Simplified Technique for Ocular Prosthesis Fabrication: A Case Report with 2 Years Follow-Up

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ABSTRACT

Ocular prosthesis fabrication traditionally involves complex processes that require meticulous attention to detail and specialized techniques. This case study presents an alternative approach utilizing simplified techniques for the fabrication of ocular prostheses. A 28-year-old female presented with evisceration of the right eye due to adherent leucoma, HSV keratouveitis, and panophthalmitis, necessitating an artificial eye for cosmetic rehabilitation. Instead of conventional methods involving elaborate procedures, a simplified technique was employed, significantly reducing the fabrication time. This case report outlines the step-by-step process of the simplified technique. The results demonstrate the efficacy of this approach in producing high-quality ocular prostheses with reduced complexity and resource requirements. The findings emphasize the potential of simplified techniques to enhance ocular prosthesis services and underscore their importance in improving patient care and quality of life.

Keywords: Artificial Eye, Eye Diseases, Ocular Prosthesis, Rehabilitation.

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Introduction

An individual's mental health is profoundly affected when they lose or have damage to one of their eyes. It also has an impact on a person's social and professional life. By using specially designed prosthetic devices for cosmetic rehabilitation, these people can overcome their issues and gain social and professional recognition.[1]

An ocular prosthesis, also known as an artificial eye, is designed to replace a missing or damaged eye, restoring the aesthetic appearance of the eye. This prosthesis is crafted from high-quality materials such as acrylic to closely resemble the natural eye in colour, size, and shape to ensure optimal comfort and visual symmetry for the patient.

Peyman et al. Divided the surgical techniques to remove an eye into three groups.[2] Evisceration, Enucleation, and Exenteration. Removing the contents of the eye and replacing the intraocular volume is known as evisceration, the sclera is intact. The globe is removed completely during enucleation surgery, leaving the remaining contents of the orbit intact. All orbital tissues, including the globe, optic nerve, extraocular muscles, periorbita, and some or all of the eyelids, are removed during exenteration.

Beyond cosmetic benefits, an ocular prosthesis helps maintain the health of the eye socket and surrounding tissues by preventing shrinkage and infection. It plays a crucial role in boosting the patient's self-esteem and confidence, enabling them to lead a more fulfilling and socially active life.

Case Report

A 28-year-old female presented with a missing right eye [Figure 1]. She presented with a history of evisceration due to Adherent Leucoma, HSV Keratouveitis, and Panophthalmitis. An ocular prosthesis was planned to correct the defect.

Figure 1.

A preliminary impression of the eye socket was made with alginate to fabricate a custom tray. The patient should be seated in an upright position looking straight forward during the impression procedure. Vaseline was applied to the surrounding area including eyebrows and eyelashes.

Alginate was mixed with cold water in flowable consistency to increase setting time and was loaded into a syringe. Eyelids were retracted, and alginate was injected into the eye socket from one side to the other side allowing the material to flow to all deep areas avoiding air entrapment. The patient was asked to look up, down, left, and right to record the borders of the eye socket. The syringe was immersed inside alginate at a 45-degree angle and allowed it to set. The impression was safely retrieved from the eye socket [Figure 2A, 2B] and a primary cast was poured [Figure 2C].

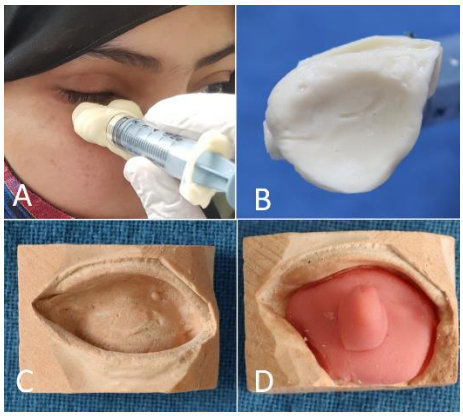

Figure 2A, 2B, 2C, 2D.

A custom tray [Figure 2D] was fabricated using cold cure acrylic resin 2mm short from the borders to make a definitive impression [Figure 3A]. A polished tray was placed inside the eye socket to check for the border. Injectable Light body addition silicone was injected into the eye socket as well as on the custom tray, and the tray was positioned into the eye socket, the patient was asked to look up, down, left, and right to record the borders. Superior and inferior border

extension is of more concern as it aids in better retention of the ocular prosthesis. Beading and boxing [Figure 3B] was done, and a definitive cast was poured [Figure 3C].

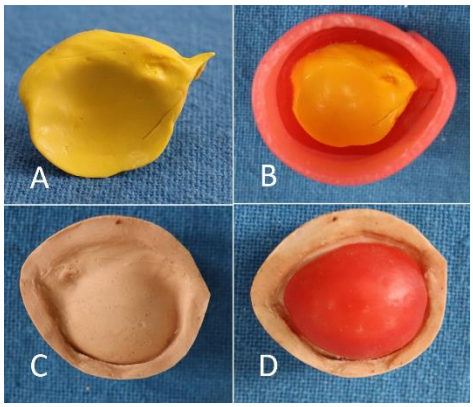

Figure 3A, 3B, 3C, 3D.

Scleral wax-up was prepared on the cast to replicate the sclera [Figure 3D], wax-up was adjusted to the correct size, shape, fullness, and mobility matching with the adjacent eye. [Figure 4A] Iris was then selected from the stock eye [Figure 4B] and trimmed to match with the natural eye (colour and diameter). Stock Iris was positioned in scleral wax up using reference lines [Figure 4C] to match with the adjacent eye.

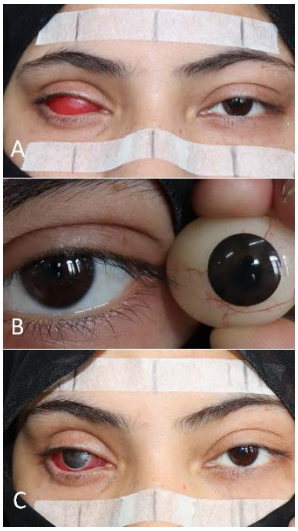

Figure 4A, 4B, 4C.

Scleral shade was selected using the Vita classic shade guide [Figure 5A]. The wax-up was flasked and dewaxed [Figure 5B].

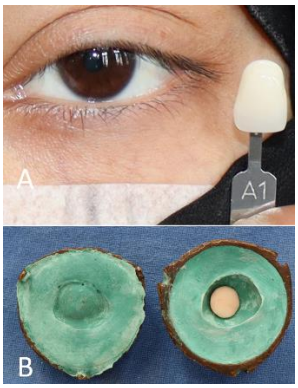

Figure 5A, 5B.

Heat cure acrylic resin of selected shade was packed and cured for 1 hour. The ocular prosthesis was trimmed and polished [Figure 6A]. The surface of the prosthesis was trimmed by 0.5mm and a thin layer of monopoly syrup [Figure 6B] was placed on top of the prosthesis to mimic the corneal layer (transparent layer), vein characterisation was not done as it was not prominent in the natural eye, which was then flasked, cured, trimmed and polished.

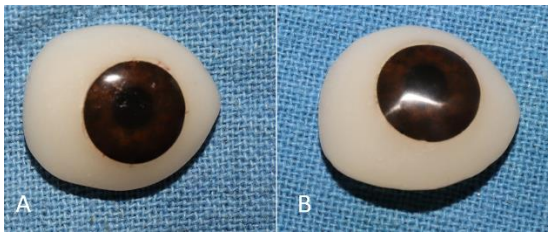

Figure 6A, 6B.

An ocular prosthesis was inserted and maintenance instruction was given to the patient [Figure 7].

Figure 7.

The patient was recalled every 6 months, after 2 years follow-up of the patient, the patient needed no correction of the prosthesis yet the prosthesis was polished with pumice to make it smooth to compensate for wear and tear.

Discussion

An ocular prosthesis fits within the conjunctival sac and mimics the appearance of a natural eye, primarily used after surgeries like enucleation or evisceration. In contrast, an orbital prosthesis replaces not only the eye but also surrounding orbital tissues, including parts of the eyelids and adjacent facial structures, following extensive surgeries such as orbital exenteration.

While custom prostheses require more time to manufacture than stock prostheses, they provide better fit, mobility, and aesthetics. Ocular impressions can be made in a number of ways, such as direct impression, with stock or

customised trays, or by altering already existing prostheses or conformers.[3]

Acrylic paints and red silk fibres can also be used for the characterisation on sclera, to replicate the veins which can be stabilized with monopoly syrup.[4]

Regular cleaning is essential to prevent illnesses. It is recommended that the prosthesis be properly polished once a year to maintain it in good condition. Anophthalmic sockets don't generate enough tears, thus lubricating them often could be necessary to ease discomfort.[5]

The prosthesis not only restored the aesthetic aspect but also played a crucial role in maintaining the health of the orbital socket, preventing complications such as socket contraction, collapse of the eyelids, prevents fluid accumulation.[6]

Conclusion

This case report illustrates the successful application of a simplified technique for ocular prosthesis fabrication, which offers a viable alternative to traditional methods. Over the two-year follow-up period, the prosthesis demonstrated excellent fit, aesthetics, and durability, requiring only minor maintenance, improving patient outcomes, ensuring both functional and psychological rehabilitation, and improving the overall quality of life.

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