IMPRESSIONS TECHNIQUES FOR OCULAR PROSTHESIS-A CLINICAL REVIEW

Ponnanna A Appanna, Amit Porwal, Nikhil Verma

ABSTRACT
Numerous ocular impression and fitting techniques have been described in the literature. Most of them can be placed into one of the several broad categories such as direct impression/external impression, impression with a stock ocular tray or modified stock ocular tray, impression with custom ocular tray, impression using a stock ocular prosthesis, ocular prosthesis modification, and the wax Scleral blank technique. The aim of this article is to review the literature on different clinical impressions techniques used for the fabrication of an ocular prosthesis.

Key words: Impression techniques; Ocular conformer; Ocular prosthesis; Scleral blank technique

Introduction
Eyes are generally the first features on the face to be noted. The unfortunate loss or absence of an eye may be caused by a congenital defect, irreparable trauma, tumor, a painful blind eye, sympathetic ophthalmia or the need for histological confirmation of a suspected diagnosis. The disfigurement associated with loss of an eye can cause significant physical and emotional problems. Most patients experience significant stress, due primarily to adjusting to the functional disability caused by the loss and to societal reactions to the facial impairment. Replacement of the lost eye as soon as possible is necessary to promote physical and psychological healing for the patient and to improve social acceptance. Ocular prostheses are either ready-made or custom-made. Fabrication of a custom ocular prosthesis allows infinite variations during construction. However, the use of a ‘stock’ prosthesis is usually advocated when time is limited and cost is a consideration. Various important steps are there in the fabrication of an ocular prosthesis, but the most important is the making an impression of the eye socket. The aim of the article is to review the literature on different impressions techniques used for the fabrication of an ocular prosthesis.

Literature Review: Numerous ocular impression and fitting techniques have been described in the literature. Most can be placed into one of several broad categories: Direct impression/external impression, impression with a stock ocular tray or modified stock ocular tray, impression with custom ocular tray, impression using a stock ocular prosthesis, ocular prosthesis modification and the wax scleral blank technique.

The Direct Impression/External Impression: Several authors have used a technique in which low viscosity alginate or reversible hydrocolloid is injected directly into the enucleated socket. The patient is instructed to stare straight ahead as the material sets. Additional material is applied to the external tissue, and an impression is made using a rigid tray for reinforcement (Figure 1 and 2). As a result, the anatomy of the ocular socket and overlying tissues is obtained. A stone mold is made from an impression, and wax is poured into this mold. The wax form or scleral blank acts as a trial ocular prosthesis. It can be tried in the patient and adjusted as necessary to achieve proper tissue contours and fit.

Impression with Stock Ocular Tray: Perhaps the most common impression technique is a stock ocular tray to help and support the impression material. Allen and Webster were early proponents of this technique, calling it a “modified impression method.” The stock ocular tray is placed in the socket (Figure 3). The tray has a hollow stem fastened in the middle through which a runny mix of ophthalmic alginate is injected. Perforations in the tray aid flow and retention of the alginate. Subsequently, the impression (Figure 4) is removed and invested in stone. A wax pattern is fabricated from the mold. This wax trial prosthesis is placed in the socket and 10 minutes allowed for muscle accommodation. The fit of the trial prosthesis is evaluated and modified as needed.

Stock Ocular Tray Modifications: Variations of the “modified impression method” center on the fabrication or configuration of a stock ocular tray. Maloney placed three channels through the superior edge of his own set of customized stock trays to prevent air entrapment. Following his method, raised ring around the stem prevents the eyelid from blocking the channels. Engelmeier suggested casting a set of stock trays in Ticonium to permit sterilization and reuse (Figure 5).
Several authors advocated the use of modeling plastic impression compound as an ocular tray material (Figure 6), forming it around one-half of a small rubber ball and placing a hollow tube through it. Ophthalmic alginate is injected through the tube to make an impression.

**Impression with Custom Ocular Tray:** Miller suggested that a custom ocular tray is necessary for certain situations. For example, the anophthalmic socket could be highly irregular or stock trays may not be available. Miller’s method involves attaching a solid suction rod to the patient’s existing prosthesis, conformer, or wax shell and investing it in an alginate mold. After the alginate sets, the prosthesis, conformer, or wax is removed and replaced with clear acrylic resin. Perforations are made in the resulting tray, and a tunnel is cut into the stem through which impression material can be delivered (Figure 7). An impression is made using injected alginate.

**Impression Using Stock Ocular Prosthesis:** Several authors have recommended the use of a stock ocular prosthesis as a tray to carry impression material. The impression technique involves selecting an esthetic stock eye and reducing its peripheral and posterior aspects. It is then lined with a thin mix of ophthalmic alginate and inserted for the definitive impression. Alternately, alginate can be injected directly into the socket and then reinforced by placement of the stock eye (Figure 8 and 9). The resulting impression is processed, providing a customized stock prosthesis. Limitations of this technique include the need to maintain a fairly large supply of artificial eyes and the inability to match all sizes and colors of the iris and pupil.

**Ocular Prosthesis Modification:** Some clinicians have advocated modification of an existing prosthesis to gain acceptable fit. Chalian has suggested that trimming and polishing a stock prosthesis will sometimes achieve this goal. Alternately, the stock prosthesis can be modified using alginate or soft wax, and then invested and processed. Smith described a reline procedure for an existing prosthesis using a dental impression wax, Korecta-Wax No. 4 (D-R Miner Dental, Orinda, CA). The ocular is reduced peripherally and posteriorly, and modified with baseplate wax. When proper contours and position are achieved, a thin layer of Korecta-Wax No. 4 is added. The lined prosthesis is warmed, inserted, and adjusted as needed. For definitive refinement, the lined prosthesis is left in place for 30 minutes while the patient intermittently moves his or her eyes in all directions (Figure 10). A laboratory reline procedure is then accomplished.

Ow and Amrith advocated the use of a tissue conditioner as a reline material because of its biocompatibility and ease of manipulation. The periphery of a stock prosthesis is reduced and subsequently modified with base plate wax. Viscogel (De Trey Division, Dentsply Ltd, Surrey, England) is added and the prosthesis inserted for 20 minutes. Excess material is removed, and the ocular prosthesis is worn for 24 to 48 hours to create a functional impression (Figure 11). If esthetics and adaptation are acceptable, the prosthesis is relined.

**Wax Scleral Blank Technique:** The wax scleral blank has been advocated as the starting point in several techniques. Benson created a wax blank by adapting base plate wax around half of an appropriately sized steel ball. The resultant pattern is smoothed, tried in, and adjusted. After the addition of an iris button, the pattern is invested and processed. If the socket is not grossly abnormal in configuration, McKinstry suggests using his “compression impression” technique. He empirically formed a wax pattern based on examination of the site. The pattern is tried in, modified as needed, and processed after addition of an iris. One particular advantage of the empirical wax blank method is that it can be more effective than an actual impression in forming an inferior fornix if the patient’s lower lid is weak, or the fornix is shallow. Using a wax blank created from a socket impression, Sykes describes preparing a functional impression using poly vinyl siloxane (PVS) material on the intaglio surface. The altered wax pattern is then used to fabricate the final ocular prosthesis.

**Conclusion**

Numerous impression and fitting methods exist. Effectiveness and desirability often depend on the patient’s presentation, operator experience, and materials and equipment available.

**Authors Affiliations**

1. Ponnanna A Appanna, MDS, Professor, Department of Prosthodontics, Pacific Dental College, Udaipur, Rajasthan, India, 2. Amit Porwal, MDS, Senior Lecturer, Department of Prosthodontics, Pacific Dental College, Udaipur, Rajasthan, India, 3. Nikhil Verma, MDS, Associate Professor, Department of Prosthodontics, Pacific Dental College, Udaipur, Rajasthan, India.
References

How to cite this article

Address for Correspondence
Dr. Ponnanna A Appanna, MDS, Professor, Department of Prosthodontics, Pacific Dental College, Udaipur, Rajasthan-313024, India.
Email: pons100@gmail.com

Source of Support: Nil
Conflict of Interest: None Declared