

CASE REPORT

Cost effective cosmetic prosthesis for lost digits

G. MANIVANNAN*, G. KARTHIKEYAN*,
PREMAL DAS** & G. BABU***

**Occupational therapist, TLM Community Hospital, Naini,
Allahabad*

***Surgeon, TLM Community Hospital, Naini, Allahabad*

****Physiotherapist, TLM Community Hospital, Naini, Allahabad*

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Summary Leprosy causes nerve damage which leads to repeated injuries or ulcers causing the loss or absorption of digits. The loss of digits is also common in traumatic injuries. Irrespective of the etiology, the loss of a finger has a considerable negative functional and psychological impact on an individual. In order to solve these problems, prostheses are provided to patients. This short report demonstrates the advantages of using liquid latex in making a low cost cosmetic prosthesis. The possibility of using latex material offers a practical alternative where silicone prosthesis is not affordable.

Keywords: Finger prosthesis, Cosmetic, Latex, low-cost

Introduction

We have five digits, comprising three phalanges for fingers and two for thumb and great toe on each hand and foot. They enable us to interact with our environment and carry out day to day functions. It has been stated that the thumb with normal length digits are the most essential from a functional standpoint.¹ The complete or partial loss of a finger results in significant functional deficiencies. In addition to the immediate loss of grasp, strength and security, the absence of a finger may cause marked psychological trauma. Beasley has noted that individuals who keep their hands hidden in their pockets due to embarrassment over their appearance are as functionally disabled as a forequarter (scapula-thoracic) amputee.²

Many people affected by leprosy have sensory impairment with visible deformity for many years;³ this leads to repeated ulcers and absorption of digits when safety measures in day to day activities are neglected. The loss of digits also projects a negative image of the disease and causes stigma which is associated with psychological problems and social restrictions.

Correspondence to: G Manivannan, Occupational Therapist, the Leprosy Mission Hospital, Naini, Allahabad – 211 008, Uttar Pradesh, India (e-mail: manibot_2001@yahoo.com; tlmnaini@tlmindia.org)



Figure 1. Preliminary mould being taken with POP roll from contra lateral side for making Right index finger prosthesis.

A commercial Silicon⁴ made prosthesis is expensive (US \$120) for leprosy-affected people who are often economically under-privileged. This short report demonstrates the advantages of using liquid latex⁵ in making a low cost cosmetic prosthesis. The possibility of using latex material offers a practical alternative where silicone prosthesis is not affordable

Methods

When a patient requests a prosthesis in our hospital, a three dimensional impression of the same fingers of the contra lateral hand are made with Plaster of Paris rolls. Liquid Plaster of Paris is poured into these negative moulds to duplicate the shape of the fingers. Next, a thin layer of latex is painted over this positive mould with a foam applicator. This provides the



Figure 2. POP roll applied.



Figure 3. Negative mould removed from finger.

detailing of the skin surface once dry. This mould, coated with latex is then immersed into liquid latex several times, to get multiple layers of the solution to achieve the adequate thickness of the prosthesis. Once dry, the prosthesis, which is a replica of the contralateral normal digit, is turned inside out to then be a replacement for the opposite lost digit. The filling is done with waste polyurethane foam.⁶ The prosthesis is trimmed and acrylic paint^{7,8} (e.g. fevicryl or camlin) is applied to match the skin colour.

An artificial nail⁹ is shaped, attached with adhesive and the prosthesis finished. The prosthesis is fitted and client feedback is sought for acceptability. This process is shown in Figures 1–8.



Figure 4. Negative mould filled with liquid POP.



Figure 5. Solid POP positive mould being dipped into liquid Latex.



Figure 6. Positive mould coated with latex.



Figure 7. Acrylic painting and finishing.



Figure 8. Finished latex prosthesis.

Case report 1

A 21 year old, housewife lost her right index finger due to the loss of sensation and resulting ulceration. She was studying in college and had family functions to attend and was embarrassed by this deformity. She was given a latex finger prosthesis and now is fully active and confident in carrying out her different roles and responsibilities (Figure 9).

Case report 2

A 40 year old carpenter from Allahabad district, presented with the loss of his right thumb from the MCP joint level due to a loss of sensation and resulting ulceration. He was embarrassed about showing his hand in public and was given a latex thumb prosthesis. After the fitting he was satisfied and now confidently shakes hands with his peers and community members (Figure 10).

Case report 3

A 16 year old girl presented with absorbed right 3rd and 4th toes and wore closed shoes to hide her foot. In a tropical country like India, most community members wear open slippers due to the warm climate. Latex toe prostheses were customized for this girl, and she is now wearing open footwear to college with the toe prostheses (Figure 11).



Figure 9. Index finger prosthesis.



Figure 10. Thumb Prosthesis.



Figure 11. Toe Prostheses.

Conclusion

Liquid latex¹⁰ is easily available, not very expensive and fabrication is not labour intensive. The texture of the latex matches well with the skin and looks natural. Colouring with acrylic paint needs to be done by someone with basic artistic skills. The Occupational Therapy team of The Leprosy Mission Hospital Naini, regularly make these prostheses for individuals with missing digits. The acceptance of these prostheses by patients is a great motivation for the team to continue making them and spreading the technique to others through this paper.

References

- ¹ James CH. Amputations of hand. Campbell's operative orthopaedics. Mosby Inc., 10. St. Louis, 2003; pp. 611–622.
- ² Kolb LC. Disturbances in body image. In: Arieti S (ed). *American handbook of psychiatry*. Basic Books, New York, 1959; pp. 749–769.
- ³ Wim H. van Brakel. Disability in people affected by leprosy: the role of impairment, activity, social participation, stigma and discrimination. *Glob Health Action*, 2012; **5**: 18394 – <http://dx.doi.org/10.3402/gha.v5i0.18394>
- ⁴ Shanmuganathan N. Aesthetic Finger Prosthesis. *J Indian Prosthodont Soc.*, Dec 2011; **11**(4): 232–237.

- ⁵ <http://en.wikipedia.org/wiki/Latex>
- ⁶ http://www.8linx.com/polyurethane_foam.htm
- ⁷ <http://www.himalayafineart.com/Product/153/Fevicryl+Acrylic+Colors.aspx>
- ⁸ <http://camlin.tradeindia.com/artists-acrylic-colours-383868.html>
- ⁹ <http://www.boots.com/en/Beauty/Nails/False-Nails/>
- ¹⁰ <http://www.liquidlatex.com/liquidlatex.html>