REHABILITATION OF TRAUMATIC LOSS OF A FINGER USING SILICON ELASTOMERS: A CASE REPORT

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Introduction

Loss of even one finger causes significant deficiencies in lifestyle; the more dexterous individuals suffering the greatest. Eg for a musician, the loss of even a portion of a phalange can snatch his/her livelihood.

In addition to the loss of grasp, finger loss may cause marked psychological trauma.

Maxillofacial Prosthodontic Rehabilitation is usually considered difficult, and it worsens when multiple fingers are involved. Moreover, patients who desire the prosthesis have sky-high expectations regarding the appearance of the restoration, more than the function.

So, the prosthesis must duplicate the lost structure to the tune of perfection such that it may not draw even the slightest attention towards it.

Through this paper, a case is presented where a custom-made glove-type prosthesis, comfortable to use and aesthetically acceptable to the patient was fabricated using SILICONE ELASTOMERS.

Case Report

A 35-year old female patient reported to the Dental Office for the fabrication of a Removable Partial Denture involving her Upper right Second Molar.

On general examination, it was noticed that the patient had lost a part of her middle finger of the Right hand (Figure 1) about 5 years back due to a traumatic injury.

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A solitary healed wound/scar was seen on the base of the amputed finger. The surrounding area appeared to be normal with no signs of any infection or inflammation.

An informed consent was taken from the patient, to ensure her willingness and co-operation. The case was then taken up for reconstruction of the partially missing index finger of the right hand.

Technique

1. The patient's hand was lubricated with a thin layer of petroleum jelly. This prevents the hydrocolloid impression material from adhering to the surgical site and the tissue surface. Following this, the area around the hand was boxed, the impression material was placed over the palmer side first and then the dorsal side. The patient was instructed to keep the hand in normal resting position without stretching.
2. The impression was then poured to obtain a model of the hand.
3. The positive replica of the hand was retrieved and prosthesis of the missing finger was carved in White Utility Roped Wax (Figure 2). Each rope is 3/16" diameter - 12" long. This wax is preferred because it is more accurate, easy to carve and faults are easily visible on its surface. Other waxes that may be used are: Injection Wax, Base plate Wax, Boxing Wax Strips, Korecta Wax and Ocularist Wax. The carving was done using the special Sculpting tool kit provided alongwith the Silicone material (Figure 3).
4. During the try in stage, the fit, stability and seating of the wax pattern were evaluated along with the shape and size of the pattern.
5. The pattern was then flasked (Figure 4), and care taken to avoid undercuts for the counter flasking.

The pattern was flasked to enhance the accuracy at the stage of shade matching such that the dorsal and the ventral aspects of the finger were separable. Separating medium was applied between the two pours. After dewaxing, the mould was allowed to cool.

6. The shade matching was done using Extrinsic Colours in natural daylight. The *24-Color Kit System* (Figure 5) that was used consists of the following shades: White, Yellow, Blue, Red, Black, Tan, Umber, Burnt Sienna, Raw Sienna, Monastral Red, Violet, Green, Natural, Ivory, Bisque, B. Stipple, Yellow Ochre, Cream, Honey, Santa Fe, Blush, Soft Brown, Dusk, Mocha and Dark Brown. These pigments are compatible with all addition Silicones and are designed to both mechanically and chemically bind to the surface of a silicone device. The best time for this procedure is between 11:00 AM and 1:00 PM IST. Intrinsic colours were mixed to achieve the appropriate characterization for the palmer and dorsal surfaces. Flocks can also be used to bring out a certain shade. It is critical to carry out this procedure in the presence of the patient so as to gain her approval.
7. The mould created by the elimination of the wax was packed with silicone rubber. It was kept in mind that the higher surface tension of the silicone causes easy entrapment of air within the material and every precaution must be taken to avoid this.
8. The material was allowed to bench cure overnight and for the final polymerization it was placed in hot water for one hour at 45 degrees Celsius.
9. Once the final prosthesis was retrieved, the flash was trimmed using a sharp blade and the final finishing was accomplished using fine sand paper.
10. To complete the prosthesis, an appropriate sized artificial nail was adapted into place.
11. The final step was to place the prosthesis on the patient's hand *in lieu* of the missing finger (Figure 6). Patient was instructed and demonstrated about the use and maintenance of the prosthesis. The gratitude and satisfaction in the patient's eyes made the tedious and time-consuming procedures well worth their while.

Discussion

The success of the prosthesis depends on the precision of planning the prosthesis, making the impression, carving the model and choosing the material that best suits the concerned circumstances.

Individuals who desire finger replacement usually have high expectations for the appearance of the prosthesis. The polyvinyl chloride material generally used is easily and permanently stained by such common materials as ballpoint pen and newspaper ink and has not proven durable enough for active use.

The acceptance rate has been much higher when an individually sculpted custom restoration using silicone elastomer is provided. Layers of clear silicone over each layer of colour add a lifelike translucency and protect the coloration from environmental damage.

Prosthetic form, coloration and texture must be as indiscernible as possible from the surrounding tissues. Rehabilitation efforts can only be successful when patients can appear in public without fear of attracting unwanted attention. To create such a prosthesis, which has a realistic skin surface and seamless visual integration with the surrounding tissues requires both artistic and technical expertise.

Medical Grade Silicone was used for the fabrication of the prosthesis. It is a pourable, clear-to-translucent material with High Strength (esp. Tear Strength) and High Elongation alongwith good physical and electrical stability. MDX-4210 Medical Grade Elastomer, that was used by us is Platinum Cured; better known as Dow Corning Brand Silicone. It cures at room temperature (RTV or Room Temperature Vulcanisation) and does not shrink on curing. Unlimited thick section cures are also possible with these specifications.



Flg 1



Fig 2



Fig 3

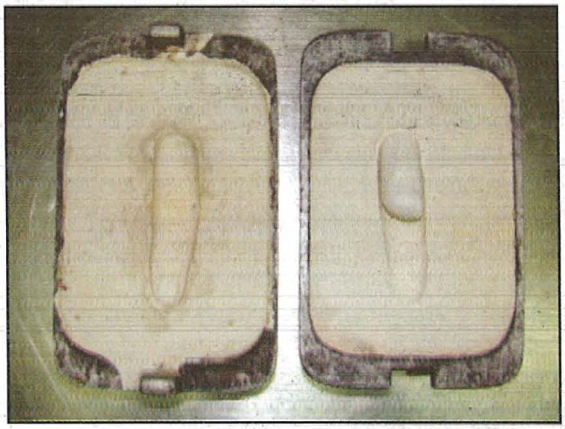


Fig 4



Fig 5

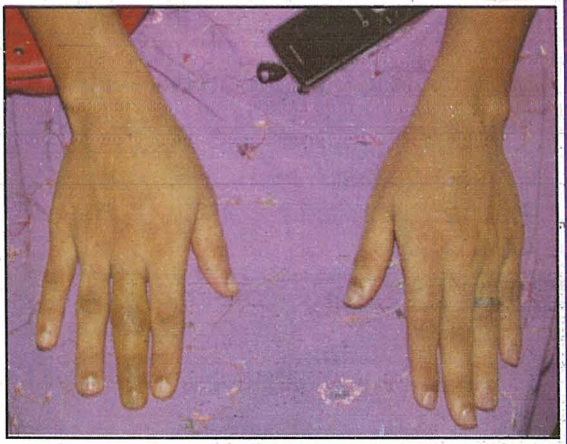


Fig 6

In our case, we have used artificial detachable nails available in the market so as to enhance the ease of replacement according to the *nail polish* used by the patient. The nail, made of Acrylic, was purchased from a local shopping complex.

It is available in Single Colour (White), Pink and White, Glittered and Coloured forms. For our finger prosthesis, we used the Single Coloured White Acrylic Nail.

Desired Objectives

1. Restoration of Aesthetics.
2. Restoration of Function.
3. Preservation of tissues.
4. Psychological Upliftment of the patient.

Conclusion

The custom made finger prosthesis is aesthetically acceptable and comfortable for use in patients with amputated fingers, resulting in psychological improvement and personality. Good suspension alone is not sufficient for patient acceptance of finger prostheses. For many patients, a high level of cosmesis is paramount. Characteristics such as a pleasing shape, thin margins, lifelike fingernails, and realistic colour, contours and detail are also essential for patient satisfaction. This level of restoration is most successful when finger prostheses are individually sculpted and coloured in situ under a variety of lighting conditions.

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BRIG. DR KOHLI ELECTED PRESIDENT OF DCI AGAIN



Hon. Brig. Dr. Anil Kohli Padam Shri and Padam Bhushan awardee and PFA fellow has been once again elected to the high office of the President, Dental Council of India at the General body meeting of the DCI held at New Delhi, with a good majority. Dr. Kohli holds commendable credential to his credit and has received several honorary degrees from the different universities and is a receipt of academic awards. Fellow Dr. Anil Kohli had been the chairperson of India Section of Pierre Fauchard Academy in the year 2007.

Dr Mahesh Varma of Delhi and Dr. Rahul Hegde of Mumbai were elected as member to the Executive Committee of DCI at the same general body.

Heartiest Congratulations Dr. Anil Kohli, Dr. Mahesh Varma and Dr. Rahul Hegde.