THE OCULAR IMPRESSION: A REVIEW

Jayaprakash MB, [1] Sumit Kumar Misra, [2]
Professor & Head, [1] Post Graduate Student, [2]
1– 2 Department of Prosthodontics, Teerthanker Mahaveer Dental College & Research Center, Moradabad.

Abstract

The disfigurement caused by loss of an eye is often a psychologically damaging experience for the patient. Ocular prosthesis is an artificial replacement of the eye. To gain improved fit and intimate tissue adaptation of ocular prosthesis, an accurate impression and fitting technique is necessary. This article will review various impression and fitting techniques used in the fabrication of acrylic resin custom ocular prostheses.

Key Words: - Eye stock Prosthesis, Ocular impression

Introduction

The loss of an eye can be a very traumatic event in a person's life, not only medically, but also emotionally. For many, the face and eyes help represent who they are, and it is common for these patients to feel as if a part of them has been lost. Various methods of rehabilitating an ophthalmic socket include, stock eye prosthesis (Prefabricated) and custom made ocular prosthesis. The stock prostheses that come in standard sizes, shapes, and color can satisfy the need for an artificial eye for such patient. No special skills or materials are required for fabrication. Stock prostheses are inexpensive and can be delivered quickly.[1-4]Often, however, a custom ocular prosthesis is indicated.[3-7]Custom ocular prosthesis has certain advantages which include improved adaptation to underlying tissues, increased mobility of the prosthesis, improved facial contours and esthetics gained from control over the size of the iris and pupil and color of the iris and sclera.[3,4]

This article review the literature about impression and fitting techniques used in the fabrication of acrylic resin custom ocular prostheses.

Literature Review

Various ocular impression and fitting techniques have been described in the literature. They include: 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

In this technique low viscosity alginate or reversible hydrocolloid is injected directly into the enucleated socket.[6,8] The patient is instructed to stare straight ahead as the material sets. A rigid tray for reinforcement is used over the additional material applied to the external tissue. As a result, the anatomy of the an ophthalmic socket and overlying tissues is obtained. Wax is poured into the stone mold made from the impression. 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. Bartlett and Moore[6]rationalized their procedure by explaining that an impression is required to realize the full movement potential of a prosthesis supported by an ocular implant. A well-fitting prosthesis also would eliminate potential voids in the socket and possible debris collection. In addition, they stressed that a wax try-in is necessary to evaluate proper physiologic function.

Impression with Stock Ocular Tray

It is the most common impression technique. It involves a stock ocular tray to help support the impression material.[9, 10]Allen and Webster[9]called it the "modified impression method." The stock ocular 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. A wax pattern is fabricated from the mold produced from impression. 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[11] placed 3 channels through the superior edge of his own set of customized stock trays to prevent air entrapment. Following his method, a raised ring around the stem prevents the eyelid from blocking the channels.

Casting a set of stock trays in Ticonium wassuggested by Engelmeier[12]to permit sterilization and reuse. Sykes, Essop, and Veres[13] advocated the use of modeling plastic impression compound as an ocular tray material, 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 the impression.

Impression with Custom Ocular Tray

In cases where an ophthalmic socket was highly irregular or stock trays may not be available, use of a custom ocular

tray was suggested by Miller[14]. He attached a solid suction rod to the patient's existing prosthesis, conformer, or wax shell and invested 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. An impression is made using injected alginate.

Impression Using Stock Ocular Prosthesis

This technique uses a stock ocular prosthesis as a tray to carry impression material.[1, 2,7]

In this method a suitable stock acrylic resin ocular prosthesis was selected. The stock ocular prosthesis is modified by trimming its peripheries. 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. 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

Chalian[15]has suggested trimming and polishing of a stock prosthesis to gain acceptable fit. The stock prosthesis can also be modified using alginate or soft wax, and then invested and processed.

Smith[4] described a reline procedure for an existing prosthesis using a dental impression wax,Korecta-Wax No. 4. The ocular prosthesis 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. A laboratory reline procedure is then accomplished.

Ow and Amrith[16] advocated use of a tissue conditioner as a reline material because of its biocompatibility and ease of manipulation.

Wax Scleral Blank Technique

The wax scleral blank has been advocated as the starting point in several techniques. Benson[17] created a wax pattern of half of the size of steel ball. The resultant pattern is smoothed, tried in, and adjusted. The pattern is invested and processed with iris button attached. Chalianet al[18] also followed the same.

McKinstry[19]suggested "compression impression" technique in which he empirically formed a wax pattern based on examination of the site. Wax pattern was tried in, modified as needed, and processed after addition of an iris. One particular advantage of the empirical wax blank method is it accurately records and form an inferior fornix if the patient's lower lid is weak or the fornix is shallow.

Le Grand and Hughes[20] in their "empirical/ impression" technique attached a "dummy" aluminum button to act as a handle. Then properly contoured wax pattern is used as a tray to carry alginate or support injected alginate impression material. Hughes[21] subsequently suggested that a syringe to be attached to the completed wax pattern so that impression material can be injected directly through it. Schneider[22]duplicated the patient's conformerto obtain a wax conformer and modified it in sections, using a dental impression wax, Iowa Wax .Various ocular movements given by patient resulted in a functional impression of the socket.

Alternately Sykes[5]in his technique usedpolyvinylsiloxane (PVS) material on the intaglio surface. The altered wax pattern is then used to fabricate the final ocular prosthesis.

Discussion

Stock ocular prosthesis often requires elaborate, time consuming adjustments. They lack a close fit and therefore cannot stimulate eyelid movement.[23] Custom –made acrylic resin ocular prosthesis replicates the orientation, natural color, contour, and size of the pupil and iris, providing realism and symmetry to the patient's face. In addition, it improves the fit of the prosthesis by gaining the intimate contact between prosthesis and tissue bed.

The close adaptation of custom –made prosthesis tends to distribute pressure more equally than does a stock eye prosthesis .This helps to reduce the incidence of abrasion or ulceration. It also enhances tissue health by decreasing potential stagnation spaces at the prosthetic tissue interface.[24]

Basic similarities exist among most techniques. Although a good impression technique can predictably capture the internal tissue surface and fornices of the socket, most authors agree that a wax trial ocular prosthesis try-in is important to evaluate fit, proper lid opening, and overlying tissue contours. The muscles must be relaxed before the wax prosthesis can be evaluated and modified. Some

clinicians prefer to use a functional impression technique to accomplish this.[25]

Conclusion

Impression making to facilitate the designing of an artificial eye for an ophthalmic socket is a common practice today. Numerous ocular impression methods exist. This review article presents various ocular impression techniques and reveals that custom made ocular prosthesis provide an excellent fit and adaptation.

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Corresponding Address:

Dr. Jayaprakash MB
Professor & Head
Department of Prosthodonticsublic Health Dentistry
Teerthankar Mahaveer Dental College & Research Center
Moradabad, Uttar Pradesh,
India -244001.
Email Id: - jayaprakashmb@yahoo.com