

Use of a Stud Attachment to Retain a Silicone Orbital Prosthesis: A Clinical Report

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Keywords

Orbital prosthesis; maxillofacial prosthesis; silicone prosthesis.

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Accepted June 18, 2011

doi: 10.1111/j.1532-849X.2011.00812.x

Abstract

Orbital defects with total loss of eyelids and eyeball cannot be satisfactorily repaired by reconstructive surgery. Prosthetic replacement is the treatment of choice owing to its acceptable lifelike appearance. The use of semiprecision attachments in maxillofacial prostheses is limited to osseointegrated prostheses. Therefore, this article describes a conventional glasses frame technique, to retain the silicone orbital prosthesis using a Dalla Bona stud attachment.

Cancer surgery, malformation, or trauma may cause broad facial defects that cannot be covered by patients because of their exposed site. Such defects lead to enormous psychological strain that needs rehabilitation. Facial prostheses are important not only in rehabilitation and esthetics but also in patient resocialization. Total orbital exenteration is a radical surgical procedure typically involving the removal of the entire contents of the orbit, including the periorbita. Consequently, it results in deep orbital deformity in the patient, with devastating cosmetic and functional implications requiring expensive and technically challenging oculoplastic intervention, not to mention associated psychological effects. An orbital prosthesis presents an attractive and viable alternative when esthetic and functional demands are beyond the capacity of local reconstructive efforts.¹

Retention of the prosthesis is an important factor for the satisfactory rehabilitation of any facial deformity. Orbital prostheses are usually retained using tissue undercuts.² In the absence of an undercut, they can be fixed with adhesives.³ Magnet retention and clips have been used in a majority of patients treated with orbital prosthesis in the United States and Canada.⁴ Miscellaneous attachments, like ball attachments or the Dalbo attachment (Sterngold, Attleboro, MA) have been used in Sweden and Canada, respectively. All the attachments used to retain the orbital prosthesis are supported by osseointegrated implants.^{5,6} However, there are no reports in the literature where the semiprecision attachment was used to retain the orbital prosthesis by conventional means. This article describes the procedure of rehabilitating a patient by using a Dalla Bona attachment (Attachment International, Inc, Burlingame, CA) to retain the orbital prosthesis. The Dalla Bona attachment was used to fix the eyeglass frame to the orbital prosthesis.

Clinical report

A 52-year-old female patient was referred to the Department of Maxillofacial Prosthodontics at the SDM College of Dental Sciences and Hospital, Dharwad, Karnataka, India. The patient complained of facial disfigurement caused by the loss of the left eye (Fig 1). A history of carcinoma, followed by exenteration of the orbit was recorded. The patient was deeply concerned about her esthetics and indicated a desire for an economical solution to restore her deformity. Clinical examination of the orbital defect revealed much less undercut for retaining the prosthesis entirely on an anatomical undercut. Hence, an additional retentive aid using an eyeglasses-retained silicone orbital prosthesis was planned. The silicone orbital prosthesis was attached to the eyeglass frame using a Dalla Bona attachment.

An impression of the orbital defect was made using an irreversible hydrocolloid (Algitex; Dental Products of India, Mumbai, India), reinforced with dental plaster (Everest Brand; Panade Industries Pvt Ltd, Nippani, India), and the cast was poured in dental stone (Kalastone; Kalabhai Pvt Ltd, Mumbai, India). The defect area on the definitive cast was duplicated using silicone-duplicating material (Duplicone; Bego Dental, Bremen, Germany), and the resultant mold was poured using type 4 dental stone (Kalastone). This cast was used to make a wax pattern for the acrylic resin base in a circumferential design adapting it to the perimeter of the defect. The wax pattern for the acrylic resin base was also extended on the bridge of



Figure 1 Patient's preoperative photograph.



Figure 2 Wax pattern for the acrylic resin base.



Figure 3 Orbital wax pattern.



Figure 4 Trial for the silicone prosthesis.



Figure 5 Dalla Bona attachment system.



Figure 6 Duplicated putty mold with castable pattern resin patrix.



Figure 7 Wax pattern of the patrix with the framework attached to the crucible former.

the nose for incorporation of the Dalla Bona patrix component (Fig 2). The wax pattern was sealed to the cast and invested. After wax elimination, heat-polymerizing acrylic resin (DPI-Heat cure; Dental Products of India Ltd.) was packed. Intrinsic coloring was applied to blend with the patient's skin tone. The cured acrylic resin base was retrieved, finished, and polished. The fit of the base was tried on the patient.

Different aids were used for aligning the artificial eye, after which it was positioned in the defect.⁷ The wax pattern for



Figure 8 Cast framework with Dalla Bona metal housing and elastic ring.



Figure 9 Patrix framework fixed in the acrylic resin base.



Figure 10 Glasses frame incorporated with metal housing corresponding to the position of the patrix.



Figure 11 Placement of the definitive prosthesis.

the orbital prosthesis was prepared over the acrylic resin base (Fig 3). Try-in of the waxed-up orbital prosthesis was done. At this stage, the eyeglass frame was selected, and the close approximation of the eyeglass frame to the acrylic resin base was checked. The wax pattern was sealed to the cast; investing and wax elimination was carried out. Primer (A-330-Gold, Factor II, Lakeside, AZ) was applied to the resin base for the bonding of the acrylic resin base to the silicone elastomer. The intrinsically colored silicone (Technovent Ltd, Leeds, UK) was packed and cured at room temperature. The prosthesis was retrieved and finished, and an initial trial was performed (Fig 4). The eyelashes and eyebrow hairs were stitched. Finally, extrinsic tinting was performed to blend with the patient's skin tone. The excess silicone on the acrylic resin base extending on the bridge of the nose was cut.

The Dalla Bona attachment for implant overdentures was used. It consisted of a brass laboratory analogue, matrix housing, and an elastic ring (Fig 5). The laboratory analogue was duplicated in a putty rubber base relined with light body poly(vinyl siloxane). Pattern resin was poured into the duplicated mold to fabricate a castable Dalla Bona stud attachment (Fig 6). The castable Dalla Bona patrix was waxed-up to form a framework with retentive loops. Retentive beads were also added for acrylic resin retention (Fig 7). The cast framework with Dalla Bona patrix was retrieved, finished, and polished (Fig 8). The prefabricated Dalla Bona metal housing fit well to the cast Dalla Bona patrix. Space was created in the acrylic resin base on the part extending on the bridge of the nose, to incorporate the cast framework. The framework with patrix was embedded in the acrylic resin base on the bridge of the nose using self-polymerized acrylic resin (Fig 9). The matrix was fully seated on the Dalla Bona patrix. The height of the Dalla Bona patrix was 3 mm and 5 mm, including the fully seated matrix. A cavity was prepared on the inner surface of the bridge of the eyeglass frame using a carbide bur. The eyeglass frame was placed in situ and was evaluated for any interference of the metal housing. Once the trial was found satisfactory, self-polymerizing acrylic resin was used to secure the matrix metal housing into the eyeglass frame (Fig 10). Finally, the orbital prosthesis was retained by the glasses frame using the Dalla Bona semiprecision attachment (Fig 11).

Home care instructions were given, and follow-up evaluation was performed once in 3 months. At the time of the follow-up evaluation, the prosthesis was noted to be functioning well. The orbital prosthesis was able to detach from the eyeglass frame easily, ensuring that the Dalla Bona attachment was functioning effectively.

Discussion

The technique used for retaining maxillofacial prostheses plays an important role in the success of the treatment. Osseointegration concepts for retaining the orbital prosthesis are well documented.^{4,5,8} Due to financial constraints, patients do not always have the liberty to opt for an implant-retained prosthesis. Further, the use of implants may be limited or delayed by radiotherapy, chemotherapy, and/or the patient's health status.⁹ Modern prosthetic replacements are secured with adhesives that are readily available and easily applied and provide satisfactory retention for a limited period; however, continual use of adhesives may cause an allergic response or irritation.²

Conventionally retained orbital prostheses are practical, trouble-free, cost-efficient, and successful. Eyeglasses can be effectively used to retain an orbital prosthesis when there are no other means for retention. In this report, the patient had minimal anatomical retention; hence, additional retentive aid was required to hold the prosthesis in place. Usually, the glasses frame is attached permanently to the prosthesis with autopolymerizing resin; however, the main disadvantage is that when the patient removes the eyeglasses, the prosthesis is also removed, which can be embarrassing for the patient.¹⁰ When our patient removed the eyeglasses, the prosthesis was retained by engaging the remaining soft tissue undercut along with minimal use of medical-grade adhesive.

Many stud attachments are available from different manufacturers. They are usually in the form of ball-and-socket devices, primarily used for overdenture retention and stabilization.¹¹ The stud attachments most commonly reported in the literature are the O-ring system and Dalla Bona attachments.^{12,13} Both attachments have shown satisfactory results for adequacy of prosthesis retention.^{14,15} The Dalla Bona stud attachment was used in the present clinical scenario because it was readily available in the clinical set-up; however, the presented technique may be employed with any of the stud attachment. The use of the Dalla Bona attachment provided good retention for the prosthesis. The eyeglass frame camouflaged the margins of the prosthesis.

Summary

A simple procedure of fabricating a silicone orbital prosthesis using a semiprecision attachment has been presented. The method used an acrylic resin base embedded with a Dalla Bona attachment to attach to the prosthesis. The main advantage of this method is that the prosthesis is not permanently attached to the eyeglass frame. Hence, the patient can remove the glasses without removing the prosthesis. In that case, the prosthesis will be retained in the undercut; however, the use of the Dalla Bona attachment provided extra retention that gave psychological comfort to the patient.

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