



Resurfacing soft tissue defect of fingers in a case of neglected burn injury involving two adjacent fingers-A case report

Singodia Pankaj, Jha Amitesh Kumar*

Consultant and Incharge, Specialist,

M.Ch. (Plastic and Reconstructive surgery), Burns and Plastic Surgery, Tata Main Hospital, Jamshedpur, Jharkhand, India

***Corresponding Author:**

Jha Amitesh Kumar

Department of Burns and Plastic Surgery, Tata Main Hospital, Jamshedpur, Jharkhand, India

Type of Publication: Case Report

Conflicts of Interest: Nil

ABSTRACT

We present a case of thirty two year old female with history of thermal burn injury involving the dorsal surface of the thumb and index fingers of the right hand. On presentation the wound seemed to be neglected with exposed phalanges of the fingers. She had restricted movements at the interphalangeal joints. She was treated by home remedy initially and then at local centres before referring the case to us. The wound was debrided and resurfaced by first dorsal metacarpal artery flap (FDMA) for the thumb defect and Reverse cross finger flap from middle finger for the index finger defect. The flap survival was good with good graft uptake at the donor sites. There was minimal donor site morbidity. The FDMA flap is a versatile flap for covering thumb defect. Reverse cross finger flap from the middle finger is another very good option for covering the index finger defect. Neglected burn wounds of the fingers can lead to many complications. These should be treated by specialists early to minimise functional and anatomical loss.

Keywords: Burn, soft tissue defects, fingers, FDMA flap, reverse cross finger flap.

INTRODUCTION

Burn injury to the hand and fingers are very common during our daily activities especially in females involved in household activities. These injuries being non-life-threatening are often neglected or treated by non-specialists. However improper treatment may lead to exposure of vital structures such as tendons and bones. This leads to deformity, loss of function and may require amputation of the fingers. Neglected burn injuries to the fingers may lead to soft tissue loss of fingers exposing the phalanges. We report such a case in which there was soft tissue loss over the dorsal surface of index finger and the thumb. There are various options for covering such defects. These are classified into local flaps, regional flaps, distant flaps and free flaps requiring micro-vascular anastomosis. We used two local flaps from the fingers to cover these defects. These were first dorsal

metacarpal artery flap (FDMA) for resurfacing the thumb defect and Reverse cross finger flap from the middle finger for resurfacing the index finger defect. The advantage of using these flaps is that they are thin, versatile and have minimum donor site morbidity. The operating time is shorter as compared to free flaps. Patient satisfaction in terms of aesthetic and functional outcome is good.

Case History:

A 32 years old female patient presented to us with history of thermal burn involving the dorsal surface of the thumb and index fingers of the right hand. The injury was two months old. She was treated by home medications initially and then by non-specialists. She was referred to us when her wound failed to heal. On examination there was soft tissue defect of about

3cm*2cm, involving the dorsal surface of the thumb and index finger with exposed inter-phalangeal joints. The movement at the inter-phalangeal joints was restricted of these two fingers. The phalanges at the site of the defect were exposed with discoloration of the periosteum (Figure 1).

After discussing all the options with the patient and her relatives, it was decided to use local flaps for covering the defects. We used first dorsal metacarpal artery flap (FDMA) for resurfacing the thumb defect and adipofascial flap (Reverse cross finger flap) from the middle finger to cover the index finger defect.

Procedure- The wound was debrided and flaps were planned in reverse. The thumb defect was about 3cm*3cm in size after debridement with exposed phalanges and loss of periosteum (Figure 2). A template of the defect was made and FDMA flap was planned over the dorsal surface of the index finger. The flap was elevated on its vascular pedicle and was transposed to the defect (Figure 3 & 4). The skin and subcutaneous tissue of the thumb was incised to adjust the pedicle of the flap. The donor site was skin grafted by placing a full thickness skin graft (Figure 5 & 6). The index finger defect was 3cm *2cm in size and an adipofascial flap (reverse cross finger flap) was planned from the dorsal surface of middle finger over the middle phalynx to cover this defect. The skin over the flap was raised at the subcutaneous level in open book pattern. The adipofascial flap was elevated with its pedicle along the radial border of the finger. All tissue between the skin and paratenon were included in the flap. The flap was sutured to the defect. This was covered with full thickness skin graft. The skin over the middle phalynx was sutured back to its bed (Figure 5 & 6). The patient was discharged and followed up at outpatient department. A very small portion of graft was lost over the reverse cross finger flap. However it gradually settled with dressing. After three weeks the fingers were separated by dividing the pedicle and full inseting of the flap was completed (Figure 7 & 8). At one week follow up after dividing the pedicle, the flaps seem well settled and graft uptake was good. Two months follow up showed good contouring of the reverse cross finger flap. The FDMA flap had also settled well and the graft uptake at the donor site was good (Figure 9 & 10).

Complication- There was loss of small portion of graft at the dorsal surface of index finger. However it subsequently granulated and reepithelialised.

Discussion:

Burn injuries to fingers are common while cooking. Lack of proper awareness about first aid in burns leads to complications. These include loss of skin, soft tissue, and exposure of tendons, nerve and bones. Negligence of this condition leads to many patients requiring amputation of fingers. Soft tissue defect of fingers is a difficult problem to deal with. This becomes more challenging if more than one finger is involved. Paucity of tissue in fingers and frequently exposed bones and tendons make primary closure of the defect and skin grafting difficult. These defects usually require flap coverage. There are various options for closure of these defects. These are broadly classified as local flaps, regional flaps, distant flaps^[1] and free flaps^[2, 3]. The advantage of using local flaps is their thin, versatile nature with minimum donor site morbidity and shorter operating time. They also have good functional and aesthetic outcome. The FDMA flap is a versatile flap for resurfacing thumb defect. This flap has the advantage of not compromising the blood supply of the donor index finger. The flap is raised on its vascular pedicle which is the first dorsal metacarpal artery, a terminal branch of radial artery. The ulnar branch of the first dorsal metacarpal artery usually supplies the flap. The flap is raised over the proximal phalynx of the index finger and includes skin, subcutaneous tissue up to the level of paratenon. The flap is transposed to the defect either by tunnelling through the subcutaneous tissue of the thumb or by making a tract by incising the skin and subcutaneous tissue of the thumb. The donor site is skin grafted. The advantage of this flap is short operating time, ease of elevating the flap and its thin, versatile nature. The disadvantage is that the donor site needs to be skin grafted. Shende et al^[4] in their study mention that FDMA flap has a constant anatomy and is first treatment of choice for thumb defects. Chetan et al^[5] also mentions the FDMA flap to be a useful flap for resurfacing thumb defects.

The reverse cross finger flap in this case was raised at the level of middle phalynx of the middle finger. It included adipofascial tissue above the level of paratenon. This is a pedicled flap with the radial

border of the flap forming the base. The skin over the flap is elevated at subcutaneous level from radial side of the flap. The skin is sutured to the original site after elevating the flap. The flap is then sutured to the defect and covered by full thickness skin graft. In three weeks time the flap establishes its blood supply locally. The pedicle of the flap is then divided and fingers separated. The advantage of this flap is thin and versatile nature, short operating time and the donor site does not need any skin graft. The disadvantage is that fingers are immobilised for three weeks and there are chances of joint contracture. However compared to other options of regional, distant and free flaps, this flap has minimal donor site morbidity, does not require sacrificing any blood vessel for raising the flap. Many authors like Nawfal et al^[6] and Erdogan et al^[7] mention the reverse cross finger flap to be usual flap for covering small defects of the fingers.

Conclusion- Burn injuries to the fingers should be promptly treated at speciality centres. Neglected cases can still be managed to provide anatomical coverage, aesthetic appearance, and functional improvement by Plastic surgical methods. First dorsal metacarpal artery flap and the reverse cross finger flap play important role in covering soft tissue defects involving multiple fingers without compromising the function of adjacent fingers.

References

1. Ayhan Okumus. Repair of large soft-tissue finger defects with super-thin mobile abdominal flap at thickness of finger skin.

Turkish Journal of Plastic Surgery 2020;28:152-58.

2. Shigenobu Sakai. Free flap from the flexor aspect of wrist for resurfacing defects of the hand and fingers. *Plast Reconstr Surg* 2003;111:1412-22.
3. Zhi-Qiang Fan, Bao-Fu Yu, Qi Zeng et al. The free neurovascular transverse wrist crease flap for repairing soft tissue defects of the fingers; clinical outcomes of multiple centers. *Journal of orthopaedic Surgery and Research*, volume14, Article number;365(2019).
4. Shende K Nilesh, Puri Vinita, Patil Chaitanya, Patil Deepak, Palsule Shilpshree. First dorsal metacarpal artery flap a workhorse for reconstruction of selected small defects of the hand. *Turkish Journal Of Plastic Surgery* 2019;27: pages 98-103.
5. Chetan satish, Sunit nema. First dorsal metacarpal artery islanded flap: A useful flap for reconstruction of thumb pulp defects. *Indian J Plast Surg* 2009;42:32-35
6. Nawfal Fejjal, Redouane Belmir, Samir El Mazouz, Nouredine Gharib, Abdellah Abbassi, AminBelmahi. Reversed cross finger subcutaneous flap: A rapid way to cover finger defects. *Indian J Plast Surg* 2008;41:55-57.
7. Erdogan Atasoy. The Reverse Cross Finger Flap. *J Hand Surg Am* 2016;41:122-28.

Clinical Photographs

Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7



Figure 8



Figure 9



Figure 10

