



RING RETAINED SILICONE FINGER PROsthESIS: A CASE REPORT

Prosthodontics

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ABSTRACT

Finger and partial finger amputations are some of the most frequently encountered forms of partial hand loss. The loss of a finger can produce functional disturbances in one's life apart from the psychological trauma that one goes through. When surgical reconstruction is contraindicated, prosthetic restoration of amputated finger with silicone materials is an alternative to eradicate the psychological, functional problems and thereby improving the patient's quality of life. This case report describes the steps of prosthetic rehabilitation of partially amputated finger with silicone prosthesis using room temperature vulcanized silicones.

KEYWORDS

amputation, partial finger amputation, room temperature vulcanized silicone, psychological, functional.

INTRODUCTION

Loss is defined by Peretz¹ as "a state of being deprived of or being without something one has had and valued". The loss of a body part can be painful experience in one's life. The hand is a representation of one's self image that can be looked upon by others easily. They also have an aesthetic component associated with them as they can emphasize the beauty of a gesture or the grace of a movement². Finger and partial finger amputations are some of the most frequently encountered forms of partial hand loss. The most common causes of these amputations are trauma, congenital absence and malformations³. The loss of a finger can produce functional disturbances in one's life apart from the psychological trauma that one goes through. The estimated rate of traumatic finger amputations is 1.9 per 100,000 for the age group between 25 to 65 years⁴. In today's digital era, there are numerous techniques to restore finger amputations. The choice of technique to be used depends on various factors such as amount of soft tissue involved, and the bone, the involvement of other fingers, the size of the residual stump and economical status of the patient. Currently, the finger amputations can be rehabilitated by microsurgery through re-implantations. But surgical reconstruction cannot be the treatment of choice for each and every patient. For such patients, silicone finger prosthesis with passive retention can be helpful as it can be made life-like, thereby improving the psychological status of an individual. This case report describes the steps of prosthetic rehabilitation of partially amputated finger with silicone prosthesis using room temperature vulcanized silicones.

CASE REPORT

A 58-year male patient reported to the Department of Prosthodontics, for prosthetic rehabilitation of partially lost left middle finger and right index finger. He had a history of occupational trauma to his left middle finger more than 10 years ago and right index finger 12-15 years ago. On general examination it was noticed that amputation was carried out through the middle portion of the middle inter phalanx of the middle finger and distal portion of the proximal inter-phalanx of the index finger (Figure 1). The amputated finger showed thickened ends with normal surrounding area & no signs of any infection or inflammation. On general examination and interacting with the patient, it was decided to prosthetically restore the finger prosthesis which would allow the patient to do passive function, be acceptable by the patient and is comfortable to use. The treatment plan was discussed with the patient and an informed consent was also taken from the patient.

Procedure

The patient's left hand was lubricated with a thin layer of petroleum jelly (Vaseline Original, Unilever, India). Irreversible hydrocolloid impression material (Plastalgin, Septodont, India) was mixed in a vacuum mixer and then transferred into a box and the patient was instructed to put his hand into the box and keep it in the normal resting

position without stretching until the material sets (Figure 2).

The impression was poured in type III dental stone (Kalstone, Kalabhai, India) and the model was retrieved.

Impression of the right index finger and middle finger was made and molten modeling wax (Modelling wax No. 2, Rolex, India) was poured into it to get the wax pattern of the prosthesis. The wax pattern was then hollowed from the inside by sculpting. The wax pattern was placed in warm water and then placed on the amputated model and modifications in carving were carried out to resemble the finger of the other hand (Figure 3). The wax pattern was tried in the patient's hand and the length, fit and shape was verified (Figure 4).

The wax pattern was invested in a dental plaster (Kaldent, Kalabhai, India) with two-pour technique. The mold was dewaxed (Figure 5). After the mold was carefully opened separating medium (Separating Agent, Detax, Germany) was applied between the two pours before silicone packing.

The room temperature vulcanized silicone (RTV Silicone, MP Sai Enterprises, Mumbai) and pigments were mixed intrinsically to match patient's skin chairside. Color matching of the dorsal and ventral surface was done separately in natural light. After getting the desired shade the silicone material was packed into the mold and light pressure was applied to remove excess material. The mold was left overnight for curing at room temperature as per manufacturer's instructions. After polymerization, the prosthesis was carefully retrieved from the mold and excess material was trimmed off with BP blade. Extrinsic staining of prosthesis and minor detailing was done chairside.

For acrylic nail fixation, commercially available acrylic nails were chosen. A slit was made along the crease on the nail bead area and 2 mm of nail portion was placed into the slit and a cyanoacrylate adhesive (Fevi kwik, Pidilite, India) was applied on the under-surface of the nail to bond with silicone and placed back on the mold to achieve a stronger bond to the nail bed. The acrylic colors were used for extrinsic staining of the artificial nail.

A commercially available wide ring over the margin of a finger prosthesis ending at the metacarpal-phalangeal joint was placed to physically hold the prosthesis. The final prosthesis was inserted on the residual stump and the fit and color matching was evaluated (Figure 6). The patient was demonstrated about the use and instructions were given about maintenance of the prosthesis. The patient was recalled after a day, 1 month and 3 months for follow-up. Recall examination revealed satisfied retention of the prosthesis.

DISCUSSION

The purpose of a prosthodontist while prosthetically rehabilitating an amputated finger is to give a precisely fitting prosthesis which would improve the function and psychological state of an individual. Jean Pillet described the essential characteristics of the prosthesis as the prosthesis must be of high quality, both technically and aesthetically⁵. The room temperature vulcanized silicones have several advantages over other materials such as acrylic resins and polyvinyl chlorides. The RTV silicones are reported to have a wider rate of acceptance, stain resistance properties, durability of the prosthesis and comfort to the patient⁶. It cures at room temperature and does not require any special processing equipment.

Traditionally, various methods have been employed in the past to fabricate the wax pattern of the finger prosthesis. In the present case, the impression of normal finger of the contralateral hand was made and modified as per required. While sculpting the wax finger, hollowing out the solid wax need multiple alterations to precisely adapt it over the residual stump as the overlapping part needs to be very thin to avoid looking unesthetically bulky.

Another important consideration was to mask the junction between the prosthesis and residual stump as to disguise it and to achieve excellent esthetic results. If this junction lies over the proximal phalanx, then an ordinary ornamental ring can be placed over the junction and if it lies over the middle phalanx, then a small skin colored plastic bandage can be placed over it as if masking a minor skin scratch.

Retention of the finger prosthesis is another important consideration as to improve the esthetics, function and comfort of the patient. In the literature, finger prosthesis has been retained by various techniques such as vacuum effect on the stump⁵, medical grade adhesives², placement of finger ring⁷ and recently by osseointegrated implants⁸. As the patient was not ready to bear any expensive procedure, the non-surgical approach of rehabilitation with finger ring was carried out. In addition to providing retention to the prosthesis, finger ring was also used in the present case to mask the junction between the prosthesis and residual stump on the proximal phalanx.



Figure 1: Pre-operative View Of The Defect Site.



Figure 2: Impression Of The Affected Hand Recorded Using Irreversible Hydrocolloid.



Figure 3: Finished And Carved Wax Patterns For Finger Prosthesis.



Figure 4: Wax Try-in.



Figure 5: Dewaxed Molds For Loading Of Room Temperature Vulcanizing Silicone Material.



Figure 6: Finished Prosthesis With Rings For Additional Retention.

CONCLUSION

Silicone finger prosthesis is a boon to individuals suffering from psychological trauma after loss of the finger. Prosthetic rehabilitation of missing finger may not completely restore the function, form and aesthetics but it certainly improves the professional and social life of the patient. The technique described above is simple, inexpensive. When surgical reconstruction of amputated finger is contraindicated, unaffordable or unsuccessful, then a high quality esthetic finger prosthesis with passive function can do wonders for the patient.

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