

Magnetically retained silicone facial prosthesis

S Venugopalan, P Ariga, P Aggarwal, A Viswanath

Department of Prosthodontics, Saveetha Dental College, Chennai, Tamil Nadu, India

Abstract

Patients with orocutaneous fistulas suffer from discomfort in terms of facial esthetics, food spill over and lack of psychological confidence to present them socially. Prosthetic camouflaging of facial defects and use of silicone maxillofacial material are the alternatives to the surgical retreatment. Silicone elastomers provide more options to clinician for customization of the facial prosthesis which is simple, esthetically good when coupled with bio magnets for retention.

Key words: Magnet retention, oro cutaneous fistula, silicone maxillofacial prosthesis

Date of Acceptance: 09-Jun-2013

Introduction

The acquired facial deformity due to trauma, tumor and ablative surgery can cause severe disfigurement and facial impairment. Such individuals even reported to have depression, anxiety and hostility.^[1] Surgical facial reconstruction in suborbital, pre auricular, buccomandibular region are performed using skin grafts, local flaps, regional myocutaneous flaps and composite flaps.^[2] Post-surgical adjunct radiation therapy sometimes can compromise the successful regional myocutaneous flap and thus resulting in unaesthetic facial defect or oro cutaneous fistulas.^[3]

Post-surgical defects could be rehabilitated or camouflaged using polymethyl methacrylate, latexes, vinyl polymers, copolymers, polyurethane elastomers, silicone elastomers and the various modes of retaining the facial prosthesis include straps, spectacle frames, extension from the denture, magnets, adhesives and implants material.^[4] In this case report using maxillofacial silicone material and magnets, the prosthesis was constructed to camouflage the facial defect more esthetically.

Case Report

A 67-year-old male patient was referred to the department of prosthodontics with an oro facial communication defect. His medical records suggested that he was diagnosed with

carcinoma cuniculatum-squamous cell carcinoma on the right cheek. The treatment involved extensive surgical excision of carcinomatous cheek tissues and neck nodes upto level III. Then, the surgical reconstruction was performed using a deltopectoral flap. Post surgically he underwent 60 CYG of radiation therapy for a period of 4 weeks.

Post-surgically, there was wound break down and the oro facial communication developed. The patient's chief complaint was limited mouth opening and any solid or liquid food tends to flow out from the oro facial communication. His other major concern was his facial disfigurement and inability to socially present him to others.

On extra oral examination, the oro facial communication was located on the inferior border of the right naso labial fold and 3.5 cm distally to angle of the mouth. The oro facial defect was oval shaped measuring 1.5 cm × 1 cm [Figure 1].

Intra oral examination revealed he had partially edentulous upper arch and completely edentulous lower arch. There was limited mouth opening (measuring 3 cm) due to the surgical facial scar and intra orally the right labial sulcus was obliterated.

Address for correspondence:

Dr. Suresh Venugopalan, Department of Prosthodontics, Saveetha Dental College, Ponamalle High Road, Chennai - 600 077, Tamil Nadu, India.
E-mail: sureshvbat@gmail.com

Access this article online

Quick Response Code:



Website: www.njcponline.com

DOI: 10.4103/1119-3077.127575

PMID: 24553044

Immediate surgical retreatment was not recommended due to the adjunct therapy (chemotherapy or radiation) at the reconstructed site and hence prosthetic rehabilitation of the patient was considered to improve the function and psychological status of the patient after obtaining the informed consent.

The facial impression was recorded using irreversible hydrocolloid impression material. Before recording impression, a thorough preparation of the patient was performed by blocking undercuts on his nostrils and protecting his eyes with gauze packs. To facilitate breathing, patient was in the supine position, suction tip was placed in the corner of the mouth on the contra lateral side and also petroleum jelly was applied on his hairline, eyebrows, moustache for easy removal of impression material. The alginate impression (Tulip-Cavex, Holland) was mixed to the right consistency and loaded layer by layer on the face and a gauze strip was placed on top of the alginate impression material before it sets. A layer of dental plaster was mixed and poured over the gauze strip to act like a base for the alginate facial impression. Once the plaster was set, the alginate impression along with base was carefully separated from the face [Figure 2]. After beading and boxing, dental stone was poured to obtain a positive replica of the face and the oro facial defect.

Once a replica was obtained, a custom made tray was fabricated with auto polymerizing acrylic resin for making a more definitive impression of the defect. This tray was tried on the patient's face and then beading of the tray was done using elastomeric impression material of high consistency (Aquasil, Densply DETRY, GmbH Germany). This prevented the tray from impinging onto the facial tissues during impression making and also limited the flow of the impression material within the confines of the tray. After this, the final definitive impression was recorded using elastomeric impression material of medium consistency (Aquasil ultra monophase, Dentsply Caulk, USA) [Figure 3]. Once impression was obtained, beading and boxing of the impression was done and the master cast was poured.

An acrylic conformer was constructed using an auto polymerizing resin (Clear acrylic, DPI India). This conformer was shaped as a hollow cylinder (into the oro facial defect), which fans out as a spherical horizontal extension onto the cheek. This conformer will act as a base for the silicone material and also aid in retention of facial prosthesis [Figure 4].

Once the conformer was constructed the wax up was done on the defect using the modeling wax. The facial sculpting was done using the mirror image of the left facial contours. Symmetrical facial patterns were observed from facial view, profile view and supine view from jaw angle [Figure 5].

Grooves and notches were created on the land of the master cast after the facial sculpting. Beading and boxing was done only on right side extending upto the midline. Separating medium was applied and dental plaster was poured into the boxed section. Once the plaster was set, it was carefully



Figure 1: Oro cutaneous fistula



Figure 2: Facial impression using irreversible hydrocolloid

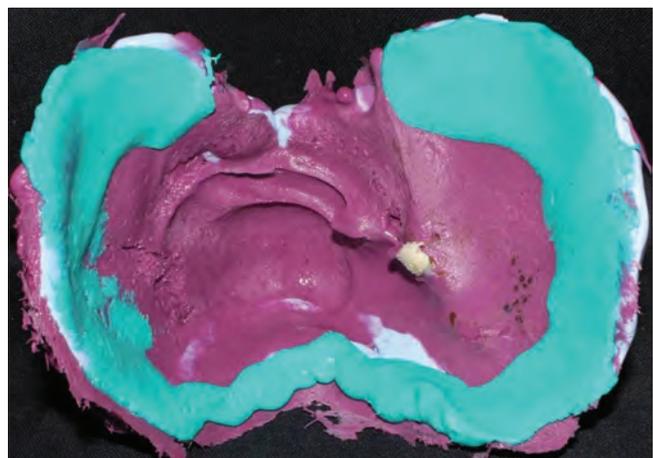


Figure 3: Definitive impression

separated from the master cast and this plaster mass will act as an index.

Once the index was separated from the master cast the modeling wax used for facial sculpting was flushed out. This created the mold space for the silicone material. The conformer was also thoroughly de waxed and was replaced in its position on the master cast [Figure 6].

After de waxing, a uniform coat of mold separator (Factor II Inc., USA) was applied on the warm mold (both master cast and plaster index) to facilitate separating the silicone from the mold. A conditioner (Gold Primer A 330 suspended in dichloromethane, Factor II Inc., USA) was also applied onto the acrylic conformer to obtain a good bonding between the conformer and silicones.

The facial prosthesis and or ofacial defect were restored using room temperature vulcanizing (RTV) silicones (Platinum VST 50, Factor II Inc., USA). Trial mixes of RTV silicone base and catalyst material were mixed; the consistency was varied by adding different quantities of thixotropic material. Intrinsic colors were added according to the recommendation and a trial RTV silicone sample was identified close to the patient's normal skin tone (B3 shade-medium skin tone). The number of parts of each intrinsic coloring component added was recorded so that during the final silicone mix same amount or number of parts of intrinsic colors can be added to obtain a shade similar to that of the trial silicone's base color.^[5]

When the mold temperature had cooled down the final RTV silicone base and catalyst were mixed in 10: 1 proportion and the thixotropic material, intrinsic colors were added similar to the trial silicone preparation. Once a uniform homogenous mix was obtained the silicone base shade was re-verified against the patient's skin tone and using a brush the RTV silicone was painted uniformly on the mold surface. This uniform brush application will help in eliminating any void formation. After the complete application, the plaster index was re-oriented back onto the master cast and complete seating of the same was verified with the help of notches created on the land of the cast.

The master cast and plaster index were secured with elastics and left for overnight curing of the RTV silicone. The completely cured RTV silicone's facial prosthesis was retrieved from the mold the following day and subjected to finishing and polishing.

Extrinsic stains were added to mimic the keratinized appearance and to achieve a darker lip tone. Nylon hair (white and black) were punctured inside the silicone using needles all along the beard line to mimic the facial hair.

Although silicone cheek prosthesis was ready, the mode of retention on the face was challenging. The lower complete denture base was adapted on the cast and inserted inside the patient's mouth. Visible denture base area was marked through the orofacial communication. Using utility wax the circular open circuit magnet (Neodymium Iron Boron Bio Magnet, 3M India) measuring 0.5 mm in diameter was

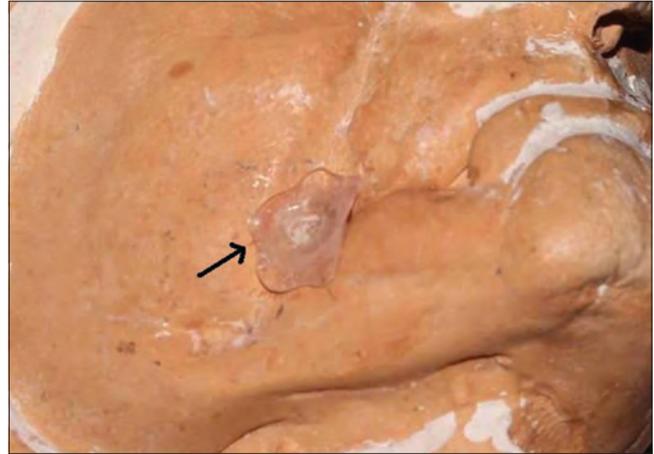


Figure 4: Conformer at the oro cutaneous fistula

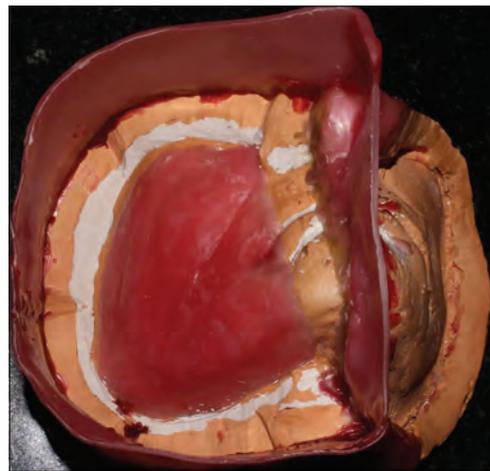


Figure 5: Facial sculpting



Figure 6: Plaster index

mounted on the marked area of the denture base [Figure 7]. The position of the magnet was verified intraorally as well as extraorally [Figure 8]. The other circular magnet measuring the same diameter was mounted on the orifice of the cylindrical part of acrylic conformer. Once the position was verified, the magnets were secured thoroughly using the auto polymerizing resin. Care was taken that the polarity of both magnets attracted each other and a complete surface to surface contact existed between them. Thus, the RTV silicone facial prosthesis was retained magnetically to the intraoral denture base through the orofacial communication. This will aid in both functionally preventing food out pour and esthetically restoring the facial deformity [Figures 9-11].

Post prosthesis delivery periodic recall and check ups were scheduled at 1st month, 3rd month and 6th month to make any necessary adjustments. Patient was satisfied in terms of facial appearance, color matching, swallowing activity and prosthesis preventing escape of food and fluids from the mouth. There was no noticeable complication at the or

ocutaneous communication site due to the use of prosthesis; alternatively patient's psychological morale was improved with the use of silicone prosthesis.

Discussion

Surgical retreatment of orocutaneous communication can be delayed due to systemic status of the patient, possible prognosis of surgery, adjunct therapy and dimension of the defect, accessibility and cost of rehabilitative procedure. In such circumstances, prosthetic rehabilitation is viable alternate treatment options. The maxillofacial prosthesis can be constructed from the polymethyl methacrylate, latexes, vinyl polymers and copolymers, polyurethane elastomers and silicone elastomers. The use of silicone maxillofacial elastomers are advantageous because it provides a wide range of customization, light weight, life like appearance, ease of intrinsic and extrinsic coloring, non-allergenic, tissue compatibility, ease of construction and dimensionally stable.^[5] Although silicones are the sought after material for maxillofacial prosthesis they do carry certain disadvantages such as deterioration of the prosthesis due to environmental



Figure 7: Magnets positioned on the denture base



Figure 8: Magnet position verified extra orally



Figure 9: Denture base and silicone prosthesis connected by magnets

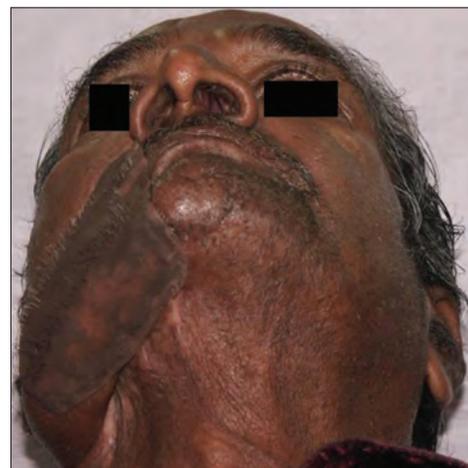


Figure 10: Chin view of magnetically retained facial prosthesis



Figure 11: Frontal view of magnetically retained facial prosthesis

conditions (ultraviolet light, air pollution, temperature), fragile margins, microbial growth on the open pores of the elastomers leading to rapid degradation of color dexterity.

The cheek silicone prosthesis although constructed to the patient's esthetic requirement retaining the same on the face is complicated. The prosthesis has to defy the gravity acting on it and at the same time the mode of retention should be invisible. This will make the maxillofacial prosthesis appear more realistic. The mode of maxillofacial prosthesis retention ranges from engaging into anatomical undercuts, use of medical adhesives to mechanical methods such as use of straps, eyeglasses, thread, wire loop, pins, tubes and magnets. However, the magnets are considered to be the best possible source to obtain retention and stabilization for the maxillofacial prosthesis as first reported by Javid.^[6]

The use of magnets in retaining nasal, ear and orbital maxillofacial prosthesis has been reported earlier,^[7,8] but in this clinical report an attempt is made to retain the maxillofacial cheek silicone prosthesis using bio magnets. The magnets small size and stronger attractive forces are advantageous in seating of the maxillofacial prosthesis, retention, stabilization and ease of prosthesis removal for hygiene maintenance. The current technique using silicone elastomers and magnets is superior

in terms of patient comfort because it eliminates the external head straps, acrylic prosthesis and relining procedure for tissue contact as suggested in earlier techniques.^[4] Although the maxillofacial prosthesis is intended to rehabilitate the defect, there were few limitations like the static appearance of the prosthesis during some of the patients facial expressions on the contra lateral side.

Conclusion

The oro facial communication can be successfully rehabilitated close to patient's normal skin tone using RTV silicone facial prosthesis. The magnetically retained maxillofacial prosthesis provides an esthetically acceptable facial contour, functionally prevents food spill over from the oral cavity and boosts patient's psychology to present themselves socially.

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How to cite this article: Venugopalan S, Ariga P, Aggarwal P, Viswanath A. Magnetically retained silicone facial prosthesis. *Niger J Clin Pract* 2014;17:260-4.

Source of Support: Nil, **Conflict of Interest:** None declared.