

Acrylic Finger Prosthesis: A Case Report

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ABSTRACT

Hands basic function is to grasp, hold and manipulate items. Hand gesture is perhaps the most blatant example of non-verbal communication. Finger and partial finger amputations are most frequently encountered forms of partial hand loss. Common causes are traumatic injuries, congenital absence or malformations present great clinical challenges. In addition to immediate loss of grasp strength, finger absence may cause marked psychological trauma. Individuals who desire finger replacement usually have high expectation for the appearance of prosthesis. This clinical report portrays simple method to retain acrylic finger prosthesis.

Keywords: Partial finger amputation, Prosthetic finger, Silicone finger prosthesis

CASE REPORT

A 28-year-old male patient was referred to the Department of Prosthodontics with a chief complaint of partially missing right hand index finger. The amputation was partial involving the junction of 2nd and 3rd phalange [Table/Fig-1,2]. The wound was completely healed and the surrounding skin showed no signs of inflammation and infection. The patient has no history of previous prosthesis. After thorough diagnosis it was decided to fabricate wrought wire retained acrylic finger prosthesis. Patient was informed about the limitations of the prosthesis.

A plastic container was reduced to a height, which can accommodate the hand upto the wrist level. Patient was instructed to keep the hand in normal resting position. An impression of the hand on side of amputated finger was made using irreversible hydrocolloid material (Algitec-DPI) which was loaded into the prepared plastic container. After the material sets patient was instructed to slowly remove the hand from the container. Impression was then poured in type III dental stone using vibrator to prevent voids and thus a positive replica was obtained [Table/Fig-3].

Impression of the contralateral index finger was similarly made and poured with type III dental stone. This serves as a guide to develop contours in wax pattern for amputated finger. As there was a bulky soft tissue undercut at the amputated site, hence a wrought wire framework design was planned (Leone – 20 gauge). Wax pattern was fabricated using the contra lateral impression [Table/Fig-4]. After necessary modifications in the wax pattern and retentive frame work, try-in was done. During this stage the fit and length was verified.

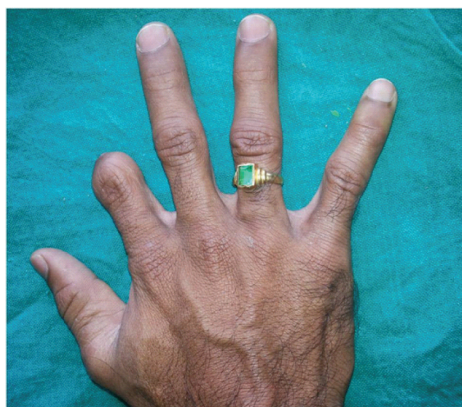
Wax pattern along with retentive framework was invested in a flask with dental stone and regular dewaxing was carried out. Internal staining of dorsal and ventral surface was done separately to match basic skin colour of the patient. Separating medium was applied and the stained acrylic dough was incorporated into the mold space and the compartments were closed. After regular flasking procedures the flask was divested and the prosthesis retrieved carefully. Finishing and polishing was done [Table/Fig-5]. To better match the skin colour external staining was also carried out and prosthesis delivered to the patient [Table/Fig-6,7].

DISCUSSION

Fingers have an important role in function and aesthetics. Finger amputation may result from congenital cause, trauma, infection and tumours. Partial or complete absence of finger causes functional deficiencies and aesthetic problems to patients [1]. Even though microvascular surgery has come for the rescue of patients; technical difficulties, financial issues and non-feasibility of reconstruction surgery have still made prosthetic replacement an important treatment option for finger amputees [2-4].

The purpose of this case report is to describe a simpler technique to retain acrylic finger prosthesis using wrought wire framework. This prosthesis improved the function by restoring shape and length of finger. In this case report, rehabilitation of patient with partial finger amputation with custom made acrylic finger prosthesis retained with wrought wire framework was done.

People with body malfunctions, caused by surgical removal, amputations or birth disorders have both functional and psychological



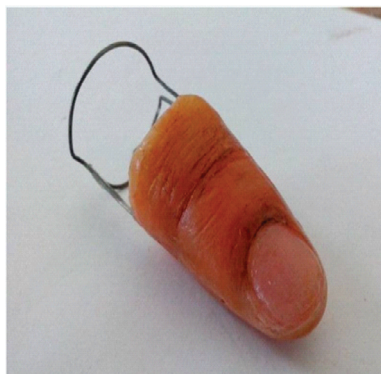
[Table/Fig-1]: Dorsal aspect of hand - pre-operative



[Table/Fig-2]: Palmer aspect of hand - pre-operative



[Table/Fig-3]: Working model of the hand



[Table/Fig-4]: Prepared wax pattern on the model, **[Table/Fig-5]:** Fabricated prosthesis, **[Table/Fig-6]:** Final prosthesis – dorsal aspect, **[Table/Fig-7]:** Final prosthesis – palmar aspect

consequences. Finger and partial finger amputations are some of the most frequently encountered forms of partial hand loss resulting in loss of grasp strength [5].

Finger prosthesis should be biocompatible, strong and stable [6].

Microsurgical replantation is a method to save severely injured and traumatically amputated digits but not all trauma patients are lucky enough to get microsurgical replantation done [7]. Delay in approaching the higher centers, lack of availability of facilities, severely crushed fingers are some problems usually a trauma patient from rural India faces.

Even though polyurethane, polyvinylchloride have been used to produce life like effects in finger prosthesis. Silicone rubber has been proved to be most promising in achieving the desired effects in hand injuries [8]. Material of choice in this case report was acrylic because of patient's affordability and a viable alternative to expensive silicone was tried.

Retention of the prosthesis is important for function, aesthetics and comfort thereby improving the acceptability to patient. It can be achieved by medical grade adhesives, [9] can be vacuum retained on stump [6] and placement of finger ring [10]. Osseointegrated implants have been used recently to retain the prosthesis [11]. In this case report, we opted a wrought wire mesh to retain the prosthesis as there was a prominent soft tissue bulge at metacarpal-phalangeal joint, which the patient was reluctant for surgical intervention. So, in this case report wrought wire retained acrylic finger prosthesis was planned and executed by considering the above factors.

CONCLUSION

A total or partial loss of finger can have a great physical and psychological impact on patient. Aesthetics and retention are the determining factors for a successful prosthesis. A simple and effective method using acrylic and wrought orthodontic wire has been attempted and found to be quite successful.

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