

Long Arm Double Sliding flaps for finger contractures : A novel technique explained with 3 interesting cases

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Abstract

Burns, trauma, electrocution, infection of the hand can cause flexion contracture of the fingers. Finger contractures affect the day to day activities of the patient to a large extent. Treatment of the contractures is a major challenge for the surgeons and difficulty in coverage of the joint area due to the paucity of skin flaps is a practical problem. Z- plasty is a simple technique used for mild contractures of the fingers. however, the cases where there is an extensive discrepancy between the required and the available length of the skin, the traditional Z plasty fails to cover the skin defect. In such cases the two long flaps on the either side of the joint are used involving the whole of the contracture and the raw areas are the covered with full-thickness skin grafts from the same limb.

Keywords: digital contractures, sliding flaps, double long arm

INTRODUCTION-

Burns, trauma, electrocution, infection of the hand are the most common causes of contractures of the digits of the hand. Post-burn deformities occur even in a well-managed case and remain the most common cause of finger contractures [1]. Reconstruction of finger contractures is a challenge for the plastic surgeon. It is important to restore the length, function, along with providing a good quality skin cover [2]. Failure to seek medical help, inadequate medical care, and inadequate care after healing are common causes of burn contractures, which may result in digits that are functionally and aesthetically abnormal [3]. Finger contractures can be treated with various techniques commonly used are Z plasty, square flap, trapezoid flap, interdigital butterfly flap, seagull flap [4,5]. The rate of recurrence in all these techniques is quite high as

skin cover on volar aspect of the joint is compromised. The double long arm sliding flaps use the entire contracted skin in the flaps and the raw area on the sides is later covered with full thickness skin graft harvested from the same limb. This technique is best suited in patients with excess skin at the site of contracture. In patients with tight adherent skin this procedure may not be useful.

SURGICAL PROCEDURE AND ILLUSTRATION- [6]

The skin length on the volar and dorsal aspect of the affected finger is assessed as shown in [Figure 1](#). A midline incision is first made across the whole length of the contracture as depicted in [Figure 2](#). The contracture is released until the full range of motion is established. Once the midline incision is extended up to the junction of the normal skin, 2 incisions are made on the lateral and medial aspects of the finger,

one starting from the distal end of the contracture and extending proximally beyond the involved joint, and the other incision starting from the proximal end of the contracture and extending distally beyond the involved joint, in the same fashion as a Z-plasty incision (Fig. 3). This creates 2 long flaps on either side of the finger. Care is taken not to damage the digital arteries and nerves. The 2 flaps are raised with a common incision in the midline, with the side incisions being oblique in orientation. If the flaps are of sufficient length, they may sit side-to-side adjacent to one another (Fig. 4). In case of tissue

deficiency, incisions can be extended to create larger flaps, and the flaps can be repositioned in an end-to-end manner (Fig. 5). The areas shown in pink in (Figs. 4, 5) are areas requiring skin grafting. Once the flaps are approximated in the midline, the sides are grafted with full-thickness skin grafts. The wound is then dressed, and the joint is stabilized using a K-wire.

Active physical therapy begins early in the postoperative period as soon as the sutures are removed and the wound has healed well. Scar control is achieved.

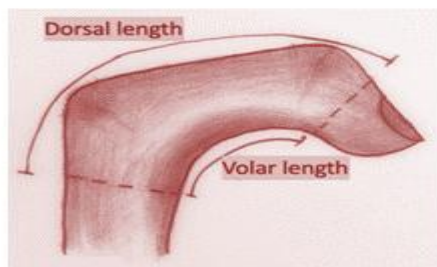


Figure 1 Analysis of skin requirement

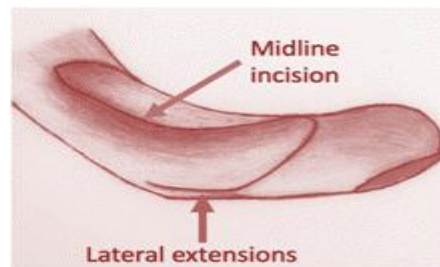


Figure 2 skin incisions

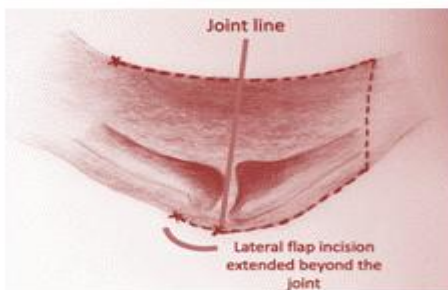


Figure 3 Skin incisions extending across joints

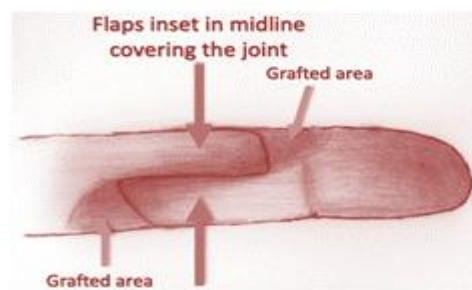


Figure 4 Side to side placement of flaps with raw area to be grafted

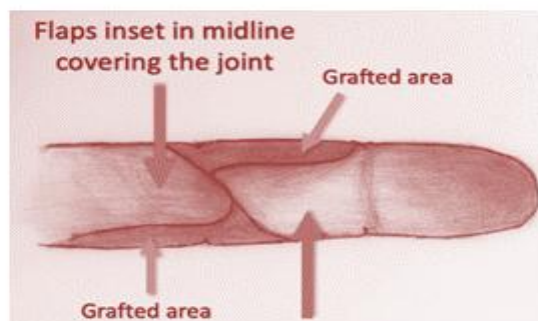


Figure 5 End to end placement of flap with the raw area to be grafted placed away from the joint on the volar aspect

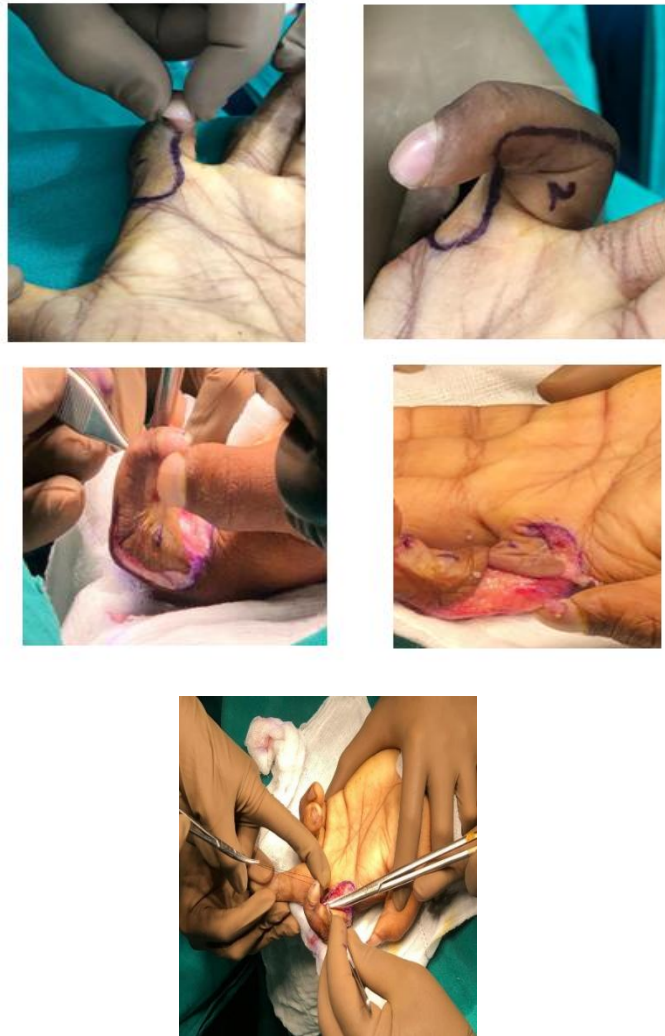
CASE 1- 11 year old male patient, student, came to our outpatient department with complaints of contracture of right middle finger. He had an history of a lacerated wound over the base of the middle finger 3 years back which was sutured following which he developed a contracted digit.



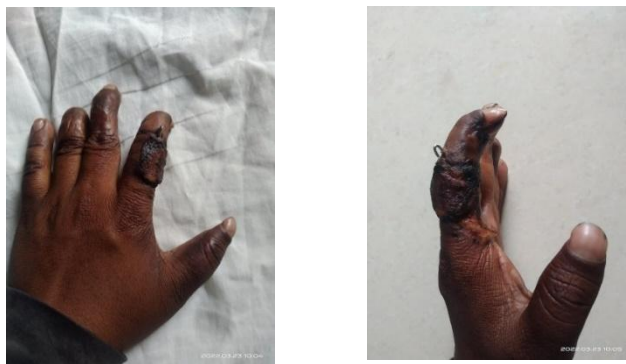
POST OP- Patient was able to his schooling and daily activities.



CASE 2- 25 year old male, typist by occupation, came to our outpatient department with an alleged history of electrical burns 3 years back involving mainly the index finger of the left hand.



POST OP- Patient had an improved function of typing, writing and grasping.



CASE 3- 27 year old male, labourer, patient presented to the emergency department with alleged history of crush injury to right middle and index finger with vascular deficit following which replantation surgery was done on day 3. Post operatively patient developed cutaneous necrosis following which debridement and VAC

dressing was done. Patient was operated with fixation of the phalanx with k wire following which patient developed contracture of the index finger.



POST OP- Patient had a better aesthetic outcome.



DISCUSSION-

Surgeons usually wait a year before they operate on these contractures to allowing good stabilization of the scar. However, few studies challenge this classic approach. Achauer and Vander- Kam[7] noted that surgery on immature hypertrophic scars required careful consideration because of the possibility of recurrence. Furthermore, Greenhalgh et al [8] have shown that early release is not associated with a worse outcome. Early release may be helpful if the secondary deformity is associated with functionally limiting hand contracture. We believe that it is preferable to wait until the scar has adequately healed and the skin condition has settled.

Treatment wound contracture is generally done by Z plasty but it is not always possible to perform the

standard Z- plasty technique in patients with severe contracture as covering the joint area becomes a difficult task. When there is a discrepancy between the required length and the available length, the traditional Z-plasty technique leaves the joint exposed. In our view, 2 long flaps taken from each side can use all the available skin to cover the crucial joint area, thereby preventing recurrence. Severely adherent tight contractures can be complicated with flap necrosis by compromising blood supply. Nevertheless, we have observed that the final outcome is not affected by this, and the patients are able to achieve a satisfactory range of motion. Further, skin grafts have been used in severe cases where the skin flaps fail to cover the entire joint leaving behind raw areas.

CONCLUSION-

The technique of double long arm sliding flaps provide better range of motion and cosmetic appearance with a good skin coverage in patients with severe digital contractures as compared to other treatment modalities for finger contracture. Flap necrosis is a complication seen in severely adherent contractures. Post operative mobilization can help achieve near normal range of motion

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