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Case Report

Distal phalange rehabilitation by glove type prosthesis: a case report

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In the modern era, with the advancements in technology and exponential growth of social media, esthetics plays an important role in the mental health of a person. In such environment, missing distal phalange on right hand of the person can impact the social well-being of the person. This case report presents an easy and economical method of replacement of missing distal phalange of right hand in a 24 year old young woman with the help of glove type silicon prosthesis. Glove type designing helps in retention of the prosthesis.

Keywords: distal phalange; glove type prosthesis; heat cured silicon; flexible denture flask

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INTRODUCTION

Physical and mental health are equally important for the well-being of an individual. Where physical health is important for the functioning of the individual, mental health is important for the social existence of the individual. In the era of social media, esthetics play an important role. In such times, missing phalange of right hand can impact the social life and mental health of an individual.¹ Loss of phalange can be due to congenital absence or due to some trauma or surgical excision.² Extent of the loss of digit determines the functional disability which can vary from being minimum loss of function if only a phalange is missing to loss of grasping power, grip or writing ability if major portion of the digit is missing.¹ Various methods are available for the rehabilitation of lost part of finger. If reported immediately to the surgeon, microvascular surgery could be done for reattaching the part of digit.¹ But the time and cost are limiting factors in this method of rehabilitation. Other methods for fabrication and retention of missing part include implant supported prosthesis or acrylic or silicone prosthesis retained by some artificial substitutes like adhesives or any mechanical methods like ring etc.³

With the technological advancements, realistic prosthesis can be fabricated with the help of CAD/CAM technology where scanning of the

remaining digit is done and the artificial prosthesis is created using CAD/CAM. But, cost is a major factor that decides the treatment options especially in low socio-economic strata people. Keeping various factors in mind, patient was presented with option of either finger prosthesis for the full length of finger which could be retained using a ring but might limit the function as a minimum thickness of silicon could hinder the movements of the finger or missing phalanx fabrication using glove technique. Since patient was apprehensive of wearing a ring, she chose glove type finger prosthesis. After explaining the limitations of the prosthesis, consent was made and prosthesis fabrication was initiated.

CASE REPORT

A 24 year old female patient visited the clinic for the replacement of the missing distal phalange of the index finger of right hand [Figure-1].

History revealed the traumatic loss of the fingertip during her childhood after the finger got stuck in pedestal fan. Clinical examination revealed the complete loss of distal phalange. Patient was more concerned with the esthetics as she was able to manage the functional loss by compensation from the remaining finger and from the adjoining finger. Financial constrains from the patient did not allow for the CAD/ CAM assisted rehabilitation of the same.

Since there was only one phalange missing, esthetic restoration of the margin with ring was not possible and retention posed a great challenge. Glove type finger prosthesis was planned to overcome the retention.

Alginate (Zhermack, Tropicalgin) was mixed in a paper glass and amputated finger impression was made [Figure-2].

Impression was poured in type III dental plaster (Kalstone, Kalabhai) and upon setting, the stone model was retrieved.

Putty (Flexceed vinyl polysiloxane impression material) impression was made of the index finger of the left hand and was poured with molten modeling wax (Rolex modelling wax no.2) [Figure-3].

The wax model retrieved was trimmed at the level of distal phalange to match with missing phalange of right side [Figure-4].

The stone model was trimmed about 2mm around the periphery so that the wax pattern and the prosthesis made would snugly fit like glove over the finger. Wax try-in was done [Figure-5].

On separating sheet, color and heat cure silicon material was mixed to match with the color of the

skin. Both palmar [Figure-6 A] and dorsal surface [Figure-6 B] were checked for shades.

After the shade matching and anatomy of the wax pattern was satisfactory to the patient, it was decided to flask the wax pattern. Flexible denture flask was used since it would easily allow the packing of two different shades for palmar and dorsal surfaces. After flasking, dewaxing was done. Both shades were mixed separately and poured in respective halves of the flask [Figure-7].

Then the flask was heat cured for 1 hour and finger prosthesis was retrieved [Figure-8].

Then a prefabricated nail was fixed with the help of fevi-kwik over the nailbed [Figure-9].

Prosthesis was inserted over the amputated part and patient was happy with the outcome of the esthetics and fit of the prosthesis [Figure-10].

Post-operative instructions included removal of the prosthesis during night time, followed by cleaning with mild soap-water solution and ultra-soft toothbrush. The finger to be lubricated daily with some petroleum jelly to avoid any dryness or complication related to continuous use of prosthetic finger.



Figure 1: Pre-operative



Figure 2: Alginate impression in paper glass



Figure 3: Retrieved wax model



Figure 4: Wax model trimmed to distal phalange



Figure 5: Wax Try-in



Figure 6 A: Palmar surface shade selection



Figure 6 B: Dorsal surface shade selection

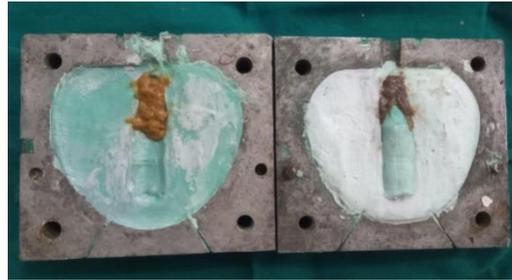


Figure 7: Flasking done



Figure 8: Retrieved prosthesis



Figure 9: Final prosthesis with nail attached



Figure 10: Post-operative

DISCUSSION

Of the many available options for the replacement of the missing part of the finger, autologous method is preferred.¹ However, due to certain limitations like failure of the graft, loss of phalanx long ago, non-preservation of the traumatized part as per

recommended guidelines² or most importantly the financial constrains makes the autologous replacement non-feasible. In such situations, prosthetic rehabilitation is the choice of treatment. Retention for such cases plays an important role for the success. In the present case, glove type prosthesis

was planned as it would not restrict the movement at the interpharyngeal joint and some grasp will be maintained.³ Also the prosthesis provide an additional benefit of ease of insertion and removal. As suggested by Larcher et al, availability of at least 1cm of mobile phalanx provide a stable point for light grasp by finger prosthesis.¹

Another important factor to be considered is the material of the prosthesis. Most common materials available include the polymethyl acrylic and silicones.² Various types of silicones are available which can be classified by their use or method of vulcanization. Grade II silicones are the medical grade silicones which are used for the fabrication of extra-oral prosthesis.¹ Heat vulcanized silicones was preferred as it showed better color stability than room vulcanized silicones.⁴

Intrinsic pigmentation was chosen over the extrinsic as review showed better color stability and longevity.⁵ Shade matching plays an important role as esthetics is the reason for the replacement with prosthetics. The whole process when done manually requires a high level of skill and a good artistic hand. Material selection also plays an important role in the success of the prosthesis. With humid conditions present in summers, retention by adhesive was discarded. Stability could not be achieved using metallic ring inside of the silicone prosthesis as the elasticity of the natural finger would change the position of the ring casted on stone model. Glove type prosthesis made using heat vulcanized silicone provided an additional advantage of elasticity along with intimate fit of the prosthesis due to rectified stone model provided suction as a mode of retention.⁶

Since the patient was a young female, prefabricated nails available in the market were chosen as these can be changed according the need like that of changing color of nail paints or glitters or shape as per occasion.

CONCLUSION

For the psychological comfort of the patient, certain factors such as the length of the prosthesis, shape and material of the prosthesis should be given a special attention. In the present case, limitation of not wearing a ring and also to maintain the function of the finger, preference was given to replacement of only the distal phalanx using glove technique. Heat vulcanized silicone was chosen for a better edge strength and longevity of the prosthesis as the financial condition limited the frequent replacement of the same. Much of changes were not made in wax pattern as that might alter the fine details such as the finger prints and joints.

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