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Case Report

Prosthetic Rehabilitation of a lost finger using heat cure acrylic resin– A case report

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ABSTRACT

Hand is a part of a body which plays an important role in various activities like basic function of grasping and feeling. Apart from this it also has an aesthetic value. Partial or complete loss of fingers due to any reason may cause physical, psychological and economical disability to an individual. A well-formed and color matched prosthetic finger may not completely restore the function, but may help in reducing psychological disability. Various resin materials along with resin dies have been used for this purpose.

Introduction

A human hand consists of five fingers also termed as phalanges which help in carrying out day to day functions like grasping, feeling etc. Amputation derived from Latin word 'Amputare' is defined as removal of part or all of a body part enclosed by skin (online medical dictionary). Amputation of finger is seen in patients who have experienced any traumatic injury, surgery (cancer/ tumor removal), disease (diabetes & gangrene) or congenital conditions of hand. Regardless of the cause, loss of finger has an eminent physical, psychological & functional impact on an individual. Therefore reconstructing an amputed finger is of utmost importance to restore natural appearance as it reduces dysfunction to an extent & also represents as an effective psychological therapy.[1]

Reconstruction of finger amputations depends on factors like amount of tissue & bone involved level of amputation & involvement of other fingers.[2] Finger prosthesis is advised when surgical reconstruction fails or is not affordable. Fabrication of a prosthesis giving a natural appearance requires replication of minute details with color matching, texture of the skin and nails.[3] This paper presents a case report of prosthetic reconstruction of amputed finger using heat cure acrylic resin material.

Case Report:

A 48 year old male patient reported to the Department of Prosthodontics, Crown and Bridge and Implantology, A.C.P.M Dental College, Dhule, Maharashtra with the complaint of a partially missing finger. The patient revealed a history of having lost the digit in a traumatic injury caused by a mechanical lathe.

A complete examination of the hand revealed a residual stump terminating in the middle phalangeal region; light brown in color on the index finger of the right hand

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measuring approximately 3cm. The area around the residual stump was without any sign of inflammation. An informed consent was taken from the patient before starting the treatment to ensure his willingness and co-operation.

Procedure

1. The patient's hand was lubricated with a thin layer of petroleum jelly. This prevents the hydrocolloid impression material from adhering to the surgical site and the tissue surface. Following this, the area around the finger was boxed; impression material was mixed and poured into the boxed area. Patient was asked to introduce the remaining part to the lost finger into the material and was instructed to keep the hand in normal resting position without stretching. Similarly impression was also made of the contralateral (left) index finger. [Figure 1].
2. The impression was then poured in artificial stone, using vibrator to avoid voids. . [Figure 2].
3. The models were retrieved and the pattern for the prosthesis of the missing finger was carved in modeling wax taking the contralateral finger as a reference. [Figure 3].
4. The inner surface of the wax pattern was made hollow, to reduce the weight of the prosthesis. The carved pattern was carefully placed and removed from the model, to avoid distortion.
5. The pattern was then flasked in the lower half of the flask, making sure to avoid undercuts for the counter flasking. The pattern was flasked to enhance the accuracy at the stage of shade matching such that the dorsal and the ventral aspects of the finger were separable. Separating medium was applied between the two pours. After dewaxing, the mould was allowed to cool. [Figure 4 & 6]
6. The shade matching was done using natural daylight. Intrinsic colors were mixed to achieve the appropriate characterization for the palmer and dorsal surfaces. Patients approval was gained before finalizing the shade. [Figure 5a &5b].
7. The heat cure acrylic resin and pigments were mixed to match patient's skin. Mixing and color matching of the dorsal and ventral surface was done separately in natural light. After getting the desired shade the resin material was packed into the mold and pressure was applied to remove excess material. After acrylization, the prosthesis was carefully retrieved from the mold and finishing was done. [Figure 7].
8. To complete the prosthesis an appropriate sized artificial nail was fabricated using cold cure acrylic resin with proper shape, size and shade and was adopted with the help of monomer.
9. In the final step a snuggly fitting resin prosthesis was placed on the patient's hand. Patient was instructed and demonstrated about the use and maintenance of the prosthesis. [Figure 8 & 9].

Discussion:

In cases where the lost finger cannot be surgically reconstructed, or the surgical reconstruction is not possible or unavailable, prosthesis aids in great psychological help.[4] It also to some extent helps in restoring function of grasp, sense. This helps the patient in leading a more normal professional and social life. Few requirements of the prosthesis includes high quality both technically and aesthetically, resemble the digit of opposite hand, material used should be strong and repairable, easily cleanable, does not stain with extrinsic stains, biocompatible.[5]

The acrylic resin and silicone are the most common materials used for rehabilitation.

Advantages in using resin materials is that they are readily available, easy in intrinsic and extrinsic coloring, good strength and compatible with adhesives, color stability and easy to repair. [6]

Figure 1: Impressions

Figure 2: Stone Models

Figure 3: Wax Pattern Fabrication

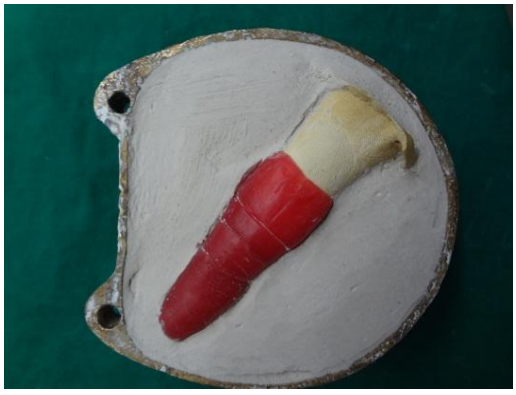

Figure 4: Flasking


Figure 5 (a)(b): Shade Selection

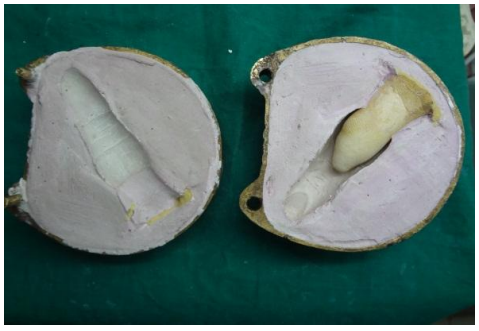

Figure 6: Wax Burnout

Figure 7: Packing of heat cure resin


Figure 8 & 9: Post insertion

Although the patients frequently require optimal reconstruction of the hand in cases of injury or amputation, prosthetic devices help recove basic functions of the hand.

Summary

Prosthetic rehabilitation of the missing finger may not restore the function completely, but it definitely helps an individual to overcome the psychological trauma and led a healthy professional and social life. For the patient presented in this paper the prosthetic rehabilitation was done by fabrication of custom made resin finger prosthesis which helped the patient to overcome the anxiety, depression or a post-traumatic stress disorder.

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