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# GLOVE-TYPE FINGER PROSTHESIS- A BOON TO PHYSICALLY DISABLED

Dental Science

**Dr.Prabhakar Angadi** MDS, Associate Professor, SMBT dental college and hospital, Sangamner

**Dr.Nazirkar Girish S** MDS, Professor and Head, SMBT Dental College & Hospital, Sangamner

**Dr.Aishwarya Tendolkar** Ex PG student (SMBT dental college and hospital) and consultant prosthodontist

**Dr.Pratiksha Tiwari G*** PG student, SMBT Dental College & Hospital, Sangamner *Corresponding Author

**Dr.Sneha Yadav** PG student, SMBT Dental College & Hospital, Sangamner

## ABSTRACT

Finger deformities affect function and aesthetics, compromising with the day to day activities of life and also psychological well-being of patient. This case report describes fabrication of silicone glove type of finger prosthesis for 27 year old male for partially missing index finger, middle finger and thumb of left hand because of accidental trapping of fingers in sugarcane juice machine. This finger prosthesis restored psychological well-being and aesthetics of patient.

## KEYWORDS

Glove Type Retention, Finger Prosthesis, Silicone.

**Case History:**

A 27 yr old male who is a sugarcane juice vendor came to Department of Prosthodontics and crown and bridge with chief complaint of partially missing left index finger, middle finger and thumb. (Figure – 1)The patient gave a history having lost his fingers due to accidental trapping of fingers in sugarcane juice machine, only proximal phalanx, part of middle phalanx and first interphalangeal joint was present for middle and index finger and for thumb only proximal phalanx was present.'

**Fig-1: preoperative dorsal view of both the hands**

A complete hand examination revealed the residual stump size of index finger (3.9cm*2.1cm), middle finger (4.7cm*2.3cm) and thumb (2.6cm*2.6cm) respectively with normal compressibility of overlying tissues, without any symptoms and infection.

It was decided to fabricate a glove type of finger prosthesis as the sizes of all the residual stumps were appropriate .The treatment plan was then explained to the patient and to ensure the patient's willingness and co-operation an informed consent was signed before beginning of the treatment.

**Impression making:**

The patient's palm was lubricated using petroleum jelly, a primary impression was made of entire palm using neocolloid impression material using plastic box as a mould (Figure-2).The patient was instructed to keep the hand in normal resting position with fingers apart without stretching.

**Fig 2: Primary impression**

An impression was then poured using dental stone and a positive replica of the hand was retrieved. A donor whose finger dimensions and contours closely mimicked the fingers of the patient were chosen to reduce the time required for sculpting, (Figure-3) an impression was made in alginate impression material in a plastic glass (Figure-4, 5).

**Fig-3: Hand comparison with primary cast**

Molten modelling wax was then poured into the impression mould and was then retrieved.(Figure-6) 1mm of circumference of all the stumps was reduced on the working model to achieve snug fit for final prosthesis. This pattern was then hollowed from inside, tried on the cast and necessary chair-side modifications were made to resemble the digits of other hand.

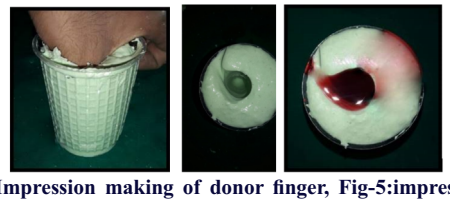

**Fig -4:Impression making of donor finger, Fig-5:impression of donor finger,**

**Fig-6:fabrication of wax pattern**

The wax pattern was then tried on patient's fingers (Figure-7). The pattern was relined with light body impression material to achieve a better fit (Figure-8). Artificial nails were fabricated using clear acrylic and pink cold cure acrylic resin and nails were characterized to incorporate stains for matching the nail of natural fingers

**Fig -7: Try in of hollowed out wax pattern**

**Fig-8:relining of hollowed out wax pattern**

**Investment technique:**
Key was fabricated for each stump by pouring dental stone in the relined models. Base flasking was done up to the junction of dorsal and ventral surface (Figure-9), separating medium was then applied and second pour was done to cover entire wax pattern.

As the length of middle finger was more than regular flask. A customized cast-metal flask was fabricated for flasking of middle finger. Dewaxing was carried out and flask was then allowed to cool (Figure-10).

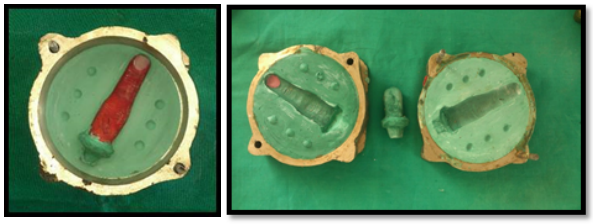

**Fig -9:Base flasking of prosthesis after fabrication of stone key, Fig-10: Dewaxing**

**Shade matching:**
Shade matching was done in daylight between 11am to 1pm. The heat vulcanized silicone was used. The base was dispensed and the intrinsic colours were added to achieve the required shade. Shade matching was done separately for dorsal and palmar aspects of the finger (Figure-11). The patient's presence was critical to gain his approval.

Packing was again done separately for dorsal and palmar aspect (Figure-12).

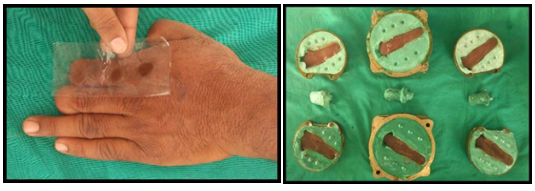

**Fig-11: shade matching , Fig-12: separate packing for dorsal and palmar surface using heat cure silicone.**

Once the final prosthesis was obtained, the flash was trimmed using a sharp blade and final finishing was accomplished using silicone burs . Extrinsic staining was done for exact matching of the shade (Figure-15, 16).

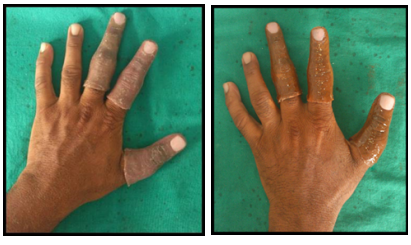

**Fig -13:Try in of finished prosthesis on patient's hand.Fig-14-Try in of finished prosthesis on patient's hand after extrinsic staining.**

**Final prosthesis:**
Since the prosthesis was extended up to Metacarpophalangeal joint, customized solder wire rings were fabricated to mask the junction (Figure-15). The patient was demonstrated about the use and maintenance of the prosthesis (Figure-16).

**Fig -15:Fabrication of customized solder wire ring, Fig-16: Prosthesis in function**

**Discussion:** The success of the prosthesis depends on the precision of planning the prosthesis, making the impression, carving the model and choosing the material that best suits the concerned circumstances.[1]In this technique conventional impression method is used which has a certain advantages like being less cumbersome quick, easy and an economical technique. Impressions were made from donors opposite palm that was a mirror image of the patient's disabled palm.

Wax was preferred over clay to make the pattern because residual oils from clay contaminate the mould surface, which interferes with the platinum catalyst employed in silicone prosthesis materials. The resultant wax was pliable enough to form into small shapes with fingers when warm, yet stiff enough to carve with an instrument when chilled.[2] placing it in chilled water for some time prevents distortion of the pattern.

The colouring of silicone is a technically sensitive procedure. The intensity of the non-polymerized silicone matched the one but after polymerization the same shade looked light, so external staining was also done. This definitely shows that there is a difference in intensity between non-polymerized and polymerized silicones. The retention of artificial prosthesis is of utmost important needing ring, adhesives and osseointegrated implants.[3,4] That in turn enhances the function, comfort and improve quality of life of the patient.[5] A simple solder wire ring was fabricated that could be tightened by winding around the patient's fingers which added to the retention.

**Conclusion:**
For most patients, the aesthetic appearance of an amputated finger plays a more important role than function, which is a challenge. But with today's advancements, this can be easily achieved. When fabricated with immense care, they can be made life-like. A well fabricated aesthetic prosthesis can help in providing the patients with psychological support and also functional support to some extent.

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