

Customised Silicone Finger Prosthesis for Functional and Cosmetic Rehabilitation of Amputated Fingers

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Abstract

Introduction: The primary functions of hands are to grip, hold, and move objects. A hand gesture is the most visible form of nonverbal communication. Finger amputation results in both functional and psychological impairments. Silicone prostheses offer an aesthetic and non-invasive rehabilitation option. A patient with finger defects has high expectations for their prosthesis, which can lead to significant psychological distress in addition to an immediate loss of grip strength.

Case Description and Procedure: In this case series, both young males with traumatic amputation of the distal phalanges were rehabilitated using a customized silicone prosthesis by sculpting the wax pattern with intricate details. The prosthesis was fabricated using impressions of the contralateral fingers, medical-grade HTV silicone, and a finger ring was incorporated to assist with retention and to obscure junction lines.

Conclusion: Both the case reports emphasize that silicone finger prostheses, when anatomically and chromatically customized, can restore esthetics, passive function and improve patient satisfaction after traumatic digit loss.

Keywords: Maxillofacial Prosthesis; Prosthetic Finger; Silicone Finger Prosthesis; Partial Finger Amputation; Functional passive; Customised Finger Prosthesis

Introduction:

Loss of a finger due to trauma affects both the physical and psychological well-being of an individual. Functional compromise is coupled with social embarrassment due to visible disfigurement. While surgical reconstruction remains an option, prosthetic rehabilitation offers a non-invasive, cost-effective alternative.¹

A thorough hand examination is essential, assessing the extent of damage to the fingertip, the angles and degrees of amputation, tissue loss, nail involvement, additional finger involvement, neurovascular involvement, and hand function. After evaluating the amputated area and the remaining shaft, the practitioner should formulate a treatment strategy.²

The loss of a finger can lead to significant functional impairment, psychosocial challenges, and aesthetic concerns. Advances in prosthetic and surgical technologies have resulted in various approaches for finger replacement, generally classified into non-invasive cosmetic prostheses and invasive implant-retained options.³ Common modalities include silicone elastomer prostheses, titanium endoprostheses, and osseointegrated abutment-retained prosthetics.⁴

Case Report: I

A 34-year-old male patient was referred to the prosthodontics department with complaints of a left thumb amputation. A partial amputation occurred at the junction of the middle and distal phalanges [Figure. 1a]. The patient has no prior history of using a prosthesis. It was decided that a silicone finger prosthesis would be made after a comprehensive diagnostic evaluation with a spectrometer. The limitations of the prosthesis were explained to the patient. The treatment plan involved fabrication of a lifelike, custom-made silicone finger prosthesis.

Procedure

After informed consent and explanation of the prosthesis' limitations, impressions were made using irreversible hydrocolloid. A preliminary impression of the amputated site was taken and poured in Type IV dental stone (Orthokal, ADA specification). A secondary impression, including the wrist and adjacent fingers in a resting position was made for accurate characterization.

To replicate the missing fingers, impressions of the contralateral (donor) index and middle fingers were made, and molten modeling wax was used to create wax patterns [Figure. 1b]. These were evaluated, adjusted, and sculpted to match the contralateral fingers. A two-piece mold was fabricated using ADA Type III dental stone via the lost wax technique, incorporating a retrievable stump mold [Figure. 2a].

Medical-grade high-temperature vulcanizing (HTV) silicone (Cosmosil HTV, UK) was mixed with catalyst in a 10:1 ratio, and thixo agent was added to enhance handling and minimize air entrapment. Skin tone was matched using spectrophotometry, and eccentric staining was applied to replicate skin variation. The silicone was packed into the mold, cured at 100°C for 60 minutes, and subsequently trimmed and finished [Figure. 2 b,c].

Final fit and shade were evaluated in the patient's presence to allow real-time customization. A finger ring was provided for additional retention. The patient expressed satisfaction with the aesthetics and comfort of the prosthesis [Figure. 3].

Case Report: II

A 25-year-old male patient visited the Department of Prosthodontics, Crown & Bridge at King George's Medical University (KGMU), Lucknow, with a history of traumatic amputation of the distal and middle phalanges of the Left index, middle, ring, and little fingers during childhood [Figure. 4]. The main concern was an unesthetic appearance. Clinical examination showed well-healed, non-inflamed tissue without signs of infection. The patient had no previous experience with prosthetic use. The prosthesis was fabricated using the same steps as described earlier in the case.

Sculpting tools were employed meticulously during wax pattern fabrication to carve fine anatomical details such as skin creases, nail folds, and subtle surface textures [Figure. 5]. This detailed carving was essential to replicate the natural contours and realistic appearance of the patient's contralateral fingers, thereby enhancing the prosthesis's esthetic integration and acceptance. The careful manipulation of the

wax allowed customization to the patient's unique hand anatomy, contributing significantly to the overall prosthesis realism and patient satisfaction. The contralateral imprint created the wax pattern. Try-in was completed following the required retentive frame and wax pattern adjustments [Figure. 6]. The length and fit were confirmed at this point. A finger ring was incorporated to assist in retention and to obscure junction lines.

DISCUSSION

Amputation of one or more fingers due to trauma or congenital absence significantly impacts not only hand function but also emotional and social well-being.⁵ Patients who undergo partial hand loss often begin therapy shortly after surgery, with rehabilitation goals centered around minimizing functional disability and enabling a prompt return to daily activities. In this case, the use of a silicone prosthesis reflected a palliative rehabilitation philosophy—providing the patient with an accessible, non-invasive, and emotionally restorative intervention.⁶

While surgical reconstruction remains the gold standard in select cases, many patients decline these options due to cost, complexity, or surgical risk. Passive aesthetic prostheses such as silicone fingers are effective alternatives that can help restore social interaction and confidence. Notably, modern silicone formulations provide superior stain resistance and lifelike texture, enhancing long-term patient satisfaction.⁷

Functional benefits, such as gentle pressure to reduce hypersensitivity and protect healing tissue, have also been reported. However, rehabilitation must also address realistic expectations, maintenance needs, and retention challenges.⁸ In this case, a wrought wire mesh and finger ring provided cost-effective, non-invasive retention, circumventing the need for osseointegration or adhesives.⁹

From a palliative care perspective, such interventions align with the core principles of holistic patient care. They address existential distress, restore dignity, and support social reintegration. While often overlooked in mainstream palliative literature, such cases highlight the broad relevance of palliative philosophy beyond life-limiting illness.

CONCLUSION

For the majority of patients, the appearance of an amputated finger is more significant than its functionality. Today, the rehabilitation of an amputated finger is no longer visually complex because of advancements in expertise, technology, and materials. With great care, they may be made to look realistic. A well-made cosmetic prosthesis can aid in offering psychological support to patients. In young trauma patients, silicone finger prostheses can offer more than cosmetic restoration; they renew confidence, agency, and quality of life.

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FIGURE LEGENDS:

Figure 1	Left thumb traumatic amputation (a) Pre-Operative view (Ventral aspect) (b) Wax pattern Try-in (c) Post-operative view: Final Silicone Finger prosthesis delivered
Figure 2	(a) Two-part mould after dewaxing (b) Colour matching with spectrophotometry (c) Silicone Mixing (d) Left thumb 'Lifelike' Silicone prosthesis fabricated
Figure 3	Final Passive functional finger prosthesis with extrinsic stains delivered (a) With a finger ring (b) holding a glass bottle
Figure 4	Distal and middle phalanx traumatic amputation in left index, middle, ring, and little fingers (a) Ventral aspect (b) Dorsal aspect
Figure 5	Sculpting and carving tools are used for making realistic features in wax pattern.
Figure 6	Wax pattern try-in for evaluation of fit and grip restored.



Figure 1



Figure 2



Figure 3



Figure 4

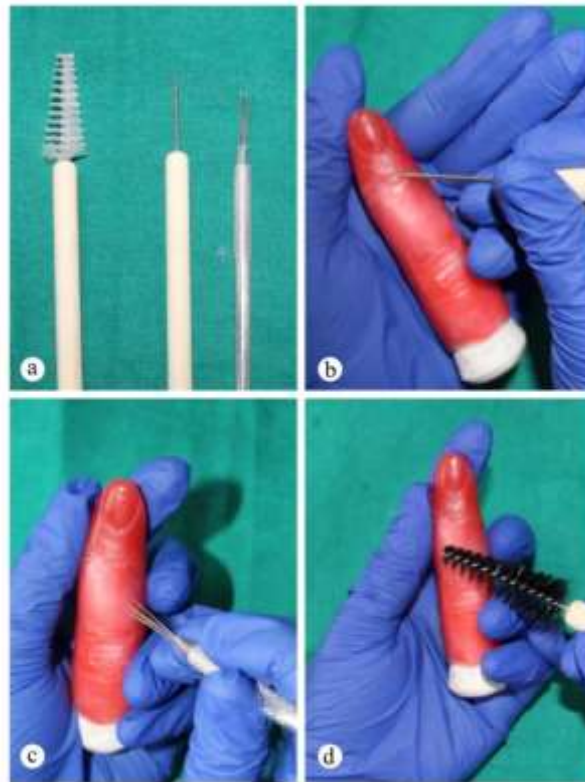


Figure 5



Figure 6