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A Method for Fabricating an Implant-Retained Orbital Prosthesis Using the Existing Prosthesis

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Abstract

This article describes a time-saving technique for fabricating a new implant-retained orbital prosthesis using the patient's existing prosthesis. The location of the ocular component is transferred; the position and openings of the palpebral anatomic structures and the precise anatomic details of the existing orbital prosthesis are duplicated. Making the impression, fabricating the definitive cast, alignment of the ocular component, and completing the wax sculpture of the prosthesis are accomplished in one appointment.

Fabrication of an esthetically pleasing orbital prosthesis is a challenging process. The correct location and the orientation of the ocular component is vital for an esthetically pleasing orbital prosthesis,[1] because slight discrepancies in eye position are immediately noticed by even the most casual observer.[2] Manipulating the ocular component into a position that matches the gaze of the normal eye is performed as the patient is staring directly at a point at least 6 feet away. The patient should be standing or sitting in an upright position without head support when evaluating ocular position. If a bright penlight is held at eye level, and the patient looks directly at the light, a reflection of the light is visible in the center of the pupil of the natural eye.[1] Sculpting the orbital prosthesis requires great attention in order to accurately duplicate the skin details and intricate anatomy of the eye in the natural position and to provide harmony with existing tissues.[1,2] The wax pattern is carefully tried in the actual defect, and usually extensive chairside time and energy is spent at this stage.[3] Hooper et al[4] reported that clinical and laboratory fabrication of a maxillofacial prosthesis is a time-consuming and labor-intensive process. They also indicated that replacement of a prosthesis may require a patient appointment time of 4 to 5 hours. Markt and Lemon[5] performed a maxillofacial prosthesis patient-opinion survey, which included a question elucidating reasonableness of the prosthesis cost. They reported that only 53% of the patients thought their prosthesis' cost was reasonable, and others underestimated prosthetic cost despite spending several hours at each of several clinical appointments. Furthermore, the limited longevity of facial prosthetic materials limits the service life of the prostheses.[6,7] Prostheses with a short lifespan can lead to patient disillusion with the treatment and extensive use of health care resources.[4]

Some techniques have been reported that permit the construction of a duplicate prosthesis from the same mold.[1,8–10] However, alteration of the tissues in the defect site sometimes limits the use of existing molds, so making a new impression of the defect site becomes necessary. Also, dental stone molds conveniently used for fabricating facial prostheses tend to break when repeatedly used to make duplicate prostheses. A mold's years of service and the number of prostheses that can be fabricated from a mold are limited.[8]

The objective of the technique described was using an existing implant-retained orbital prosthesis of the patient in fabricating a new prosthesis. The existing prosthesis was satisfactory in terms of ocular position, shape, and surface details; however, discoloration was observed, and a minor change occurred in the soft tissues in the defect site. The advantages of this technique are transferring the location of the ocular component, duplicating the position and openings of the palpebral anatomy, and duplicating the intricate folds and wrinkles of the existing orbital prosthesis. Hence, the clinician saves time required for sculpting. Also, the transfer of the spatial relationship of the implants from the defect to the definitive cast is ensured using the acrylic resin substructure of the existing

Figure 1 Wax index in the form of pyramids on the ocular surface.

Figure 2 Exposed surface of acrylic resin substructure and triangular keys on the irreversible hydrocolloid impression surface.

silicone orbital prosthesis. This acrylic resin substructure is used in the new prosthesis. Thus, construction of a new substructure is eliminated. The stages of making an impression, fabricating a definitive cast, alignment of the ocular component, and completing the wax sculpture of the prosthesis can be accomplished in one appointment. Minor modifications can be made on the wax pattern of the prosthesis. A disadvantage of the technique is the requirement of an additional impression procedure.

Technique

1. Remove eyebrows and eyelashes from the prosthesis to prevent the impression material from sticking to the hair. Place an index in the form of pyramids using a sticky and rigid wax (Hiflex Sticky Wax; Dental A2Z Ltd, Pitlochry, UK) on the surface of the ocular segment (Fig 1).
2. Place the prosthesis on the patient seated in an upright position. Make an impression of the prosthesis and surrounding tissues using irreversible hydrocolloid impression material (Hydrogum Soft; Zhermack SpA, Badia Polesine, Italy).
3. Remove the prosthesis from the impression. Remove the silicone covering the acrylic resin substructure and replace the prosthesis in the impression with the guidance of a wax index. Create triangular keys on the irreversible hydrocolloid impression surface using a sharp blade. Putting keys on the impression material to orient two pieces of an impression was modified from a previous report[11] (Fig 2).
4. Cover the silicone part of the prosthesis, excluding the acrylic resin substructure, and surrounding impression surface with type III dental stone (Labstone; Heraeus Kulzer, Armonk, NY). Allow the stone to set (Fig 3).
5. After the stone has set, recover cast and impression. Remove the prosthesis. Remove the ocular component from the prosthesis and replace it in proper position with the guidance of the wax index in the impression (Fig 4). Replace the cast on the impression in proper position.
6. Melt the modeling wax (Set-Up Wax; Dentsply Trubyte, York, PA) and pour the wax in the space of the missing silicone portion of the prosthesis (Fig 5). After the wax has set, separate cast and impression. Remove the wax pattern.

Figure 3 Cover the prosthesis, excluding acrylic resin substructure, and surrounding impression surface with dental stone.

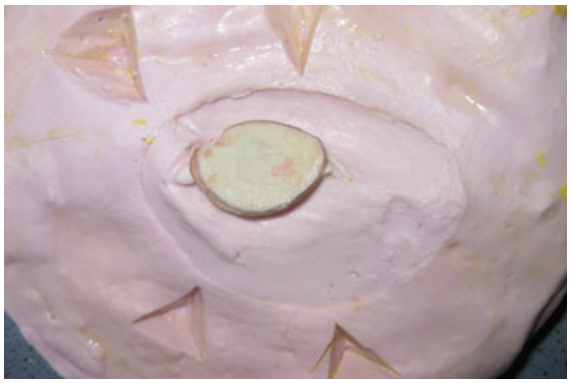

Figure 4 Replace the ocular part in proper position with guidance of wax index in the irreversible hydrocolloid impression.

7. Remove the acrylic resin substructure from the prosthesis. Clean the residual silicone from the surfaces of the substructure using a carbide bur (Laboratory Carbide Bur; GC Corp, Tokyo, Japan)
8. Place substructure on the patient. As described in a previous report[12] make an impression of the defect site by placing light-body vinylpolysiloxane impression material

Figure 5 Melt and pour the wax in the space of the prosthesis.

Figure 6 Evaluate the wax pattern on the patient.

(Express; 3M ESPE, St. Paul, MN) under the acrylic resin and obtain a definitive cast.

9. Adapt the wax pattern on the definitive cast incorporating acrylic resin substructure. Evaluate the wax pattern on the patient (Fig 6). Make modifications if necessary.
10. Fabricate the prosthesis in silicone (Cosmesil; Principality Medical Ltd, South Wales, UK) using conventional techniques.[1,2] Clean the acrylic resin substructure with acetone and silicone primer (Platinum primer; Principality Medical Ltd, South Wales, UK) prior to pouring the silicone into the mold (Fig 7).

Summary

This article describes a technique for remaking an implant-retained orbital prosthesis by using an existing orbital prosthesis, transferring ocular and acrylic resin substructure in a proper position. Reducing chairside time in remaking an orbital prosthesis is the main advantage of the technique. With this method, making an impression from the defect site, preparing a wax pattern of the prosthesis, and evaluating the wax pattern on the patient are accomplished in one appointment, while all of these steps normally require the patient to be present during the procedure for at least two clinical appointments. The disadvantages of the method are that the patient has to wear an eye patch during the mold preparation and silicone processing, and the requirement for an additional impression procedure that may be uncomfortable for the patient.

Figure 7 Orbital prosthesis in place.

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