

## Adhesive Retained Extra Oral Defect Maxillofacial Prosthesis

Angadi Kalyan Chakravarthy<sup>1</sup>, B.J. Vidya Sree<sup>2</sup>, Budiga Veerendra<sup>3</sup>,  
V.Bhanu Chander<sup>4</sup>, Ramavarapu Avinash<sup>5</sup>, Mohammed Jalaluddin Rasheed<sup>6</sup>

<sup>1</sup>(Department of Prosthodontics, Meghna Institute of Dental Sciences, Nizamabad, Telangana, India)

<sup>2</sup>(Department of Prosthodontics, Meghna Institute of Dental Sciences, Nizamabad, Telangana, India)

<sup>3</sup>(Department of Prosthodontics, Meghna Institute of Dental Sciences, Nizamabad, Telangana, India)

<sup>4</sup>(Department of Prosthodontics, Meghna Institute of Dental Sciences, Nizamabad, Telangana, India)

<sup>5</sup>(Department of Prosthodontics, Meghna Institute of Dental Sciences, Nizamabad, Telangana, India)

<sup>6</sup>(Department of Prosthodontics, Meghna Institute of Dental Sciences, Nizamabad, Telangana, India)

Corresponding Author: B.J.Vidya Sree

**Abstract:** Rehabilitation of maxillofacial defect patients is a challenging task as there has been an increase in the acquired facial defects, resulting from cancer surgeries and automobile accidents leading to facial trauma. Nonetheless, the congenital facial defects also demand for facial rehabilitation. These defects may be restored by reconstructive surgery but many a times due to multiple surgical interventions and compromised esthetic outcome rehabilitation by prosthetic means is a chosen option. The most common prosthetic treatment problem with such patients is, getting adequate retention, stability, and support. In cases of maxillofacial defect, movement of the prosthesis is inevitable. The primary objectives in rehabilitating the maxillofacial defect patients are to restore the function of mastication, deglutition, speech, and to achieve normal orofacial appearance.

**Keywords:** Adhesive retained, Acquired Maxillofacial defect, Silicone

Date of Submission: 11-07-2019

Date of acceptance: 26-07-2019

### I. Introduction

The defects in maxillofacial region may result due to certain disease, pathological changes, radiation, burns, trauma or surgical intervention. The case reported in this article is an extraoral facial defect resulted from extraoral cyst in the right cheek region. The primary objectives in rehabilitating the maxillofacial defect patients are to restore the function of mastication, deglutition, speech, and to achieve normal orofacial appearance [1].

Extraoral facial defects are difficult to restore prosthetically due to lack of anatomic undercuts, limited means of retention, mobility of soft tissues, and weight of prosthesis [2]. Various methods of auxiliary retention include eyeglasses, magnets, adhesives, combinations of the above, and implants [1,3]. Materials commonly used for fabrication of facial prostheses are acrylic resins, acrylic copolymers, vinyl polymers, polyurethane elastomers, and silicone elastomers, but none of them full fill all the requirements for a satisfactory prosthesis. However, the advent of silicone has brought us a material that nearly meets the requirements of ideal prosthetic material as outlined by Bulbulian [4].

One of the most common requisites of a facial prosthesis is that it should camouflage the defect, so that the confidence of the person is restored and that helps him to lead a normal life [5]. A stepwise technique for fabrication of adhesive retained silicone ear prosthesis is described, with special focus on anatomic simulation with the contralateral ear, it's positioning, camouflaging the margins, investing technique and colour matching to give life like prosthesis [5, 6].

### II. Case Report

A 43-year-old male patient reports to the Department of Prosthodontics with a chief complaint of acquired defect on the right cheek region following surgical excision of sebaceous cyst 10 years back, reconstructed with radial free forearm flap and is taken up for rehabilitation with adhesive retained silicone maxillofacial prosthesis. On examination the defect site was having healthy tissue bed, measuring around 4x3 cm in size, oval in shape, extending from the ala-tragus line to 2cm above lower border of mandible superiorly and 3cm from the corner of the mouth to 2cm from angle of the mandible anteroposteriorly [Fig.1,2]. Mutilation left the patient with step down deformity, loss of contour/fullness, colour/texture mismatch with local tissues.

After precise evaluation of the case, the proposed treatment plan was to construct adhesive retained silicone facial prosthesis. The rationale behind fabrication of this extraoral adhesive silicone prosthesis was to meet the aesthetic demands of the patient and enhance the retention with adhesives.

### **III. Procedure**

1. Impression of the maxillofacial defect and entire face was made first by making Facial moulage. For this, the face was boxed with radiographic films, customized as per facial contour [Fig.3] and then irreversible hydrocolloid impression material (Algitex, Dentsply India Pvt. Ltd.) was applied over the face [Fig.4].
2. The impression was reinforced with fast setting dental plaster (for support during retrieval and pouring of impression) and working model was obtained with pouring the impressions with type III dental stone (Kala stone, Kalabhai Dental Products Pvt. Ltd., Mumbai, India) [Fig.5].
3. Sculpting wax pattern identical to contralateral side is a difficult task. The working model of the defect site is soaked in water to prevent sticking of wax and a thin wax sheet (Hindustan Dental Wax, HDP, Hyderabad, India) is then adapted on the tissue bed of proposed defect site which provides a base for the prosthesis and is used for proper prosthesis adhesion to the tissue bed following the convexity of zygomatic buttress [Fig.6].
4. The margins of the pattern are placed in the crevices and patient is asked to open and close the jaw to make side to side movement and to confirm that the margins were not lifting on movement of the jaw and if necessary, required corrections are made [Fig.7,8]. The wax pattern is now sealed in position on the master cast and leading edges are thinned as much as possible so as to allow the silicone edges to feather into the natural skin and when used in conjunction with adhesive they disappear. As the skin texture is not glossy finish, to simulate and create the tissue surface texture of ear, flaming of waxwork and damping with a wet gauge is done followed by re-flaming.
5. A three-piece mold is fabricated for easy placement of silicone in the mold. To get the three-piece mold, lower portion of the dental flask is used as base, dental plaster is poured to flush with the surface leaving no undercuts and the wax pattern is placed on this top portion of the flask. Once set, 4 grooves are created on the plaster to act as a vent for the escape of silicone flush. [Fig.9].
6. Cold mold seal is applied as a separating agent and now the upper portion of the flask is seated and third pour is done using dental stone and lid is placed and clamped and allowed to set.
7. Dewaxing is done in the usual manner. After keeping the flask in hot water for fifteen minutes the flask is opened carefully and all three pieces of the mold are thoroughly cleaned with hot water to remove all the traces of separating medium and wax. Cold mold seal is diluted with water in 1:1 ratio and applied. The molds are allowed to dry completely as traces of separating medium, wax or water will interfere with setting of silicone and the prosthesis will have the tacky surface that will invite catching of dust at a later date.
8. To fabricate a life like silicone prosthesis the patient must always be present for the color match. It requires great care and patience from the doctor along with an understanding of color matching for a successful color match. As the silicone is translucent desired skin color can be obtained using primary colors in proper proportions. Using red, yellow and blue primary colors of intrinsic coloring system first base shade is prepared. The three-piece mold is now ready for silicone packing. Medical grade factor II room temperature vulcanizing (RTV) silicone is used and is mixed as per manufacturer's instructions [Fig.10,11,12,13].
9. Cured prosthesis is retrieved from the mold, cleaned thoroughly with soap and excess silicone flesh is trimmed from the margins. Prosthesis is tried on patient and margins are trimmed as per the proposed margins. A thin layer of medical grade water base silicone adhesive (Technovent, ProBond Adhesive) is applied on the intaglio surface of the prosthesis and oriented on the defect and with a little pressure the prosthesis is held in place while the adhesive is cured and sets [Fig.14,15,16]. Patient is educated for placement and removal of the prosthesis [Fig.17]. Home care regarding cleaning of prosthesis is also explained to the patient so as to keep tissue bed healthy. Finally, the prosthesis is delivered to the patient.

### **IV. Discussion**

Large orofacial defects result in serious functional and cosmetic deformity which often has a significant psychological impact on the patient. The patient reported in this article was left mutilated with step down deformity, loss of contour/fullness, colour/texture mismatch with local tissues. Thus, to meet the aesthetic demands of the patient and financial constraint of the patient, surgical procedure was not planned for this case. On the contrary adhesive retained prosthesis can be placed immediately on a healthy tissue bed, without surgery and is cost effective [2]. Acceptable results, however, could be obtained with a tissue supported facial prosthesis. But, retention of such a large prosthesis is difficult, and only with ingenuity and an understanding of the remaining anatomic structures, combination prosthesis that mutually retain one another can be constructed as was done in this case. Various methods of auxiliary retention for facial prostheses which have been described in

the literature were used in this case including eyeglasses, tissue undercuts, magnets, adhesives, and combinations of the above. [1,8- 10]. Medical grade silicone adhesive was used as an aid for retention of the prosthesis. Clinically significant vertical mobility or sinking down of the prosthesis during functional movements was also not found in this case due to the distribution of weight of prosthesis by adhering it with adhesive and restricted mouth opening. Problem of degradation of silicone in this case is expected to be minimal since medical grade material and intrinsic stains with layering technique has been used. The problem of delamination was overcome by bonding processed silicone with an adhesive under vacuum and increasing marginal strength. With the advancement in technologies CAD CAM is also being used for scanning and three dimensional reconstruction of ear but it requires special armamentarium which may not be freely accessible and not cost effective [11-13]. A 6- month periodic recall appointment was advisable for assessment of the prosthesis (retention, stability, and support) and the supporting tissues.

**V. Figures**



**Figure 1:** Pre-Operative frontal view of extraoral defect



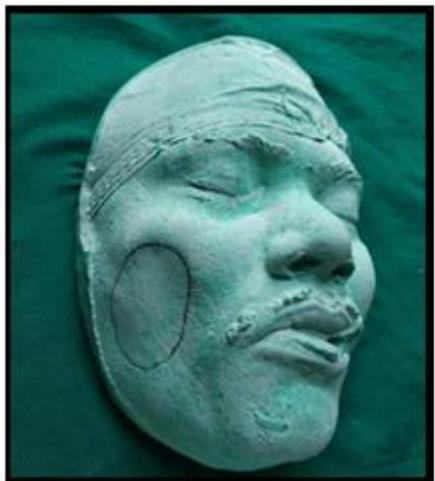
**Figure 2 :** Pre-operative lateral view of extraoral defect



**Figure 3:** Facial Moulage



**Figure 4:** Irreversible hydrocolloid impression



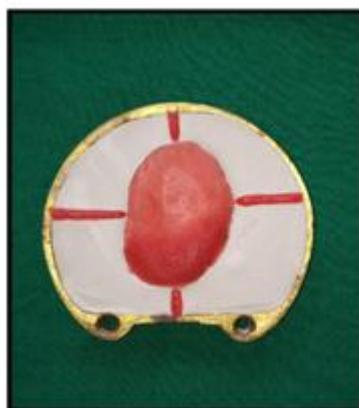
**Figure 5:** Obtained working model



**Figure 6:** Final sculpted wax pattern



**Figure 7,8:** Wax pattern try in extraoral frontal and lateral view



**Figure 9:** Three piece mould and flasking of wax pattern



**Figure 10:** Shade matching



Figure 11: RTV Silicone material



Figure 12: Intrinsic pigments



Figure 13: Packing of silicone in dewaxed mould



Figure 14: Medical grade Adhesive



Figure 15,16 : Post-operative extraoral frontal and lateral view of Adhesive retained Maxillofacial prosthesis

## VI. Summary and Conclusion

A patient who has lost his facial tissues due to cyst, trauma, infection, or tumor experiences lot of emotional and psychological breakdown similar to that experienced by an amputee. A prosthesis that is lifelike in appearance provides a sense of psychological security to the patient, and the physical wearing comfort becomes a primary prerequisite for the patient. Medical grade silicone maxillofacial prosthetic material has the ability to match any skin color using intrinsic and extrinsic color system and are color stable, has rubbery consistency to match the elasticity of skin, biologically inert thus biocompatible. Adequate knowledge and advice should be given to the patient regarding cleansing and maintaining the prosthesis. Thus, it can be concluded that prosthetic rehabilitation of large facial defects is a challenging task which requires critical understanding of available anatomic structures and prosthesis designs to achieve maximum retention, stability, and esthetics.

### References

- [1]. Beumer J, Curtis TA, Firtell DN. Maxillofacial Rehabilitation. Prosthodontic and Surgical Considerations. St. Louis, Toronto: C.V. Mosby Co.; 1979.p. 183- 243.
- [2]. Beumer J, Curtis TA, Marunick MT. Maxillofacial Rehabilitation: Prosthodontic and Surgical Considerations. St. Louis: Ishiyaku EuroAmerica; 1996.p. 225- 9.
- [3]. Goiato MC, Fernandes AU, dos Santos DM, Barão VA. Positioning magnets on a multiple/sectional maxillofacial prosthesis. J Contemp Dent Pract 2007;8:101- 7.
- [4]. Bulbulian AH. Maxillofacial prosthetics: Evolution and practical application in patient rehabilitation. J Prosthet Dent 1965;15:544- 69.
- [5]. K.F. Thomas, Prosthetic rehabilitation (1st ed. Quintessence Publishing Co., Ltd., London, 1994) 55-91
- [6]. T. D. Taylor, Clinical maxillofacial prosthetics (1 st ed. Quintessence Publishing Co. Inc, Illinois, 2000) 233-264
- [7]. J. Beumer, T.A. Curtis and M.T. Marunick, Maxillofacial rehabilitation. restoration of facial defects(1st ed. Medico Dental Media Intl, St. Louis, 1996) 385-403
- [8]. Udagama A. Urethane- lined silicone facial prostheses. J Prosthet Dent 1987;58:351- 4.
- [9]. Thomas K. Prosthetic Rehabilitation. London: Quintessence Publishing;1994. p. 93- 103.
- [10]. Dumbriague HB, Fyler A. Minimizing prosthesis movement in a midfacial defect: A clinical report. J Prosthet Dent 1997;78:341- 5.
- [11]. S. Wang, X. Leng, Y.Zheng, D. Zhang and G. Wu, Prosthesis-guided implant restoration of an auricular defect using computed tomography and 3-dimensional photographic imaging technologies: A clinical report, J Prosthet Dent. 2014; pii: S0022-3913(14)00425-9. doi: 10.1016/j.prosdent.2014.08.014.
- [12]. M. O. Karatas, E. D. Cifter, D. O. Ozenen, A. Balik and E. B. Tuncer, Manufacturing implant supported auricular prostheses by rapid prototyping techniques, Eur J Dent. 5(4), 2011, 472-7
- [13]. He Yong, Guang-huai, Xue and Fu.Jian-zhong, Fabrication of low cost soft tissue prostheses with the desktop 3D printer, 2014; doi: 10.1038/srep06973 PMID: PMC4245596 Sci Rep. 4: 6973.

Angadi Kalyan Chakravarthy. "Adhesive Retained Extra Oral Defect Maxillofacial Prosthesis."  
IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 7, 2019, pp 38-43.