Clinical Report

Use of acrylic resin base as an aid in retaining silicone orbital prosthesis

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Orbital defects with total loss of eyelids and eyeball cannot be satisfactorily repaired by reconstructive surgery. While prosthetic replacement is the treatment of choice owing to its acceptable and life-like appearance, retention of the orbital prosthesis is an important factor for success of the prosthesis. This paper describes a technique for retention of silicone orbital prosthesis using acrylic resin base, wherein the latter is attached to the eyeglass frame.

Key words: Artificial eye, maxillofacial prosthesis, retention aids

INTRODUCTION

Total orbital exenteration is a radical surgical procedure which typically involves removal of the entire contents of the orbit, including periorbita. Consequently, it results in a deep orbital deformity in the patient with devastating cosmetic and functional implications that require expensive and technically challenging oculoplastic intervention, not to mention associated psychological effects. Orbital prosthesis presents an attractive and viable alternative when esthetic and functional demands are beyond the capacity of local reconstructive efforts.[1]

Prostheses for orbital defects can be made from a variety of materials such as polymethyl methacrylate, polyurethane elastomer, silicone elastomer, or urethane-backed medical grade silicone. They are usually retained by adhesives, tissue undercuts, or, in some instances, extraoral osseointegrated implants.[2-5] Eyeglass frames have been the medium of choice in anchoring orbital prosthesis with a variety of base materials and accessory-retentive features such as bar-clips, snaps, and magnets.[6-10]

Ablative surgical procedure incurs major financial burden, and hence the patient may seek a prosthetic treatment that is economical. Therefore, selection of a reasonable maxillofacial prosthetic material and economically feasible retentive aid should be the goal of rehabilitating such patients. Since silicone has better marginal adaptation and life-like appearance, it has been used for the fabrication of orbital prostheses.[11] A limitation of silicone orbital prostheses is its lack of chemical / mechanical bonding with the eyeglass frame, making it difficult to retain the prosthesis. This paper describes a method of fabricating the silicone orbital prosthesis which is attached to the eyeglass frame using acrylic resin base. The method is employed for treating two identical cases with orbital defect.

CASE REPORTS

Case 1

A 45-year-old female was referred to the Department of Maxillofacial Prosthetics at our institution. The patient complained of facial disfigurement due to loss of the left eye, and a history of carcinoma of the left eye followed by exenteration was recorded. As a result of altered facial esthetics, the patient suffered severe emotional trauma in terms of social acceptance.

Case 2

A 58-year-old female was referred to the aforementioned department. The patient complained of missing right orbital contents following the surgery due to adenoid cystic carcinoma [Figure 1].

We learnt that both the patients were seeking an artificial orbital replacement. On examination, there was no anatomical undercut in the defect that could be utilized for retention. A custom-made ocular and orbital prosthesis was planned and the treatment procedure explained to the patient. Identical methods were employed to verify the reliability of the results in both patients.

Procedure

1. The patient was placed in the supine position and draped for impression procedures; the patient's eyebrows and eyelashes were lubricated with petroleum jelly.
2. Impression of the orbital defect was made using irreversible hydrocolloid reinforced with dental plaster and the cast poured in dental stone [Figure 2].
3. The stone cast was duplicated with silicone duplicating material in a metal flask. After the duplicating material set, the master cast was separated and stone cast poured in the mould.
4. Wax pattern for the acrylic resin base was made in a circumferential design adapting it to the perimeter of the defect.
5. The pattern was sealed to the cast and invested. After wax elimination, heat polymerizing acrylic resin was packed. Intrinsic coloring was applied to match the skin color around the patient's defect.
6. Curing was carried out. The resin base was retrieved, finished, and polished. The fit of the base was checked on the cast [Figure 3].
7. Different aids were used in aligning the artificial eye, after which it was positioned in the defect.[12] Artificial eye can either be custom-made or stock eye, the former being used in this case.
8. The wax pattern for the orbital prosthesis was prepared and the acrylic resin base embedded in it. The acrylic resin base was exposed only at the bridge of the nose for attachment to the eyeglass frame [Figure 4].
9. Try-in of the waxed-up prosthesis was done [Figure 5]. At this stage the eyeglass frame was selected and tried on the patient, and close approximation of the eyeglass frame to the resin base was checked.
10. The wax pattern was sealed to the cast, flasking carried out and wax eliminated [Figure 6].
11. Primer was applied to the acrylic resin base for bonding with silicone.
12. The silicone was packed. Intrinsic coloring was produced to match the patient's skin tone and cured at room temperature.
13. The prosthesis was retrieved, finished, and initial trial taken. The eyeglass frame was placed *in situ*. If the silicone layer was found to be covered on the medial extension of the resin base, it was cut and exposed. This facilitates the attachment of the eyeglass frame to the resin base.
14. With both the eyeglass frame and prosthesis placed *in situ*, the glass frame was attached to the acrylic resin base with the help of cyanoacrylate resin adhesive. The attachment was reinforced with autopolymerizing acrylic resin [Figure 7].
15. Finally the silicone orbital prosthesis retained by the eyeglass frame was placed *in situ* [Figure 8]. Similarly all the steps were carried out for case 2 [Figures 9 and 10].
16. Home care instructions were given, and follow-up evaluation was carried out, at which time the prosthesis was noted to be functioning well.

DISCUSSION

Technique used for retaining maxillofacial prostheses plays an important role in the success of treatment. Osseointegration concepts for retaining the orbital prosthesis are well documented.[13-15] Because of financial constraints, patients, in general, do not always have the liberty to opt for the implant-retained prosthesis. Modern prosthetic replacements are secured with adhesives that are readily available, easily applied, and provide satisfactory retention for a limited period of time. However, continual use of adhesives may cause allergic response or irritation.[16]

Conventionally retained orbital prostheses are practical, trouble-free, cost-efficient, and successful.[2] The most commonly used conventional method to retain orbital prostheses is the eyeglass frames and anatomic retentive undercuts. Anatomic retention can help retain an orbital prosthesis by using a flexible conformer in the defect space; the orbital prosthesis is constructed in the usual manner with an extension into the conformer engaging the circumferential groove undercut to provide mechanical retention.[16] However, there should be adequate anatomic undercut to use this technique.

The patient treated in this report had no anatomical defect; hence an eyeglass frame was the only alternative to retain the silicone orbital prosthesis. The shortcoming of using silicone elastomer to fabricate an orbital prosthesis retained by eyeglass frame is that no bonding between silicone and the frame is achieved. The use of acrylic resin base aids in attachment to the eyeglass frame, as well as bonding to the silicone.

Acrylic resin is a simple and economical base material for use in retaining the orbital prosthesis. Previously, some reports have described the fabrication of acrylic resin orbital prosthesis attached to an eyeglass frame;[17,18] however, the advantage of the present method is the use of silicone elastomer, which has better marginal adaptation (knife edge margins can be produced) and is lightweight. In particular, silicone produces a more life-like appearance. The silicone orbital prosthesis was comfortable to wear and caused no irritation to the surrounding skin. The patient started wearing the prosthesis routinely and was satisfied with the cosmetic result. She had recommenced attending her pre-surgical social events comfortably.

Figure 1: Frontal view of the face with orbital defect on the left side

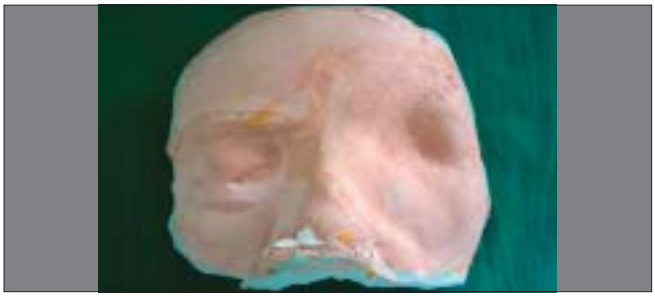

Figure 2: Facial moulage

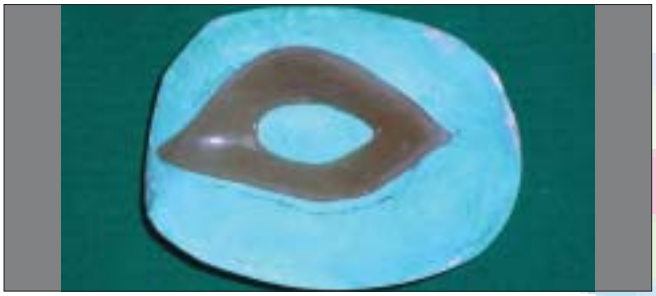

Figure 3: Fit of the acrylic resin base is checked on the cast

Figure 4: Wax pattern of the orbital prosthesis with the medial margin of acrylic resin base exposed

Figure 5: Trial of the wax pattern done and the position of medial extension of acrylic resin base evaluated

Figure 6: Primer application for bonding with silicone following wax elimination

Figure 7: Silicone orbital prosthesis attached to the eyeglass frame

Figure 8: Fabricated prosthesis in situ

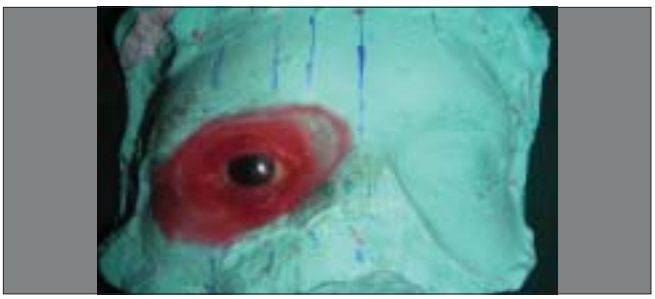

Figure 9: Wax pattern of the orbital prosthesis for case 2

Figure 10: Silicone orbital prosthesis attached to the eyeglass frame for case 2

SUMMARY

A simple procedure of fabricating an eyeglass frame–retained silicone orbital prosthesis has been presented. The method used acrylic resin base for attaching the eyeglass frame to the silicone prosthesis. The advantages of this method are its cost-effectiveness, tissue tolerance, esthetics, and comfort for use and wear.

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