



The Homodigital Island Flap: A Good Result of Fingertip Injuries Reconstruction on Single Center Hospital

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Authors' contributions

This work was carried out in collaboration among all authors. Author AW designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors AS and MDPP managed the analyses of the study. Author IS managed the literature searches. All authors read and approved the final manuscript.

Article Information

Editor(s):

(1) Dr. J. Pandiaraja, Shree Devi Hospital, India.

Reviewers:

(1) Sérgio Antônio Saldanha Rodrigues Filho, Universidade do Estado do Amazonas, Brazil.

(2) Olga Gutkowska, Wroclaw Medical University, Poland.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/66240>

Case Report

Received 05 January 2021

Accepted 12 March 2021

Published 20 March 2021

ABSTRACT

Aims: To report a case of fingertip injuries reconstructed with homodigital island flap technique.

Case Description: A 49-year-old man presented with a phalangeal defect of the 2nd finger of the right hand. There were skin and soft tissue losses without bone and tendon exposed. The operation was performed under general anesthesia and with a tourniquet applied to the upper arm. The flap was marked up lateropalmarly on the proximal basal phalanx at the radial side. After the tourniquet had been released and complete hemostasis carried out, the flap was rotated into the defect and fixed. The donor site defect was covered with a full-thickness skin graft. During the follow-up, the island flap showed a good outcome. The skin graft also healed well. Sensibility and vascularization were good.

Discussion: Treatments for fingertip injuries available cover a broad range of techniques with no

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single recommended reference standard for treatment. Island flaps are axial pattern flaps that maintain blood flow through a specific vascular pedicle. Island flaps may be considered the ideal choice for soft tissue coverage and reconstruction of fingertip defects when the preservation of length and maximal function are desired, and critical structures are exposed or injured. The advantage of the homodigital island flap is that it is a local flap technique with a reliable blood supply and provides stable coverage with an inconspicuous donor site. Besides, this technique does not need postoperative immobilization of other fingers and has a slight aesthetic removal defect. Using this technique can cause irritation to digital nerve for a few weeks, but this usually resolves completely.

Conclusions: Homodigital island flap is a useful and safe reconstruction option for fingertip injuries, considering its advantages and negligible donor site.

Keywords: Fingertip injuries; reconstruction; homodigital flap.

1. INTRODUCTION

Immediate coverage for a distal phalangeal defect is essential to preserve functions; therefore, the reconstruction can be a difficult reconstructive problem [1]. Treatments available cover a broad range of techniques with no single recommended reference standard for treatment [2]. Fingertip reconstruction is performed for restoration of good padding of the finger to achieve the objectives of preserving functional length and sensitivity, maintaining joint flexibility, preventing the development of joint stiffness or neuroma, minimizing aesthetic deformities, and providing a quick return to work where replantation is not possible [3-4]. Based on these aims, we present a case of fingertip injuries reconstructed with the homodigital island flap technique.

2. PRESENTATION OF CASE

A 49-year-old man presented with the phalangeal defect of the 2nd finger of his right hand after accidentally grinding his hands in the meat grinder. There were skin and soft tissue losses without bone and tendon exposed. There was no neurovascular damage. The defect was found only in the proximal part of the finger.

The procedure was performed in the operation theatre. Prior to surgery, a digital ALLEN test was required to examine blood supply. The operation was performed under general anesthesia and with a tourniquet applied to the upper arm. Loupe was not used in the operation procedures. The operator only employed a tourniquet to prevent profuse bleeding. Following adequate debridement, we measured the shape and size of the defect. The flap was marked up lateropalmarly on the proximal basal phalanx at the radial side. We separated the artery from the nerve microsurgically and prepared the vascular pedicle according to the defect size. After the tourniquet had been released and complete hemostasis carried out, the flap was rotated into the defect and fixed. The donor site defect was covered with a full-thickness skin graft. The graft donor site was obtained from the same volume of the hand under the proximal interphalanx 5th finger.

The patient was hospitalized for one day and then sent home with oral antibiotics and analgesics. He was asked to come for a follow-up on days 3 and 7 after surgery. During the follow-up, the island flap showed a good outcome. The skin graft also healed well. The sensibility and vascularization were good.



Fig. 1. Fingertip injury from tip to distal without bone and tendon exposed



Fig. 2. Design and procedure of homodigital island flap



Fig. 3. A. One day postoperative B. 7-day postoperative C. 1-year postoperative

It was found that the patient was very satisfied with the operation result. The nerve sensation was quite good. There was no movement limitation. Flexion and extension movements were very free.

3. DISCUSSION

Treatments for fingertip injuries available cover a broad range of techniques with no single recommended reference standard for treatment [2]. The reconstruction should result in painless

digit lacking symptoms related to neuroma formation or cold intolerance. Finally, a quick return to full occupational activity should be provided for reconstructive tools, including various advancement flaps, regional flaps, and free tissue transfers [1].

A digital ALLEN classification fingertip and nail bed injury were used on this case. Based on the ALLEN classification, this case classification values were included in zone IV, which was pulp, nail bed at or proximal to lunula/germinal matrix, and distal phalanx injured. Using ALLEN

classification has advantages of being widely utilized in research, including some injury mechanisms, somewhat guides treatment, simple and practical, somewhat prognostic for nail bed deformities, and likely best face validity for uses other than amputations [5-8].

Island flaps are axial pattern flaps that maintain blood flow through a specific vascular pedicle. Island flaps may be considered the ideal choice for soft tissue coverage and reconstruction of fingertip defects when the preservation of length and maximal function are desired, and critical structures are exposed or injured [9]. Research conducted by Acar et al. (2014) shows that among 22 homodigital flaps performed during the follow-up period, only one finger exhibited a complication with partial flap loss [3].

The advantage of the homodigital island flap is that it is a local flap technique with a reliable blood supply and provides stable coverage with an inconspicuous donor site. Besides, this technique does not need postoperative immobilization of neighboring fingers and has a slight aesthetic removal defect. Using this technique can cause irritation to the digital nerve for a few weeks, but this usually resolves completely [10-11]. The defect and donor came from the same site so that it could easily allow functional length preservation. The donor flap was elevated very carefully, so it minimized the disadvantages of arteries or venous trauma. The contraindications to this procedure are crush injuries, children and toddlers, as well as infectious wounds. The loss of the flap as a defect covering makes it a secondary defect that is smaller in size. If the flap does not include an artery, there will be necrosis. It cannot be done in patients with vascular abnormalities in the toes or patients with a crush injury [1].

Skin grafting can be useful when the patient is unwilling or unable to manage an open wound for a month or more. Less contracture occurs with full-thickness skin grafts instead of split-thickness skin grafts, but both have been used successfully [2].

4. CONCLUSION

Homodigital island flap is a useful and safe reconstruction option for fingertip injuries, considering its advantages and negligible donor site.

ACKNOWLEDGEMENTS

The authors received no specific grants from any funding agency in the public, commercial, or not-for-profit sectors.

CONSENT AND ETHICAL APPROVAL

As per university standard guidelines, participant consent and ethical approval have been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
<http://www.sdiarticle4.com/review-history/66240>