Discussion

Custom ocular prosthesis modified soft denture liner with good comfort level is the goal of this case study. In previous studies, it was explained that the permanent addition of soft liner in the ocular prosthesis increases retention in shallow eye sockets of inadequate depth through increased close contact between the prosthesis and underlying tissue and also reduces traumatic impact on residual tissue through the even distribution of force load generated by the oculi orbicularis muscle.[6] Soft denture liner is a soft, resilient and elastic material that forms part of the surface of the ocular tissue of the prosthesis.[11-15] Soft denture liners can be temporary short-term liners, also known as tissue conditioners, and long-term liners / permanent soft liners.[10] The duration of use of the short-term liner is 1 month and the long-term liner reaches 1 year. Long-term liners are classified into auto-polymerised and heat-polymerised and can be either acrylic or silicone-based.[9]

This case study uses a permanent soft liner under the brand Molloplast B which is a silicone-based long-term soft liner with heat polymerization. This permanent soft liner was chosen because it has good hardness, modulus of elasticity and water sorption.[9] These characteristics are important parameters in determining the longevity of a soft denture liner. Research of Wright et al, which examined the length of time of permanent

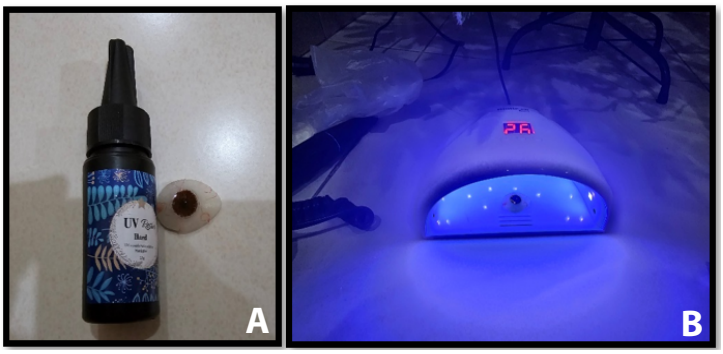

Figure 9. A. UV resin, B. UV light

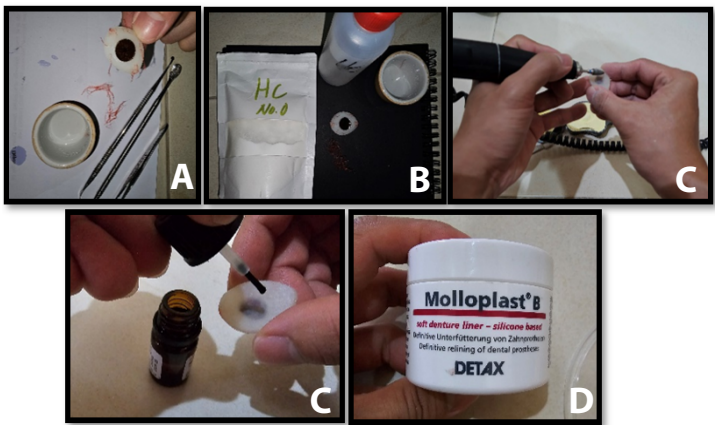

Figure 10. A. Characterization of blood vessels using red thread, B. Clear acrylic application, C. 2 mm reduction in the intaglio section, D. Adhesive primer application, E. molloplast B

Figure 11. Custom ocular prosthesis

Figure 12. From left to right: Before insertion, insertion, 1st control, and 2nd control of custom ocular prosthesis

soft liner use stated that the duration of use of Molloplast B reached 9 years.[16,17] Permanent soft liners made of silicone provide advantages in terms of viscoelasticity. Examined several permanent soft liners, both made from acrylic and silicone. The results of his research stated that silicone-based permanent soft liners are superior in terms of durability for viscosity properties.

The impact of using permanent soft liner in this case study is that it can better distribute pressure during functioning, absorb pressure and reduce the traumatic effects of postoperative eye tissue. This provides tissue comfort with a cushion effect between hard acrylic and soft tissue. This result is in accordance permanent soft liner materials produce a more even stress distribution on surfaces in contact with tissue and have excellent shock absorber properties so that eye tissue receives minimal pressure or load.

Conclusion

The fabrication of custom ocular prostheses modification with permanent soft liners is a new way to produce comfortable prostheses by minimizing direct trauma or pressure on the patient's eye tissue post-eviseration. This is because the soft liner provides a cushion effect, absorbs pressure / shock absorber and distributes pressure evenly.

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