

Cross-finger Flap on Electrical Ring Burn Injury: A Case Report

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Learning Point of the Article:

Know how to debride and cover the tendon early with a cross-finger flap.

Abstract

Introduction: The wearing of finger rings is cultural and widespread in Senegal, which explains why injuries caused by them can affect any finger. Although burn injuries are less common, they can still cause finger disability. Their management is challenging for any surgeon as the functional prognosis is at stake.

Case Report: A 25-year-old female patient was referred from a health center for a deep electrical burn of the middle finger of the left hand 21 days after the injury. Clinically, she had a dark circumferential necrotic plaque at the base of the left middle finger with a swollen extremity. The exposure of the flexor tendon prompted the indication for a flap using the cross-finger technique. In the post-operative period, the flap had settled well after flap division 3 weeks later. Sensitivity was normal. The finger extension was complete.

Conclusion: The cross-finger technique on an exposed tendon after a circumferential electrical burn injury can be a salvage solution given that these types of burns often result.

Keywords: Wearing, burn, finger, cross-finger flap.

Introduction

The wearing of finger rings is cultural and widespread in Senegal, which explains why injuries caused by them can affect any finger. Unlike studies carried out elsewhere, which have identified these types of injuries mainly on the ring finger [1,2].

Finger avulsions caused by rings are probably the most common injuries caused by wearing rings [3]. Although burn injuries are less common, they can still cause finger disability [4]. These circumferential burn injuries are most often electrical due to contact with metal rings and car batteries [5,6]. Jewelry made of

silver or gold is highly conductive and causes deep burns [7]. Their management is challenging for any surgeon as the functional prognosis is at stake [1].

Deep burn with tendon exposure may require flap coverage [8].

In this work, we present a case of deep circumferential electrical burn injury with exposure of the flexor tendon following contact of an electrical cable with the ring.

Case Report

A 25-year-old female patient was referred from a health center for

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Author's Photo Gallery



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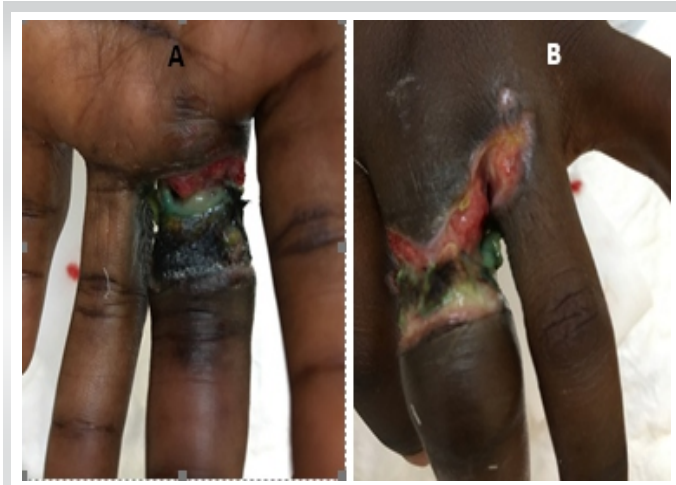


Figure 1: Circumferential lesions of the left middle finger on arrival. (A) Palmar view, (B) Dorsal view.

a deep electrical burn of the middle finger of the left hand 21 days after the injury (Fig. 1).

The patient was about to plug in a television when her silver ring allegedly came into contact with a faulty power cable. She was immediately taken to the health center, where the ring was removed before wound dressings.

Clinically, she had a dark circumferential necrotic plaque at the base of the left middle finger with a swollen extremity. Autolytic debridement with hydrogel was initiated until the necrotic tissues had completely fallen off 2 weeks later (Fig. 2).

The exposure of the flexor tendon prompted the indication for a flap using the cross-finger technique. In the post-operative period, the flap had settled well after flap division 3 weeks later. Sensitivity was normal. The finger extension was complete.

The surgery was carried out under local anesthesia with a pneumatic tourniquet placed at the proximal limb. The fasciocutaneous flap was harvested from the dorsum of the index finger. It was flipped over to cover the flexor tendon. The



Figure 2: Lesions after autolytic debridement. (A) Palmar view, (B) Dorsal view.

donor site was covered with a full-thickness skin graft harvested from the forearm (Fig. 3).

In the post-operative period, the flap had settled well after flap division 3 weeks later. Reeducation by active-passive mobilization of the fingers was carried out for 1 month. In finish, sensitivity was normal. Finger extension was complete with a null total extension deficit. Flexion of the PIP joint was 90° whereas flexion of the MCP joint was limited to 80° (Fig. 3). The TAM (total amplitude mobility) was 260°.

Discussion

The danger of wearing a metal ring lies not only in the risk of finger avulsion but also in circumferential electrical burns. These are induced by the good conductivity of silver and gold, which are the raw materials of most of these rings.

This case illustrates how finger function can be salvaged with a flap following a circumferential burn injury with tendon exposure. Similar cases have been reported in the literature [2,5,7,9].

Electrical ring burn injuries cause deep damage to the base of the finger. The viability of the finger is compromised not only by the tourniquet-like effect but also by neurovascular damage [2]. Mechanical debridement must be carried out carefully to avoid compromising the vascularization. Otherwise, autolytic debridement is safer. Several authors are unanimous regarding coverage with flap, either locally or by cross-finger, when a tendon is exposed after debridement [7,9,10]. The harvest site must be covered with a thin skin graft [8].

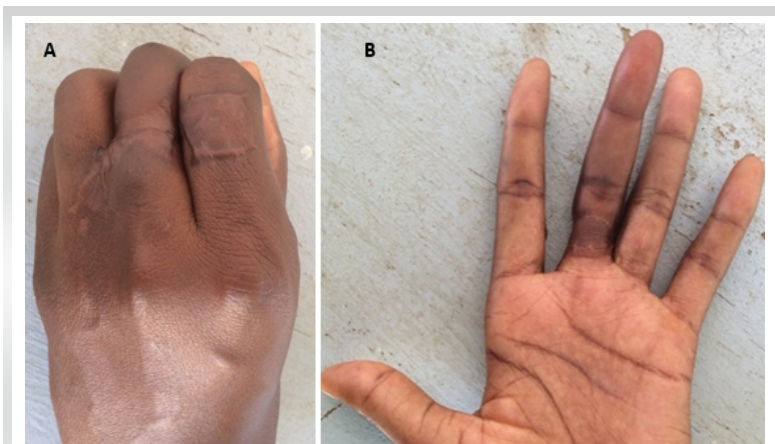


Figure 3: Results at 6 months post-operation. (A) MCPJ flexion at 80° and PIPJ at 90°. (B) Finger extension.

Conclusion

The cross-finger technique on an exposed tendon after a circumferential electrical burn injury can be a salvage solution, given that these types of burns often result in deep lesions with a risk of ischemia and then amputation.

Clinical Message

Electric burns of fingers by the ring are serious. They can be complicated by stiffness due to the destruction of the tendons or even by necrosis of the finger. Hence, the interest in treating them quickly by debridement and covering the injured elements with a local flap such as a cross finger.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

References

1. Hamouya A, Barbato B, Beauthier V, Hémon C. Complete ring finger avulsion: Review of 16 years of cases at a hand emergency unit. *Hand Surg Rehabil* 2018;37:206-11.
2. Attalla MF, El-Ekiabi S, Al-Baker A. A ring burn--electric or contact? *Burns* 1990;16:69-70.
3. Kay S, Werntz J, Wolff TW. Ring avulsion injuries: Classification and prognosis. *J Hand Surg (Am)* 1989;14:204-13.
4. Tilley W, McMahon S, Shukalak B. Rehabilitation of the burned upper extremity. *Hand Clin* 2000;16:303-18.
5. Regan MW, Moss AL. Circumferential burns to the fingers associated with gold and platinum rings. *Burns* 1986;12:360-3.
6. Bozkurt M, Kulahci Y, Zor F. Unusual ring burn injury. *Burns* 2005;31:785-6.
7. Lau CK, Rayatt SS, Wilson Y. Ring burns-preventable work related injury. *Injury Extra* 2007;38:350-1.
8. Chang CW, Lin CH, Lin YT, Hsu CC, Chen SH. Refining the cross-finger flap: Considerations of flap in setting, aesthetics and donor site morbidity. *J Plast Reconstr Aesthet Surg* 2018;71:566-72.
9. Al-Quattan MM. The use of adipofascial turnover flaps for coverage of complex dorsal ring finger defects caused by electric burns. *Burns* 2005;31:643-6.
10. Al-Quattan OM, Almobarak AA, Al Quattan MM. Double cross finger flaps from the middle to the index or ring finger: A case series of 4 patients with an emphasis on donor finger morbidity. *Int J Surg Case Rep* 2018;45:107-11.

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