

RING RETAINED DIGITAL PROSTHESIS – A CASE REPORT

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Abstract

Maxillofacial prostheses replace the lost body parts by using the silicone materials. These prostheses support the patients physically as well as psychologically enhancing their confidence and social acceptance. This case report describes the rehabilitation of a patient with missing finger using silicone prosthesis. A 54 year-old male patient who reported with the partially missing ring finger in his left hand was treated by using silicone prosthesis. The prosthesis was retained by using a ring. The conventional prosthesis was planned for this patient because of his inability to afford the sophisticated treatment such as implants.

Key Words: Finger prosthesis, Mechanical retention, RTV silicone.

Introduction

Prosthesis refers to the artificial replacement of an absent part of the human body¹ that serves primarily to improve the patient's appearance and the psychological wellbeing. The feeling of physical impairment can bring apathy towards life due to the social stigma. Thus, the artificial substitutes play an immense role in making the patient more socially acceptable.² Reconstructive surgery has limited role in rehabilitation of the lost body parts. The major role in rehabilitating the patient is thus played by the maxillofacial prosthodontist and the anaplastologist.

The fingers are the most important parts of the hand, deformity in which can pose the miserable situations; as the active function of hand is represented by its prehensile activities in grip, grasp and transferring, and absorbing forces.³ Hands also have an esthetic impact; they can emphasize the beauty of a gesture or the grace of a movement.⁴

Most of the prostheses are made from medical grade silicones.⁵ These silicones can be rendered to match to the 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). The advantages of RTV silicones include chemical inertness, flexibility and elasticity.⁶

The prostheses can be retained either by mechanical methods or by the use of adhesives. Implant retained prostheses have proven to be satisfactory, but they are economically not feasible.^{7,8} As the fingers have the most important role in daily activities, replacement of the missing finger becomes the most arduous job for the clinician. A precisely fitting prosthesis can improve the function by restoring normal length, providing opposition for the remaining digits, maintaining sensitivity through a thin lamina, protecting a sensitive stump, and transmitting pressure and position sense for activities such as writing or typing.⁹ Retaining finger and hand prosthesis by using rings, bracelets, etc. are some methods of mechanical retention. To improve the appearance and aid retention on short stumps, patients can wear a ring at the junction of prosthesis and stump.¹⁰ This article describes rehabilitation of a patient with finger prosthesis using such mechanical modes of retention.

Case Report

A 54-year-old male patient reported to the Department of Prosthodontics and Implantology for replacement of a missing finger in his left hand. (Figure1)

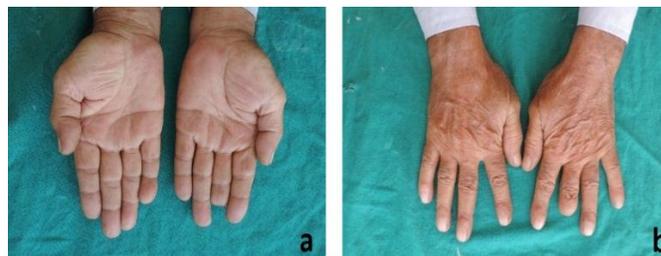


Figure 1: Pre-operative Photograph

History revealed that the patient lost his finger 15-years-ago in a road accident. The amputated stump was well-healed. The advantages and limitations of replacement of the finger were explained to the patient. Since a part of the ring finger was intact, retention of the prosthesis was planned to be done by using a ring. Selection of the ring was done in presence of patient considering his esthetic needs.

Fabrication of the prosthesis

Making the impressions and casts

An irreversible hydrocolloid impression material (DENTSPLY India Pvt. Ltd.) was chosen for making the impressions. Impressions of both the hands were made by using the plastic containers of sufficient length and diameter to confine the impressions. The impression material was mixed using cold water to increase the working time and poured into the containers. The patient was asked to dip his hands vertically into the container 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 in stone plaster and the casts were retrieved. The normal hand was used as a reference to duplicate the size, shape and orientation of the finger.

Selection of a donor and making wax patterns

A donor hand for making the wax pattern was essential to avoid the laborious task of sculpting. Using the cast of the normal hand as reference, a donor hand was selected from one of the patients from departmental OPD (outpatient department). Impression of the donor finger was made by

making the index and pouring it in the modelling wax. After the wax cooled down, it was retrieved from the impression and tried on the cast. Final carving and adjustments were made to blend the margins with the cast. The completed wax pattern was tried on the patient's finger-stump. (Figure 2)



Figure 2: Wax Pattern Trial

Color matching and incorporation of nail

The most critical step was to match the color of the prosthesis to the patient's skin color. By observing the basic skin color, the artificial colors were added to the silicone material to obtain the natural shade. The nail was fabricated and kept ready by using the autopolymerising clear acrylic resin, trimmed to the appropriate size and shaped with the proper curvature matching the adjacent nails. Around 1 mm of nail bed was scraped in the wax pattern and the nail was inserted in that space. RTV silicone material was mixed with the colors and was packed into the mould. (Figure 3)



Figure 3: Moulds after dewaxing

Curing was done for 24 hours at room temperature. Prosthesis was finished using the silicone burs and cones. Extrinsic stains (M P Sai Enterprise, MUMBAI) were used for final characterization and color matching with the adjacent fingers.

Methods of Retention

A metal ring was used to aid in retention of the prosthesis. (Figure 4)

Discussion

Successful prosthetic rehabilitation of the patients with missing body parts is a challenging task, however, it is our responsibility to make the best use of the available materials and techniques to provide the cost effective treatment modalities.

Hands may be affected by many conditions varying from congenital abnormalities to disease, but the greatest cause

of functional impairment is trauma.¹¹ Traumatic amputation of the fingers represents a serious insult to the hand, resulting in dramatic impairment of hand function.¹² Currently, many severely injured and traumatically amputated digits can be saved by microsurgical replantation. In some patients, however, reconstruction is contraindicated or unsuccessful. It is the group of patients that a prosthesis can be provided and may offer great psychological help.¹⁰

Construction of any prosthesis needs to fulfill the esthetic demands of that particular body part as it offers the psychological, functional, and rehabilitative advantages. By restoring the natural appearance to the hand, a prosthesis eliminates the trauma caused by constant reminder of the handicap and, thus, offers true psychological therapy.⁴

Similar to the present case, Pilley and Quinton¹⁰ rehabilitated 15 patients with single digital amputations with prostheses. The appearance and retention of the prostheses were improved by use of rings. Also, Pereira et al³ fabricated 136 digital prostheses for 90 patients. Retention and fit of the prostheses were achieved through modification of the inner circumference of the mold. To avoid axial deviation and accidental dislodgement of the prostheses during digital manipulation in grip functions, stiffer inserts were made in the silicone prostheses. The patients were advised to wear a ring at the skin-prosthesis junction to conceal the edges of the prosthesis.

Conclusion

Rehabilitation of any missing part of the body simulating to the natural color, shape, size and texture is the primary responsibility and intention of a clinician. Fabrication of the prosthesis in a conventional manner has its own limitations as long as the esthetics and function is concerned. In spite of that providing the best to our patients should be our aim.

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