

Prosthetic Rehabilitation of Composite Hemi-Facial Defects – A Case Report

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ABSTRACT

Introduction: Rehabilitation of severe hemi-facial defects poses a challenge to the Prosthodontist. Defects involving more than one facial part with asymmetry of contra lateral side require careful planning and technical skills to provide the prostheses.

Case Report: This article presents a case of hemi-facial defect due to chemical burn injury rehabilitated with custom made silicone prosthesis. It also highlights a technique of flasking used for the fabrication of the prosthesis combining orbital and nasal defects.

Conclusion: The technique used for the rehabilitation of conventional silicone prostheses can be well utilized when implants are not feasible.

Keywords: Hemi-facial Defects, Room Temperature Vulcanizing Silicone, Auricular Prosthesis, Nasal Prosthesis.

INTRODUCTION

Face is the index of the mind and it is through this face that the feelings are expressed. Any damage or disfigurement to the face can lead to psychological and social problems. Rehabilitating the patient with facial prosthesis that conceals the defect is a very demanding task.¹ Nevertheless when appropriately made, it is the finest service that can be rendered to a patient who feels socially secluded because of the facial deformity. Facial defects secondary to the treatment of burn injuries, neoplasms, congenital malformations and trauma result in multiple functional and psychosocial difficulties. Burns of the head, face and neck occur commonly due to thermal and chemical injury. Depending upon the degree of injury, the defect may range from superficial injury without loss of any function of the concerned organ to the complete loss of organ and its functions. Prosthetic rehabilitation to restore these facial disfigurements improves the self-esteem of the patient. This case report describes a case of self inflicted accidental acid burn injury resulting in loss of right auricle, orbit and nose rehabilitated with custom made silicone facial prostheses.

CASE REPORT

A 28 year old male patient reported with chief complaint of poor facial appearance due to missing right ear, eye and defective nose. The case was referred from department of Plastic and Reconstructive surgery for prosthetic rehabilitation of missing facial structures (Fig. 1). The history of presenting illness revealed that the injury occurred due to an accidental acid burn one year back. The patient did not complain of any pain or discomfort in the region of

defects. On general physical examination patient was found to be moderately built and nourished, the gait was normal and there was no signs of any systemic illness.

Local examination of the affected areas revealed scarring with dark pigmentation of the skin on the right side of the face extending to the neck. The defect extended superiorly 01 cm below the right frontal hairline, inferiorly corresponding to the lower margin of the sternum, medially 2.5 cm crossing the midline towards left side of the face and laterally 01 cm posterior to the external acoustic meatus. There was complete loss of auricle on the right side and patency of the external acoustic meatus was intact. The ocular socket was well healed and lined with skin graft. Examination of the nose revealed scarring, discoloration, constriction of the left nostril and intact right ala. There was no sensory or motor deficit in the deformed areas. Routine investigations including blood, urine and radiological examinations were carried out. On the basis of clinical and radiological findings, patient was diagnosed as a case of burn injury with missing right auricle, right orbit and a deformed nose. The case was taken up for prosthetic rehabilitation of missing facial structures with a spectacle retained composite prosthesis consisting of nasal, orbital and auricular components.

A hollow plastic tube was placed orally to facilitate breathing and an impression of the face was made using Alginate impression (Algin-Gum, India). The patient was instructed to close the left eye during the entire procedure. The region of interest was marked on the face and boxing was done with modeling wax (Maarc, India).

Irreversible hydrocolloid was mixed following manufacturers recommendations and the entire boxed area was filled. Wet gauge and Type III Dental stone (Goldstone, India) was used to stabilize the impression. After setting, the facial moulage was carefully removed and poured with Type III dental stone

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How to cite this article: R Kumara Sundaram, Poonam Prakash, SK Bhandari. Prosthetic rehabilitation of composite hemi-facial defects – a case report. International Journal of Contemporary Medical Research 2019;6(4):D32-D34.

DOI: <http://dx.doi.org/10.21276/ijcmr.2019.6.4.39>



Figure-1: Preoperative view



Figure-2: Impression of ear and face with the master casts



Figure-3: Wax patterns on the master casts and trial on patient

and master cast retrieved (Fig. 2). Dimension of the defects were analyzed on the face based on proportions and the same was transferred to the master cast.

The working cast was sprayed with an oil-free release agent (Silicone Spray; Dentsply, India) to facilitate removal of the wax pattern. Baseplate wax (DPI, India) was sculpted on the working cast to form the patterns of auricle, orbital and nose.² Pre-operative photographs and facial analysis



Figure-4: Dewaxing, shade matching and eye lashes incorporation



Figure-5: Preop and postop

was used as a guide for developing esthetic contours. For the orbital prosthesis, the wax pattern corresponding to the corneal portion was removed and artificial eye shell matching to the contra lateral eye was incorporated.³ On completion of the wax up, trial of the wax pattern was carried out (Fig. 3). Final contouring was done on patient face and shown to the patient. After the patient was satisfied, written informed consent and approval obtained. Silicone processing⁴ and implantation of artificial hair obtained from soft bristles of paint brush into the prosthesis was done.⁵

Anterior indexing method was used for stabilizing the eye shell during processing of orbital prosthesis.³ Two needle caps were bonded on the frontal surface of the eye shell using the cyanoacrylate adhesive.

Laboratory procedures for fabrication of nasal and orbital prostheses were done together. A custom made flask was prepared using a foldable tin foil plate (18" length, 16" height and 2mm thickness) in the form of rectangle and secured with an adhesive elastic strap.⁴

Auricular wax pattern was invested in conventional dental flask and flasking was carried out using three pour technique. Dewaxing was done. Silicone separating media applied in the form of silicone spray (Cosmosil, Series M511, UK). As the silicone is translucent material, it is necessary that the intrinsic staining is done in such a way that shade of silicone matches with the neighbouring skin color.

Shade matching was done in the afternoon so that there

was minimum alteration in the shade selection due to UV Rays(5).

After shade matching, and room temperature vulcanizing silicone (Cosmosil, Series M511, UK) was used to fabricate the composite orbito-nasal and auricular prosthesis. The prosthesis was recovered after polymerization by 24 hours bench curing at room temperature and minimally trimmed (Fig.8). Limited flash was maintained around the periphery of the all the prosthesis to help transition of the borders to the surrounding tissue.

For orbital prosthesis eye lashes and eyebrows were attached (6)(Fig. 4) matching with the contra lateral side. Finer refinement of shade was carried out with extrinsic staining. Eye glass frame was used to retain the prosthesis. Medical grade adhesive was used for additional retention.

Following rehabilitation, necessary instructions for maintenance and hygiene of the prosthesis for home care were given. Patient was advised to avoid proximity to heat sources and exposure to extreme sunlight as it likely to cause discoloration of the silicone prostheses. The patient was informed that the prosthesis should be replaced every few years as the old one wears off. A customized protocol was designed and given to the patient for routine follow up at regular intervals. Patient expressed satisfaction with the overall treatment results (Fig. 5).

DISCUSSION

The facial disfigurement may occur due to congenital or acquired causes. Rehabilitation can be accomplished either surgically or prosthetically. The method of rehabilitation depends upon the defect's anatomy, size, aetiology and operator skills. Even though surgery is considered as the primary modality of treatment, various factors may contraindicate surgical reconstruction such as advanced age, general medical condition of the patient, anatomic complexity and the patient's refusal to undergo further surgery.

Prosthetic rehabilitation was preferred in this case due to complex anatomical defect and limited surgical options. Artificial prosthesis can be fabricated using variety of synthetic materials. These include Poly vinyl chloride, latexes, polyurethane, poly methyl methacrylate and Silicones.⁷ Silicone was preferred in this case to leverage benefits like ease of fabrication, optimal aesthetics, light weight, and the ability to use soft flexible projections that can gently engage minor tissue undercuts to enhance retention and stability.⁸

Success of a maxillofacial prosthesis is judged by its retention. Spectacles, magnets, medical adhesives and osseointegrated implants have been used to enhance retention.^{8,9} Joseph et al recommended retention of nasal prosthesis with eye glass framework augmented with medical grade adhesive. We adopted the same methodology.⁹

Recent studies have focussed on computer-assisted rapid prototyping machines to sculpture facial prostheses. Several techniques have been reported to fabricate a mirror-image wax cast for maxillofacial prostheses. Nusinov and Gay used a vertical camera capable of reproducing 3-dimensional objects

to transfer parallel lines to casts for positioning. Mankovich et al presented a technique for fabricating a prosthetic scalp using a computerized tomography (CT) scanner. Runte et al investigated the use of an optical impression technique, based on a 3-dimensional optical data acquisition system to circumvent impression problems when fabricating a facial prosthesis. These techniques are not cost effective, technique sensitive and require specialized equipments and trained personal. Conventional maxillofacial prosthesis fabrication for complex defects remains the mainstay in developing countries.

CONCLUSION

Facial defects due to chemical burns can be prosthetically rehabilitated using silicone prosthesis retained by implants or mechanical means. In this case a custom sculpted silicone composite facial prostheses retained with spectacle and medical grade adhesive proved to be a very successful as implants are contraindicated. The rehabilitation enhanced esthetics, self-esteem and morale of the patient back to the society to lead a normal life.

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 17-03-2019; **Accepted:** 08-04-2019; **Published:** 29-04-2019