

## Silicone finger prosthesis- An aesthetic treatment option for partial finger amputation.



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Traumatic amputations of the fingers represents serious insult to the hand, resulting in dramatic impairment of hand function.<sup>1</sup> The ideally constructed prosthesis must duplicate the missing parts so precisely that the casual observer notices nothing that would draw attention to the prosthetic reconstruction<sup>2</sup>. Extraoral maxillofacial prostheses is vital that such facial prostheses are not instantly (abnormally) recognized by casual observers as replacements<sup>3</sup>. This case report presents fabrication of silicone digit prosthesis with internal retentive aid to ensure adequate retention.

A male patient Mr.Durgappa,40 years old (OPD no. 104507), reported to the Department of Prosthodontics College of Dental Sciences, Davangere, on 20/12/2010 with a chief complaint of missing middle finger of the right hand due to trauma (**Fig-1**). Amputation occurred at the middle phalanx of the middle finger due to an accident with a thresher machine. It was decided to treat his problem by giving him a finger prosthesis using room temperature vulcanizing silicone (RTV silicone).

Two big plastic containers were used for making the impressions of both the left and right hand using irreversible hydrocolloid impression material (Zelgan plus, Dentsply,) (**Fig-2**). The impressions were then poured in type-III dental stone (Kalstone, Kalabhai karson Pvt Ltd.). A donor whose finger dimensions and contours

closely mimicked the fingers of the patient was chosen to reduce time required for sculpting. The wax pattern was then hollowed from the inside and placed on the modified stump and sculpting was carried out to resemble the digits of the other hand. A rubber washer was incorporated into the wax pattern to provide extra retention to the prosthesis. The wax pattern was then tried on the patient's hand (**Fig-3**).

In order to provide a snug prosthetics fit, the stump was reduced accurately by around 0.5–1 mm<sup>2</sup>. This ensures adequate fitting of the finished prosthesis, which is held by its own suction on the digital stump. The stump with a keyed base and wax pattern was then embedded in dental stone using a two piece maxillary dental flask. The first pour was done until the junction of dorsal and ventral surface. Separating medium was then applied and a second pour was done to cover the entire wax pattern. Dewaxing was carried out and mould was obtained (**Fig.-4**).

Medical grade silicone MDX-4210 RTV (Room Temperature Vulcanizer) was used and color matching was done with intrinsic colors to achieve the desired shade . The shade matching was carried out in natural light. The dorsal and palmar aspects were mixed separately and characterization was incorporated in presence of patient. The material was allowed to bench cure overnight according to manufacturers instructions. After retrieval of final prosthesis, a sharp blade was used to trim the flash and final



finishing was done with silicone burs. A cold cure acrylic nail was fabricated and back painted to match adjacent nails. Nail was properly trimmed and bonded to the nail bed of prosthesis with a cyanoacrylate adhesive<sup>9</sup>. Final prosthesis

was placed on the patient's hand and checked for aesthetic and function. The patient was advised to wear a ring at the skin-prosthesis juncture to diffuse the color difference at the interface and to conceal the edge of the prosthesis.



Fig 1. Pretreatment view



Fig 2: Impression of the defective hand



Fig 3: Trial of wax pattern

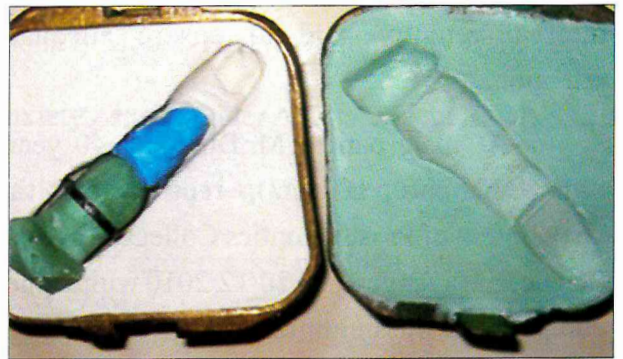


Figure 4. Mould obtained after Dewaxing



Figure 5. Finger prosthesis in position

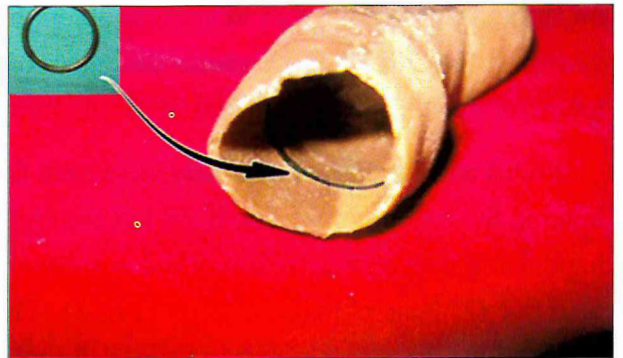


Figure 6. Silicone finger prosthesis with incorporated rubber washer.



## Discussion

A silicone prosthetic finger has a major aesthetic advantage, and a considerable functional benefit, compared to a bare finger stump, and may prove very successful in helping a patient return to a normal life after digital amputation.<sup>4</sup> The stump of the amputated finger should be minimum 1.5 cm in length to fit the standard digital prosthesis.<sup>1</sup>

Pilley and Quinton rehabilitated 15 patients with single digital amputations and the appearance and retention of the prostheses were improved by use of rings.<sup>5</sup> Pereira et al fabricated 136 digital prostheses for 90 patients, and retention and fit of the prostheses were achieved through modification of the inner circumference of the mold.<sup>6</sup> The osseointegrated digital prosthesis is an alternative technique for patients with short stumps on which a standard digital prosthesis is unable to fit properly.<sup>7</sup>

In this clinical report, retention and fit of the prosthesis were achieved by i) Modifying the amputated stump on which prosthesis was held by its own suction. ii) A rubber washer was incorporated into the inner circumference of the prosthesis to aid in extra retention (**Fig-6**).

Many traumatic amputees experience painful hypersensitivity on the stump and the gentle constant pressure of an elastomeric prosthesis can help desensitize and protect the injured tip. They also improve the hydration of stratum corneum of immature hypertrophic scars.<sup>8</sup>

The secure attachment of the nail to the prosthesis is achieved in the technique through a method of "sandwiching" of the inserted portion of the nail between the silicone layers of the prosthesis in addition to a strong surface-to-

surface bonding between acrylic resin and silicone rubber by the adhesive.<sup>9</sup> Significant advances in the field of material science have led to the production of new silicones with improved characteristics and improved methods of prosthesis coloration.<sup>10</sup>

## Conclusion

The success of prosthetic fingers depends largely on excellent primary surgery when fashioning the amputation stump, realistic goals of the surgeon and patient, careful patient selection, high manufacturing standards, and a follow-up facility which provides rapid efficient service for the patient's lifetime. The custom-made finger prosthesis is aesthetically acceptable, partially restores some degree of functionality and comfortable for patient use resulting in psychological improvement with personality development.

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