



Prosthetic rehabilitation of a patient with hand amputation using glove retained prosthesis made of silicone biomaterial: A Case report

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Abstract— Prosthetic rehabilitation of facial defects counts for a life-like appearance of the missing structures of an individual. The success of prosthesis depends on use of biomaterial and dentists own skill to restore form and function. In maxillofacial prosthesis there exists wide range of methods for gaining retention, stabilization, & immobilization. A case report has been documented, where custom made glove retained prosthesis was fabricated which was comfortable and aesthetically acceptable for the patient using Silicon material

Keywords: Rehabilitation, stomatognathic, anaplastologist., amputated, stump

INTRODUCTION

Maxillofacial prosthesis corresponds to any prosthesis used to replace part or all of any stomatognathic and/or craniofacial structures.^[1] The loss of his upper extremity has two different consequences for the amputee: a drastic reduction of the functionality and beginning of psychological trouble^[2] and inability to face the society. Reconstructive surgery indulges a restricted role in the rehabilitation of the lost body parts. The preliminary role in rehabilitating the patient is thus played by the maxillofacial prosthodontist and the anaplastologist. Etiological factors may include trauma, accidents or congenital absence of limbs or malformations.^[3] Primitive agricultural machines such as kutties and the thresher machine take a heavy toll on hands of young men and women every year.^[4] Advancements in form of micro vascular re-implantations have aided in treating severely injured and traumatically amputated digits. But the other side of the picture depicts a contradictory and unsuccessful micro vascular reconstruction. It is in this group of patients that a prosthesis offers great help as, besides psychosocial issues,^[5] patients also face pain, contractures, reduced grip strength and hypersensitivity.^[6] An ideally constructed prosthesis must mimic the lost parts so precisely that the casual observer finds it difficult to demarcate the difference. Rehabilitation efforts can only be successful when the patient can face society without fear.^[7] Fabrication of prosthesis consists of six stages:

- (i) Impression and cast
- (ii) Sculpturing and pattern formation
- (iii) Fabrication of mould
- (iv) Fabrication of stump
- (v) Processing of material with intrinsic and extrinsic coloration^[7]
- (vi) Prosthesis testing

The present case includes a conventional method for prosthetic rehabilitation of an amputated hand using silicone material retained by a glove, which had adequate suspension, function, comfortable to use and aesthetically acceptable. Most of the prostheses are fabricated using medical grade silicones.^[8] These silicones can be rendered to match skin color of the patient and give a more life-like appearance. Most of the silicones used for this purpose are room temperature vulcanizing silicones (RTV silicones). Advantages of RTV silicones include chemical inertness, flexibility and elasticity.^[9] Prostheses can be retained either by mechanical or by use of adhesives. Implant retained prostheses have proven to be satisfactory, but they are economically not feasible.^[10]

CASE REPORT

A 21 year old patient reported to the department of prosthodontics and crown and bridge for the reconstruction of the missing hand. On history taking it was found that the patient had undergone an accident 4 years back and lost his hand. (Figure 1)

Due to financial crises, he was unable to restore his missing hand. He was a machine operator by occupation. The patient was psychologically and mentally weak and found it difficult to face the society. The patient was willing for a treatment that was pocket friendly and could possibly restore the form and aesthetically appealing to somehow break the barrier of unconsciousness when he dealt with his friends and family.

Since a major portion of the hand was missing and keeping in mind the economic status of the patient a conventional glove retained prosthesis was planned.



Figure 1: Pre-operative photograph

FABRICATION OF PROSTHESIS

Making the primary impressions and study model

Irreversible hydrocolloid impression material (DENTSPLY India Pvt. Ltd.) was the material of choice for making the impressions. Impressions of both the hands were made using plastic containers of sufficient dimensions to confine the impressions. The hands were properly coated with a separating media and mixing initiated using cold water to increase the working time and to follow the procedures accurately and precisely. The patient was instructed to dip his hands vertically without touching the sides or the bottom of the container. The material was allowed to set and the hands were removed gently after the material was set. The impressions were poured with type III Gypsum product and the models were retrieved. The normal hand was used as a reference to duplicate the size, shape and orientation of the finger.

Selection of a donor hand and fabricating wax pattern

A donor hand for making the wax pattern was essential to avoid any chance of error and for better results. Using the model of normal hand as reference, a donor hand was selected keeping in mind the age physical appearance and age of the patient to plan a prosthesis that could best possibly mimic the aesthetics. After fabricating the wax pattern, it was allowed to cool and was retrieved from the impression and tried on the model. Final carving and adjustments were made to blend the margins with the model. (Figure 2)

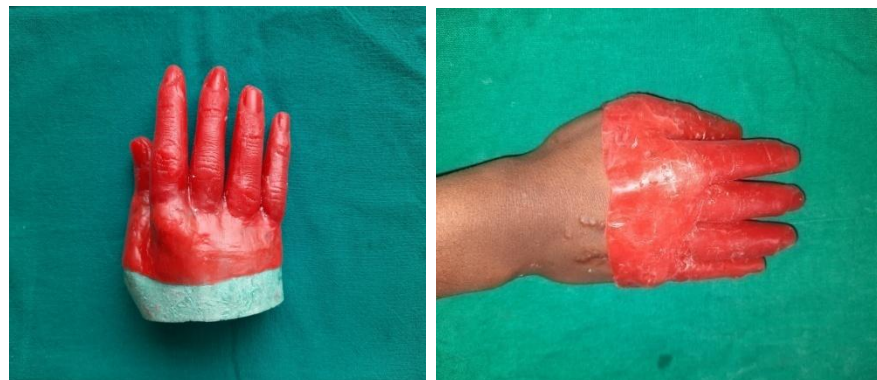


Figure 2: Wax up trial

Color matching and packing

The most challenging and crucial step involves color matching of prosthesis with skin color to make a more live like appearance. With advancement in technology newer shade guides and advance instruments can be used to mimic the color precisely. Naked eyes can be used to match the color, but human error could be a possibility so multiple advice was taken before shade matching to limit those errors. By observing the basic skin color, the artificial colors were added to the silicone material to procure the best natural shade RTV silicone material was mixed with the colors and was packed into the mould. (Figure 3) Extrinsic stains (M P Sai Enterprise, MUMBAI) were used for final characterization and color matching was done.

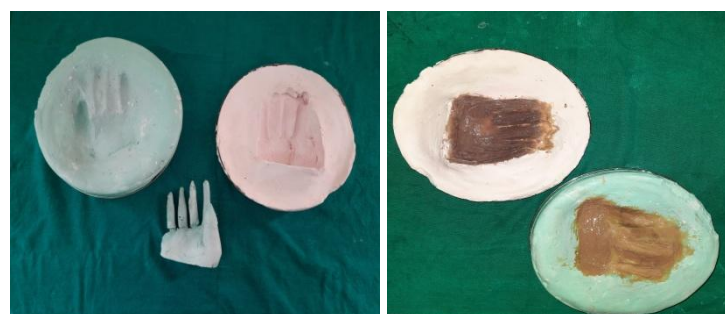


Figure 3: Moulds dewaxing and color application

After packing the material the curing was done for 24 hours under room temperature. The final prosthesis was finished and carved maintaining the edges.

Method for retention

A glove was used to aid in retention for best possible result.(Figure 4)



Figure 4: Post operative view

DISCUSSION

Successful fabrication of maxillofacial prosthesis is a challenging task and counts for accurate detailing and finish to mimic the lost entity. A prosthodontist is well aware with the techniques and materials, along with the biologic aspects of the conditions. Various techniques and materials are available to deal with such intraoral or extraoral defects. Majority of the prosthesis fail due to improper retentive aids and lack of knowledge while selecting an appropriate material. Although implants have changed the trend for prosthetic rehabilitation still ample cases fail to rehab due to miss management and economic issues. Newer advancements in maxillofacial material have resolved the problem to a certain extent but a proper knowledge and precise finish aids in a proper success for the prosthesis.

CONCLUSION

Prosthetic rehabilitation of a patient with maxillofacial defects requires skill and fine knowledge to cope with the conditions, It should be kept in mind that such patents need special attention and should be made comfortable so as they can come out from their shell and feel comfortable,

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