

CASE REPORT

Prosthetic Rehabilitation of a partially Amputated Finger using a Silicone Prosthesis

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ABSTRACT

Amputation of a finger will have considerable functional and psychological impact on an individual. Although prosthetic rehabilitation incorporating implants is considered an ideal treatment option, the patient may not give consent due to apprehension toward surgical procedures. The ideal prosthesis should replace the missing part of the finger so precisely that it would not draw the attention of the observer. Fabrication of such a prosthesis will require great technical and artistic expertise. This paper presents a case of prosthetic rehabilitation of an amputated finger using a silicone finger prosthesis.

Keywords: Amputation, Finger prosthesis, Prosthetic finger, Silicone.

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INTRODUCTION

The common causes for finger amputations are trauma, congenital absence, and malformations.¹ Loss of part or whole of a finger will emotionally disturb the patient and may lead to serious functional deficiencies. Rehabilitation of such defects depends on the amount of tissue lost, the level of amputation, and the bone involvement if any. Although advancements in the field of microsurgical procedures have helped patients, prosthetic rehabilitation remains as one of the most important treatment options available due to reduced expense and less technical difficulties involved.^{2,3} Prosthetic rehabilitation can be satisfactory in patients who have at least 1.5 cm of residual stump.⁴ Prosthodontic rehabilitation can be successful only when the patient can appear in public without the

fear of attracting unwanted attention from an observer.⁵

This article presents a case of prosthetic rehabilitation of a partially amputated finger using a silicone finger prosthesis.

CASE REPORT

A 31-year-old male patient reported to the Department of Prosthodontics, Government Dental College, Alappuzha, with a chief complaint of partially missing middle finger on his right hand (Fig. 1). The patient had lost his finger in a road traffic accident 2 years ago. Clinical examination revealed that the proximal phalanx part of the middle finger was missing. The skin over the residual finger stump was completely healed with no signs of inflammation. A silicone finger prosthesis was planned for the patient.

CLINICAL PROCEDURE

The patient's hand was lubricated with petroleum jelly. A suitably sized cardboard box was used to confine the impression material. A thin mix of irreversible hydrocolloid impression material was poured over the palmar side first and then over the dorsal side to prevent tearing of the impression during retrieval. During the impression procedure, the patient was instructed to keep the hand in a relaxed position without stretching. After the material had set, the impression was retrieved (Fig. 2). The impression was poured in a dental stone without any voids to obtain a positive replica of the affected hand (Fig. 3). An impression of the middle finger of



Fig. 1: Preoperative photograph

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Fig. 2: Impression of the defect



Fig. 3: Stone cast obtained from the impression



Fig. 4: Sculpted wax pattern on stone cast



Fig. 5: Artificial nails with adhesives

the opposing left hand was made using elastomeric impression material. Molten wax was poured into this impression to obtain a working wax pattern, which was sculpted to fit the stump replica of the mutilated finger on the stone cast (Fig. 4). Artificial nails with adhesives were used to replicate the natural nail contours (Fig. 5). Wax try-in of the prosthesis was done and necessary corrections were made (Fig. 6). The stump was then sectioned from the stone cast with the wax pattern (Fig. 7). In order to give a snug fit to the final silicone prosthesis, scoring of 1 to 1.5 mm was done on the base of the stump. The artificial nail was carefully removed from the wax pattern. Flasking of the wax pattern was done in such a manner that the ventral and dorsal aspects

were separable. Dewaxing procedure was done and the wax residue was completely eliminated (Fig. 8). The mold was allowed to cool thoroughly prior to the shade matching and silicone packing procedure. Factor II medical-grade silicone MDX-4210 (RTV) was used for the fabrication of the prosthesis. In the presence of the patient, shade matching was done by adding intrinsic colors to the silicone material (Fig. 9). Characterization with shade variations was done on the dorsal and palmar surfaces during packing of the silicone material. Curing was done according to manufacturer's instructions. After complete polymerization, the prosthesis was retrieved and polished. Artificial nail was reattached to the silicone prosthesis using cyanoacrylate adhesive (Figs 10 and 11).



Fig. 6: Try-in of the wax pattern



Fig. 7: Stump sectioned from the stone cast



Fig. 8: Dewaxing of the wax pattern



Fig. 9: Shade matching of silicone



Fig. 10: Silicone finger prosthesis



Fig. 11: Silicone finger prosthesis inserted

DISCUSSION

Although severely injured and traumatically amputated digits can be treated by microsurgical replantation, prosthetic rehabilitation can offer great psychological help to the patient when surgery is contraindicated,

unsuccessful, or unaffordable.⁶ Prosthetic rehabilitation is medically uncompromised and allows close monitoring of the surgical site.⁷ Prosthetic replacement can be considered in these situations to restore the finger with a functional prosthesis with a matching color, form, and

texture to improve and enhance the patient's confidence.⁸ Silicone prosthesis allows copying every detail of the natural hand and is not subject to ordinary thermal damages or stains.⁵ MDX-4210 is an RTV translucent silicone, which is compatible with almost all the intrinsic and extrinsic coloring systems.⁹ Advances in the field of material science have led to the evolution of silicone materials with improved biological characteristics and coloration methods.¹⁰

Although various modes of retention are available for the retention of finger prosthesis such as implants, medical-grade adhesives, rings, and attachments, the degree of retention mainly depends upon the length and form of the residual stump. In this case, the vacuum retention provided by the snug fit of the prosthesis was enough for the retention of the prosthesis.

CONCLUSION

Loss of a digit will have a profound effect on the self-esteem and psychological status of the patient. When surgical reconstruction is contraindicated or unaffordable, a prosthetic finger will assist in the rehabilitation of the patient. Fabrication of highly esthetic finger prosthesis will require great technical and artistic expertise. This case report describes the prosthetic rehabilitation of a patient with an amputated finger using a silicone finger prosthesis.

REFERENCES

1. Kini AY, Byakod PP, Angadi GS, Pai U, Bhandari AJ. Comprehensive prosthetic rehabilitation of a patient with partial finger amputations using silicone biomaterial: A technical note. *Prosthet Orthot Int* 2010 Dec;34(4):488-494.
2. Shanmuganathan N, Maheswari MU, Anandkumar V, Padmanabhan TV, Swarup S, Jibran AH. Aesthetic finger prosthesis. *J Indian Prosthodont Soc* 2011 Dec;11(4):232-237.
3. Jacob PC, Shetty KH, Garg A, Pal B. Silicone finger prosthesis. A clinical report. *J Prosthodont* 2012 Dec;21(8):631-633.
4. Aydin C, Karakoca S, Yilmaz H, Yilmaz C, Yamalik K. The use of dental implants to retain thumb prostheses: a short-term evaluation of 2 cases. *Int J Prosthodont* 2008 Mar-Apr;21(2):138-140.
5. Beumer, J.; Curtis, TA.; Firtell, DN. Maxillofacial rehabilitation, prosthodontic and surgical considerations. London: C.V. Mosby Company; 1979.
6. Pilley MJ, Quinton DN. Digital prostheses for single finger amputations. *J Hand Surg Br* 1999 Oct;24(5):539-541.
7. Nazir S, Gangadhar A, Manvi S. Fabrication of silicone finger prosthesis: a clinical report. *J Indian Prosthodont Soc* 2006 Dec;16(4):199.
8. Pereira BP, Kour AK, Leow EL, Pho RW. Benefits and use of digital prostheses. *J Hand Surg* 1996 Mar;21(2):222-228.
9. Seals RR Jr, Cortes AL, Funk JJ, Parel SM. Microwave techniques for fabrication of provisional facial prostheses. *J Prosthet Dent* 1989 Sep;62(3):327-331.
10. Aziz T, Waters M, Jagger R. Surface modification of an experimental silicone rubber maxillofacial material to improve wettability. *J Dent* 2003 Mar;31(3):213-216.