

## **CROSS-HAND, CROSS-FINGER NEUROVASCULAR FLAP: A PRELIMINARY REPORT**

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ONE of the major goals in reconstructive surgery of the hand is the restoration of sensitivity. This was achieved in the following case by a cross-hand, cross-finger neurovascular flap using the technique of regular flap transfer combined with microsurgical anastomoses.

### CASE REPORT

A 19-year-old married woman in her 7th month of pregnancy, was transferred to our department 3 weeks after a hot mangle injury which inflicted deep burns on the palmar aspect of all fingers of her dominant left hand, and circumferential burns on the ring and little fingers which had been amputated in another hospital. The appearance of the hand is shown in Figure 1. It was swollen and the fingers were painful and immobile. The thumb, although burned over the distal phalanx, was functioning.

The slough was excised on the 2nd and 7th days after admission and the excision included the neurovascular bundles, the flexor tendons and at the finger tips, removal of the external table of the bone. Three days later a cross-arm flap was raised to cover the defect (Fig. 2). One month later the flap was divided and 3 weeks after that the fingers were separated (Fig. 3).

At a later stage fusion of the DIP joints in the remaining 2 fingers and a palmaris longus graft to the left index finger was undertaken. Thereafter she regained a satisfactory pinch and started to write, using the proximal phalanx of the index to hold the pen. Nevertheless she was bothered by the lack of sensation. In order to supply this, a cross-hand, cross-finger neurovascular flap was transferred from the volar aspect of the right ring finger to that of her left index while that part of the cross-arm flap on the left index was used to cover the secondary defect on the right ring finger (Fig. 4).

Three weeks later both flaps were separated (Fig. 5). The 2 digital nerves of the flap were sutured to the stumps of the digital nerves of the left index, and the radial digital artery of the flap which was now the ulnar digital artery on the left index was sutured end to side to the common volar artery, leading to the web space between index and middle fingers. The sutures were 10/0 nylon.

The patient received 75 mg of heparin at the beginning of the operation and this was followed by injections of 30 mg heparin every 4 hours for 3 days. The neurovascular flap from the right ring finger looked very well, while the flap to the donor right ring finger volar aspect was at first slightly ischaemic, but regained vitality and survived except for a loss of 4 mm. For 2 weeks it was very swollen but with active and passive physiotherapy she regained full extension and flexion. One month post-operatively she has already developed a positive Tinel sign all the way to the tip of the left index finger (Fig. 6).

### DISCUSSION

The need for sensory restoration of the volar aspect of the finger is obvious especially in our patient who had already lost 2 fingers. Sensory restoration to her second finger was of paramount importance to add a functional finger besides the thumb in the dominant left hand. A free flap transfer of the volar aspect of the right ring finger with microvascular anastomoses and nerve suture was first considered. The possible lack of suitable veins for drainage, the best veins being on the dorsum, however, brought us to the idea of using a conventional flap technique as a first stage and the microsurgical anastomoses



FIG. 1. The left hand of the patient on admission 3 weeks after injury.

FIG. 2. Cross-arm flap to left hand.

FIG. 3. Cross-arm flap after division of the fingers.

FIG. 4. A cross-hand cross-finger neurovascular flap from the volar aspect of the right ring finger to the left index finger. The part of the cross-arm flap which covered the left index finger was transferred to the right ring finger.

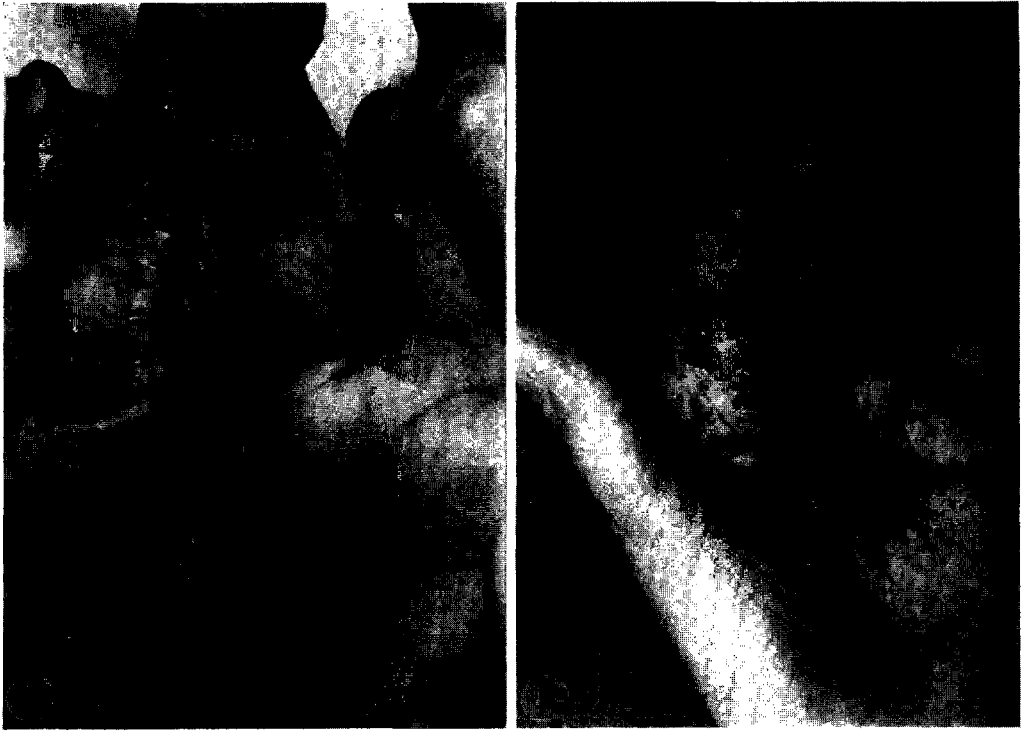


FIG. 5. The cross-finger flaps prior to detachment.

FIG. 6. The cross-hand cross-finger flap 2 weeks after separation.

later. The question whether to use half of the volar aspect of the finger and leave one neurovascular bundle untouched, or to use the technique mentioned above is an important one, concerning pain and vascularisation.

#### SUMMARY

As a preliminary report we present a case of severe injury of the dominant left hand in a 19-year-old girl. Reconstruction constituted a cross-arm flap initially, a palmaris longus tendon graft and finally a cross-hand, cross-finger neurovascular flap.