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A Distant Fasciocutaneous Chest Wall Skin Flap for Necrotic Finger Post Reimplantation: A Case Report

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ABSTRACT

The hand is often compromised by scars or potentially necrotic wounds. Complete loss of index finger will result in impairment of 20% of hand and 11% of whole-person. One of the most influential factors in consideration of tissue loss are defect size, site, depth, and orientation. In our case study, a 16-year-old male presented with sensations of tingling and pain in his finger subsequent to an accidental laceration. Examination revealed a necrotic wound located on the distal phalanx of the index finger, accompanied by mild atrophy and discoloration. Subsequently, the patient underwent graft harvesting from the right chest wall flap, followed by primary closure of the donor site on the right chest wall. Upon a three-month follow-up, the patient expressed satisfaction, demonstrating proficient daily activities despite the injury being localized to the left hand. Utilizing a chest wall flap is less prevalent than employing regional or free flaps. Anterior chest wall flaps are specifically crafted on the anterolateral chest wall or within the infraclavicular region. The choice of a chest wall flap was determined to offer a less cumbersome graft and aligns with the patient's preference. The main goal of soft tissue reconstruction is to restore functionality, encompassing tasks such as exploration, sensation, and manipulation of objects, while simultaneously preserving the original length. Nonetheless, achieving this goal remains a complex challenge.

Keywords: Necrotic finger, Reimplantation, Chest Wall Skin Flap, Soft Tissue Reconstruction

INTRODUCTION

Hand function is crucial for maintaining independence during daily life activities. Loss or deformity of digits leads to a variety of deficits.[1] Hand frequently impaired by scars or in this case it is impaired by necrotic wound. Complete loss of index finger will result in impairment of 20% of hand and 11% of whole-person. One of the most influential factors in consideration of tissue loss are defect size, site, depth, and orientation.[2,3] Traditional management of necrotic digits has been between viable and nonviable tissues to occur. Yet we attempted to preserve the function (exploring, sensing, and manipulating objects) and original length of a necrotic finger after underwent reimplantation in an adolescent male. The main challenge is to offer a stable, long lasting, and aesthetically acceptable coverage. The reconstruction of the left index finger using distant flap in chest wall was performed.[4]

CASE PRESENTATION

A 16-year-old male, right-handed, with no previous medical illness came to the clinic after debridement, ORIF Pinning and reimplantation 5 days ago of his left index finger. Currently, patient felt tingling and

pain in his finger. He underwent surgery after his finger being cut accidently within 10 hours. (23/11/2021)

Figure 1. Clinical of Patient's Right Hand After 1st Surgery

Figure 2. Radiological imaging of Patient's Right Hand

In the next 2 weeks, patient came to the clinic. The patient felt minimal pain and decreased sensation in the necrotic area. We found the necrotic wound in the distal phalanx of the index finger and showed mild atrophy and colour change. There were no signs of infection. Hand x-ray shown the union is not occurred yet. We planned to perform debridement and deltopectoral flap. (10/12/2021)

Figure 3. Clinical of the patient's right hand taken during the second visitation

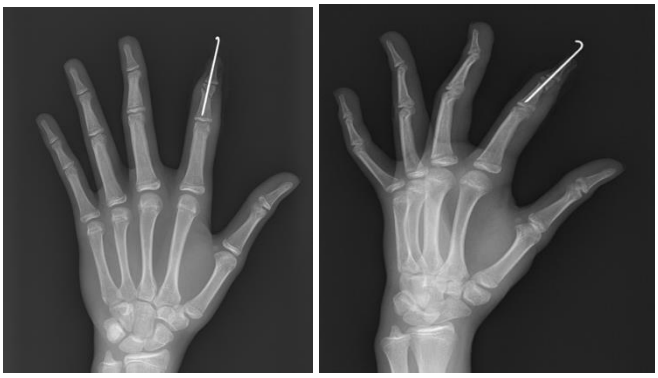


Figure 4. Radiological imaging of patient's right hand on second visitation

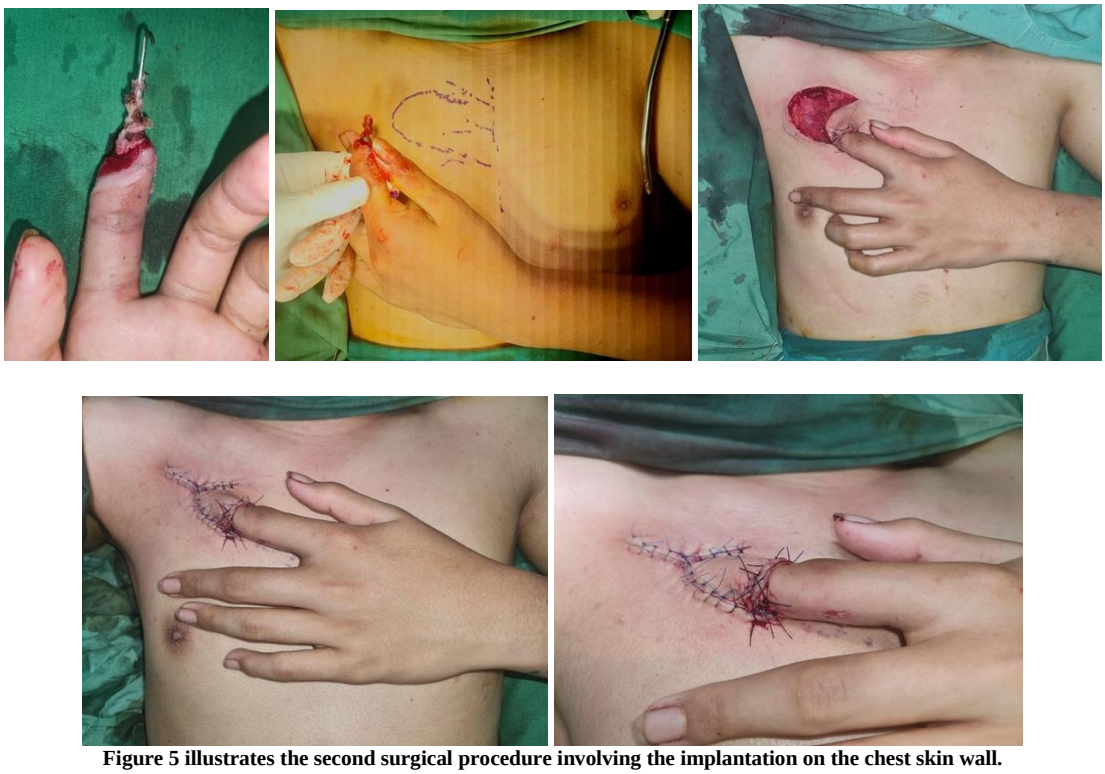


Figure 5 illustrates the second surgical procedure involving the implantation on the chest skin wall.

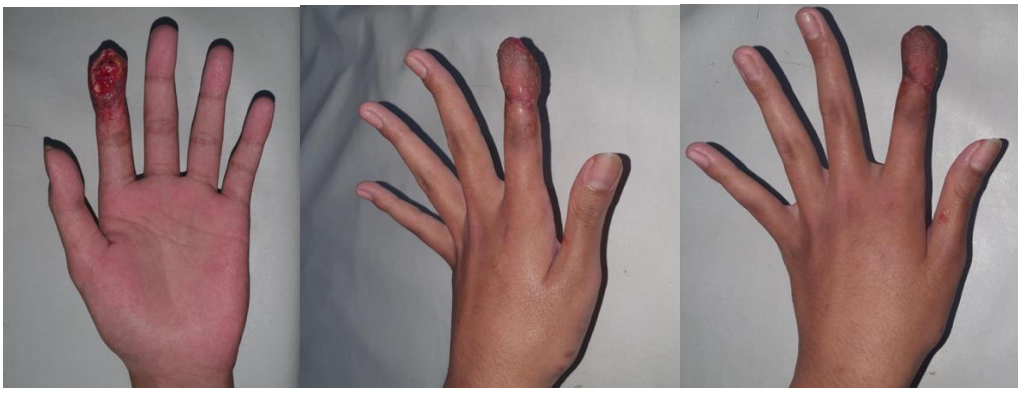
In the next month, we proceeded with the graft harvesting of the right chest wall flap with primary closure of the right chest wall donor site, remove implant and debridement. The graft was viable and in a good condition. There is no infected wound either in the index finger or in the pectoral area. (20/1/2022)

Figure 5 illustrates the condition one month post the second surgical procedure, specifically focusing on the implantation on the chest skin wall.

The patient routinely came to the clinic to control his wound. We give an optimal care to the wound for every 3 days. The capillary refill time of the flap was less than two seconds and appeared healthy.

(8/2/2022)

(11/02/2022)



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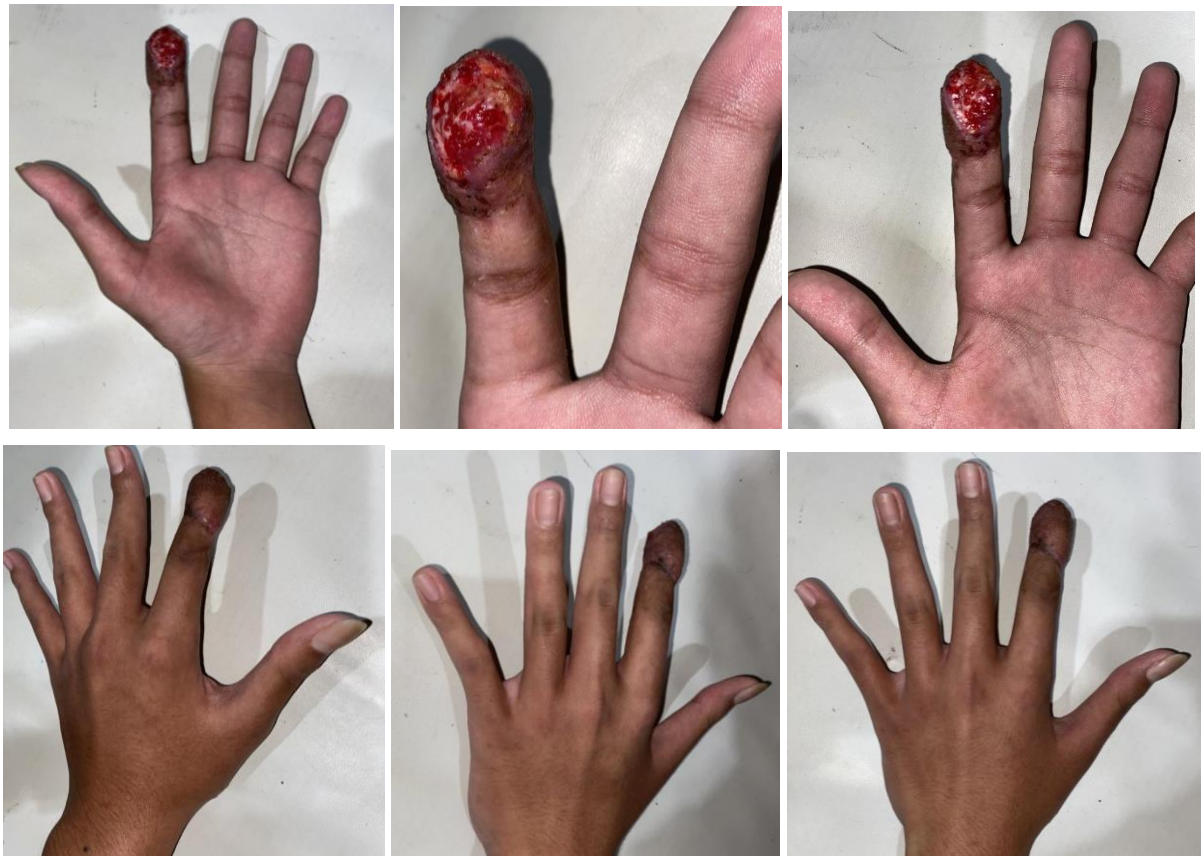

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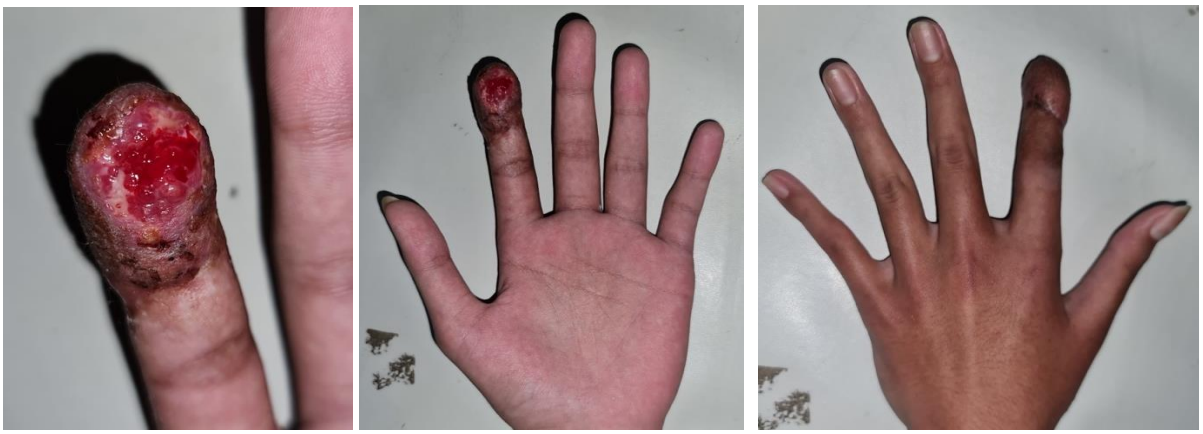


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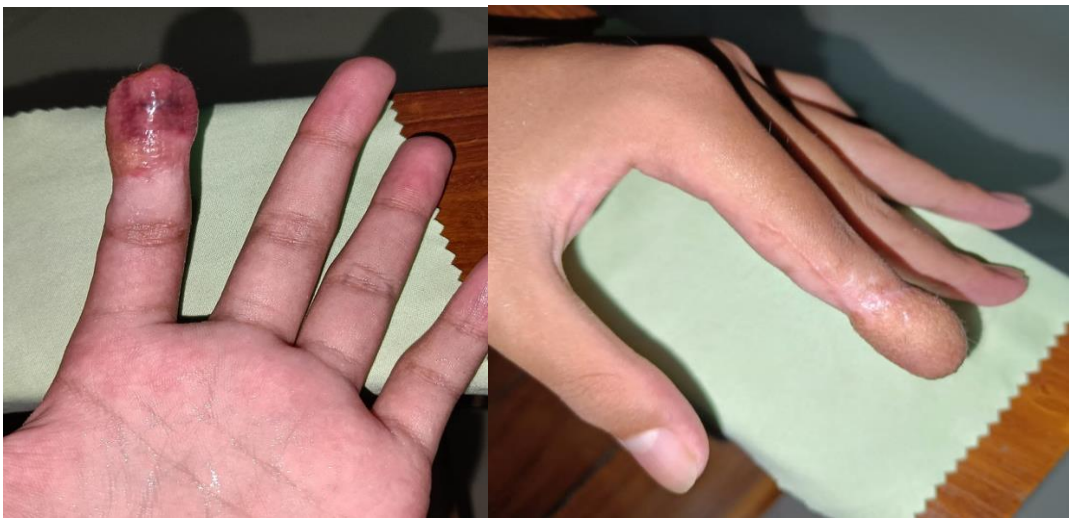

(18/4/2022)

DISCUSSION

Failure after replantation occurs at a rate of 8.6% to 33.7%. Routine management of a necrotic finger has been to allow demarcation to occur between viable and nonviable tissue, thus indicating the level of amputation required.[5] However, amputation can have poor functional and psychological consequences. The reconstructive effort suggests an alternative course of treatment to avoid those end result. [6]

Early debridement and flap planning is vital for early wound closure and rehabilitation. The choice of the right reconstructive technique depends on various factors such as patient's age, nature and duration of the trauma, characteristics of the wound and conditions of the surrounding tissues. The ischemic finger condition in this case is due to acutes causes of vascular injury.[7]

It is easier to consider reconstruction of finger injuries if the fingers are divided into 3 parts: distal to the proximal interphalangeal (PIP) joint, at the level of PIP joint and proximal phalanx. In an isolated fingertip necrotic wound, treatment strategy is crucial to achieved optimal result.[8] In this case, distant flap which is fasciocutaneous chest wall flap is used as the 1st line treatment. A flap is done to cover exposure structures such as bones, tendon, and ligament. Fasciocutaneous flaps compare to muscular flaps provide a better cover for tendon sliding, and better restoration of sensitivity which is extremely important in the functional outcome of the hand. Furthermore, it provides adequate tissue coverage with different possible orientations of the flap. [9,10]

A chest wall flap is not commonly done compared to regional flaps or free flaps. Other possible flap areas would be the abdomen or groin but since the chest is higher, it allows better control for edema. Anterior chest wall flaps are designed on the anterolateral chest wall or the infraclavicular region. The blood supply is derived from the intercostal vessels or the thoracoepigastric system and is oriented in a transverse-to-oblique direction toward the midline. Flaps designed on the contralateral chest wall as we did in this case permit easier immobilization of the extremity with the elbow flexed so the graft will be safely secured. We chose chest wall flap as it will give a less bulky graft and the patient preference. We harvested the graft after 3 weeks period and closed the donor site. Local or regional flaps are unavailable in our case as it is insufficient to provide adequate soft tissue coverage.[11,12]

In 3 months follow up, the patient feels satisfied and could perform daily activity well although the injury is in left hand and the patient was a right-handed person. The patient only felt minimal pain and the sensation of the left index finger is improving. The two-point discrimination is at 3 mm. The DASH score is at 2, which is no significant impairment and the patient

considered his injury is no longer a problem. Nevertheless, our patient had his distal phalanx resorbed.

Discuss findings of your study with relevant reasoning along with proper citations/ references.

CONCLUSION

Soft tissue reconstruction and coverage of the finger remains a complex challenge. The main goal is to achieve function (exploring, sensing, and manipulating objects) and original length. There are several choices for the flap itself whether to use regional flap or distant flap. In general, distant flap can be used to cover moderate defects and give a better function and aesthetic outcomes.

Declaration by Authors

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Conflict of Interest: The authors declare no conflict of interest.

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