INTRODUCTION

Any kind of deformity, facial or elsewhere, may cause psychological and emotional disturbance to the patient as well as social annihilation. Traumatic amputation of a finger causes serious damage to the function of the hand. Currently, many injuries and traumatic amputations of fingers can be rescued by micro-surgery through reimplantation. However, in some cases, reconstruction is either not advisable or partially successful.1

Thus, the purpose of this report is to describe a simple technique for fabrication of a silicone finger prosthesis for a patient after an accident at work to provide motor skills recovery and diminished social discrimination.

CASE REPORT

A patient was attended in the clinic for rehabilitation of the distal phalange of the index finger in the right hand. Upon examination, the remaining stump was found to be stable and a rehabilitative process was possible using a conventional finger prosthesis (Figure 1) and radiography (Figure 2).

An impression of the remaining stump was made using the irreversible hydrocolloid Hydrogum (Zhermack, Rovigo, Italy). Dental stone type III Herodent (Vigodent, Rio de Janeiro, Brazil) was poured in the mould to obtain the cast. An impression of the counter lateral finger of the patient was made (Figure 2) and wax was poured in the negative mould for duplication of the lost finger. A metallic spacer was adapted into the wax pattern to provide a hollow space.

The wax pattern was then tried on the patient, adapting the base to the stump to improve mechanical retention (Figure 2). The anatomic lines were then checked to improve aesthetics. Test of retention between the thumb and finger was performed.

After the test, the wax pattern and the substructure (wax pattern and spacer) were enclosed in a flask with dental stone type III. The wax pattern was then removed and the spacer was cleaned with acetone. The silicone Silastic - MDX 44210 (Dow Corning Corporation, MI, USA) was intrinsically pigmented according to the skin of the patient. The silicone was manipulated and inserted into the flask to be pressed later (Figure 3).

The silicone was processed at 100°C for 1 hour. When the molds were sufficiently cool, the prostheses were carefully removed. The excess of material was trimmed with scissors.

The nail was made with acrylic resin and adapted to the prosthesis with silicone to allow a natural appearance (Figure 3). The final adjustments on the prosthesis were made with the prosthesis attached to the stump model. Then, after the prosthesis was proved, it was characterized with extrinsic pigmentation and placed on the patient (Figure 4).

ABSTRACT

Hand deformities affect aesthetics function of hand severely compromised and also cause psychological disturbances. This report describes the fabrication of a silicone finger prosthesis for a patient after an accident at work. The finger prosthesis was retained by a vacuum effect on the stump. The silicone material Silastic - MDX 44210 was used to provide function and aesthetics. The finger prosthesis offered psychological, functional and rehabilitative advantages for the patient. Restoring the natural appearance with the prosthesis eliminated the trauma generated by the dysfunction and represented an efficient psychological therapy.

Key words: Artificial limb. Prosthesis. Joint prosthesis. Silicone elastomers. Finger prosthesis.
The fixation of the prosthesis was achieved only by a vacuum effect on the stump associated to a mechanical adaptation with adequate shape to provide enough stability and retention. The patient could reproduce the movements of the stump with success without displacement of the prosthesis.

A six-month follow-up was carried out to assess retention and aesthetics. The dynamic ability of the stump was determined for some basic functions as restoring normal length, providing opposition for the remaining digits, protecting a sensitive stump, and transmitting pressure and position sense for activities such as writing or typing.

**DISCUSSION**

For these reasons, prosthetic rehabilitation was introduced and a number of materials and techniques have been developed to be used in this process.

The acrylic resin and silicone are the most common materials used for rehabilitation. Although resin can be easily characterized and presents great durability, it is a very hard material and uncomfortable for the patient. On the other hand, silicone has texture and flexibility similar to the skin, provides a more comfortable prosthesis and presents better capacity for skin-prosthesis linkage. However, this material is more difficult to pigment and degrades due to colour instability when exposed to ultraviolet rays.2

Among the sculpture techniques there is the analogous finger technique, which is performed by moulding and sculpture of another person’s finger or can also be carried out based on anatomy reproduction.3,4 Currently, the methods for prosthesis retention to the remaining part of the finger include ring, double ring, adhesives and osseo-integrated implants.5,6

Retention is the primary determinant factor for the success of prosthetic restoration in any part of the body. It is important for aesthetics, function, and comfort, thereby improving the patient’s quality of life.7 Finger prostheses are retained by a vacuum effect on the stump.5,8 The stump of the amputated finger should be minimally 1.5 cm in length to fit the standard finger prosthesis.8 To improve the appearance and aid retention on short stumps, patients can wear a ring at the junction between the prosthesis and stump.5

Although the patients frequently require optimal reconstruction of the hand in cases of injury or amputation, prosthetic devices recover only basic functions of the hand. Minute finger control requires considerable mechanical engineering that encompasses an efficient motor drive and an adequate power supply, which renders possible prototypes for hand prostheses in everyday performance.9 Partial hand amputations may lead to significant functional limitations that are difficult to re-establish by either orthoses or prostheses. Disarticulation of the thumb and index finger at the metacarpophalangeal joint and the range of motion of the three remaining fingers may be insufficient to provide any degree of grasp.

Aesthetic finger prosthesis as used in this patient offered psychological, functional, and rehabilitative advantages. Both psychological and functional effects of the prosthesis enhance rehabilitation by restoring finger loss and normal professional and social life.

**REFERENCES**