

Fingertip Flap Coverage After Fingertip Amputation

Hooman Shariatzadeh^{1,*}

¹Department of Hand Surgery, Shafa Orthopedic Hospital, Iran University of Medical Sciences, Tehran, IR Iran

*Corresponding author: Hooman Shariatzadeh, Department of Hand Surgery, Shafa Orthopedic Hospital, Iran University of Medical Sciences, Tehran, IR Iran. Tel: +98-2133542010, Fax: +98-2133542020, E-mail: shariatzadeh_h@hotmail.com

Received 2015 August 6; Accepted 2015 September 22.

Keywords: Fingers Injury, Skin Surgical Flaps, Skin Grafting, Hand, Amputation

Dear Editor,

Fingertip amputation is one of the most common industrial injuries and preservation of finger function, as much as possible, is very important for the affected patients. A thorough review of the most common treatment options for this type of lesion was more than necessary.

All treatment modalities must restore the sensory function of fingertip, stable and durable skin and maximum support for nail bed (1). Fingertip injuries are classified into three anatomical zones:

a) Zone 1, lesions are located distal to the distal phalanx, with preservation of most of the nail bed and matrix, while the majority of these lesions are treated conservatively; b) Zone 2, lesions are distal to the lunula and the distal phalanx is typically exposed. The best treatment modality for these types of injuries is flap coverage. The anatomical plane of amputation may be dorsal (oblique), transverse or volar; c) Zone 3, injuries pass through the germinal matrix and are not good candidates for reconstruction, requiring direct stump closure.

1. Operative and non-Operative Treatment

Non-operative treatment or healing by secondary intention is accepted for adults and children with no bone or tendon exposed and skin loss of less than 1 cm². There are authors who even advice non-operative treatment for exposed bone in children group. For defects of more than 1 cm, healing time is long and it seems better to cover the defect with split-thickness or full-thickness skin graft. The split-thickness graft reduces the size of primary defect, because of its secondary contracture, whereas full-thickness graft durability and reinnervation is better than split-thickness graft. As a result, most authors prefer full-thickness graft from thenar area, for fingertip lesions (2). During secondary intention technique, the wound is initially treated by irrigation and dressing and soaking in water-peroxide after 7 – 10 days, followed by daily dressing, until complete healing between 3 – 5 weeks.

2. Operative Treatment Modalities Include

- 1) Primary closure (revision amputation);
- 2) Full-thickness graft;
- 3) Flap coverage.

Revision amputation or primary closure: is appropriate for exposed bone lesions that may be removed by rongeur, without compromising the support of nail bed. Otherwise, graft coverage is indicated.

Skin flap: most authors advise full-thickness graft, because of high risk of contracture, persistent tenderness and less durability of partial-thickness skin grafts.

Flap coverage: multiple flaps are available for fingertip coverage, corresponding to location and size of defect. The V-Y advancement flap (Atasoy flap) is indicated for transverse or dorsal oblique laceration. In the presence of volar oblique amputations, cross finger flap is used in patients over 30 years old. The Venkataswami oblique triangular flap is another useful flap in the volar oblique amputations (3). In the case of amputated distal part, microsurgical replantation is often successful. A more proximal volar amputation may be covered by cross finger flap or axial flag flap from a long finger. Volar thumb defects may be closed by Moberg advancement flap, for defects extending for less than 2 cm, whereas defects of up to 4 cm could be covered by neurovascular island flaps. Bilateral V-Y Kutler flaps are best applied to volar and transverse amputations, with exposed bone and excessive lateral skin presence.

The thenar flap can be used for volar, transverse or dorsal amputations of index and long finger, especially in females, because of invisible dorsal hand scar. The associated nail bed injuries may be carefully repaired by 7 - 0 absorbable suture material, under loupe magnification, to prevent nail bed deformity. Large defects of nail bed require split-thickness nail bed graft, from the second toe. The most common complications of fingertip amputation are marginal skin necrosis, hyperesthesia and cold intolerance. The tension free closure reduces the risk of skin necrosis, although hyperesthesia and cold intolerance are basically dependent to injury severity and

may be seen in 50% of patients, regardless of treatment approach. Most of these symptoms are self-limited and resolve during 2 years, postoperatively.

In conclusion, a careful evaluation of fingertip defects from an anatomic point of view, age of patient and local available tissues are important in decision making for satisfactory aesthetic and functional results.

References

1. Rosenthal EA. Treatment of fingertip and nail bed injuries. *Orthop Clin North Am.* 1983;**14**(4):675-97. [PubMed: 6634090]
2. Napier JR. The return of pain sensibility in full thickness skin grafts. *Brain.* 1952;**75**(2):147-66. [PubMed: 14934986]
3. Venkataswami R, Subramanian N. Oblique triangular flap: a new method of repair for oblique amputations of the fingertip and thumb. *Plast Reconstr Surg.* 1980;**66**(2):296-300. [PubMed: 7403318]