

*Cross-Arm Double Flap in the Repair of Severe Adduction Contracture of the Thumb—
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CROSS-ARM DOUBLE FLAP IN THE REPAIR OF SEVERE ADDUCTION CONTRACTURE OF THE THUMB

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SUMMARY

This paper describes the authors' technique of cross-arm, double flap for the repair of severe adduction contracture of the thumb. This technique has certain advantages over those previously described, the raw dorsal and volar regions are covered simultaneously and recurrent fibrosis is averted; risk of flap necrosis is minimal; intermetacarpal Kirschner wires are no longer required to maintain abduction from both the functional and aesthetic point of view, the results signal an advance in therapy (Figs. 12 and 13).

THE PROBLEM

Adduction contracture of the thumb is caused by scar tissue forming during the healing of burns, wounds, traumatic loss of soft tissue of the first space, or by ischaemic fibrosis of the intrinsic musculature due to interruption of the arterial supply following direct injury or compression induced by a tight plaster cast. Whatever the cause, when the thumb is so scarred it cannot be abducted and circumducted to fulfil its pincer function.

In order to restore mobility to the thumb it is necessary to release, not only skin, but often the connective tissue and muscle as well. In the less severe cases it is generally sufficient to carry out dermo-epidermal free grafts, dorsal flaps from the index finger or single or multiple Z-plasties. In the more severe cases, however, a larger amount of skin and subcutaneous tissue will be needed and distant flaps will therefore have to be prepared.

SURGICAL SOLUTIONS

The following classical techniques have been proposed:
from the forearm—

a proximally based flap which first covers the dorsal region of the first space and then, after delay, the volar region (Bunnell, 1964).

from the abdomen—

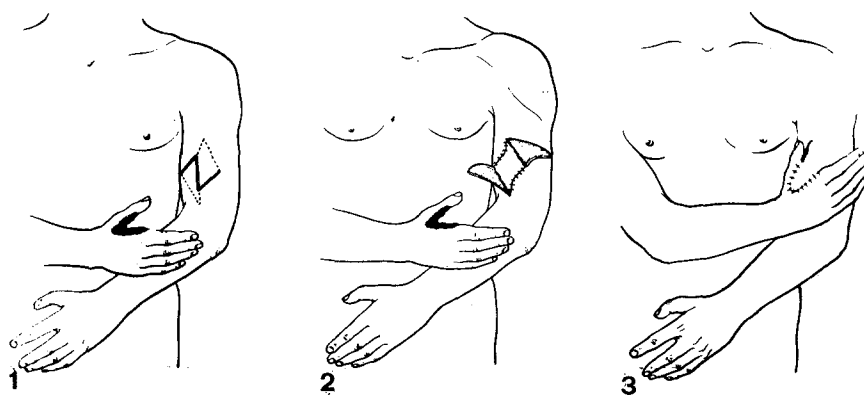
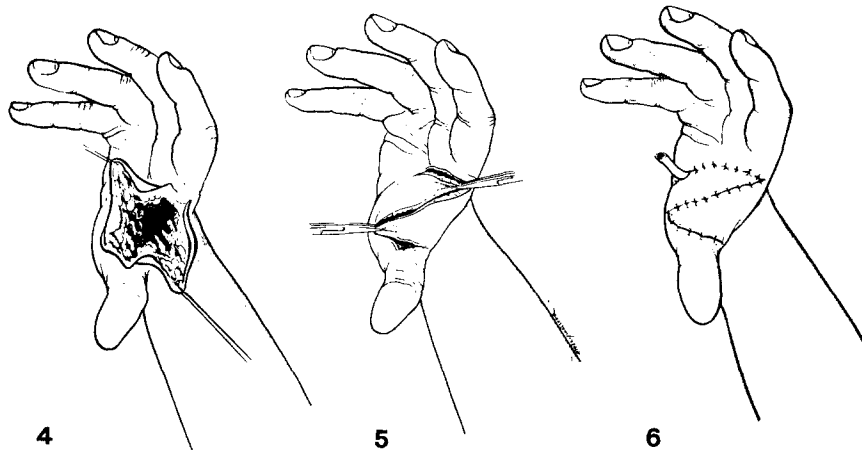


Fig. 1 Z-incision to prepare the two triangular flaps.

Fig. 2 Immediate covering of the donor area with a dermo-epidermal graft.

Fig. 3 Dorsal and volar suturing of the two flaps.



Figs. 4 and 5 Detachment and shaping of the flaps.
Fig. 6 Suturing the flaps obliquely across the interdigital web.

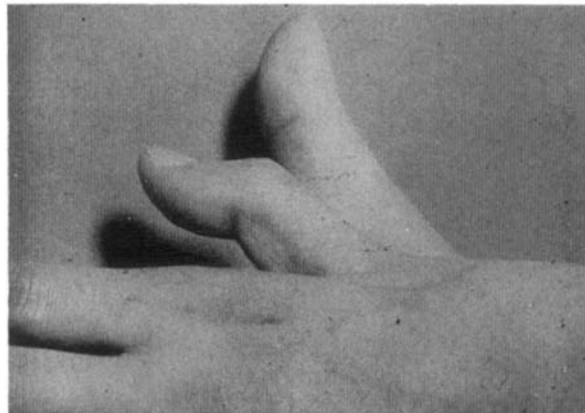


Fig. 7 Result of extensive wound in the first space of the left hand: severe adduction contracture of the left thumb, compared with right.

a single rhomboid flap which covers the dorsal and volar regions of the first space simultaneously (Littler, 1959) or a tubed flap which first covers the dorsal region and then, after delay, is further attached so as to cover the raw volar region (Bunnell, 1964).

The above techniques suffer from certain disadvantages. With all methods, the thumb may have to be held in the abducted position by means of a Kirschner wire. With Bunnell's technique, the volar region remains raw until the flap is detached. With Littler's technique there is the risk that the tip of the flap will not survive.

NEW FLAP TECHNIQUE

We have therefore developed a new technique for use in severe cases whereby the dorsal and volar regions of the first space are covered simultaneously with two relatively short triangular flaps raised on the contralateral arm. The danger of flap necrosis is minimal.

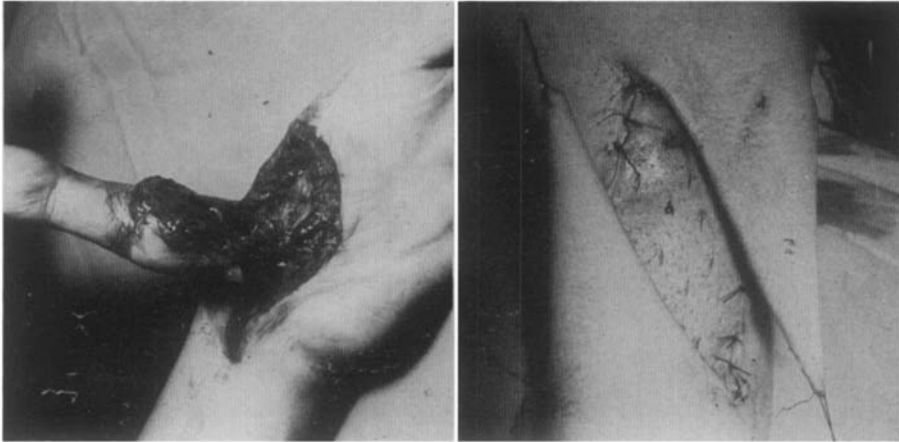


Fig. 8 Surgical exposure of the first space.

Fig. 9 Preparation of the two triangular flaps on the antero-medial region of the other arm and immediate covering of the donor area with a split skin graft.

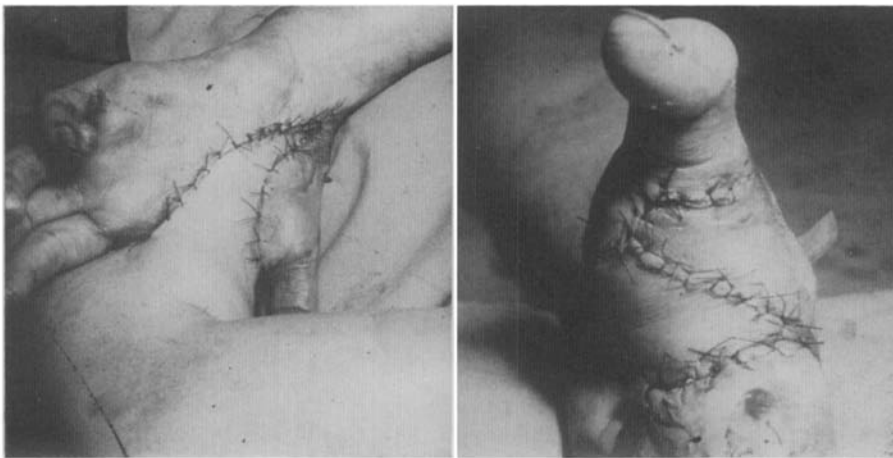
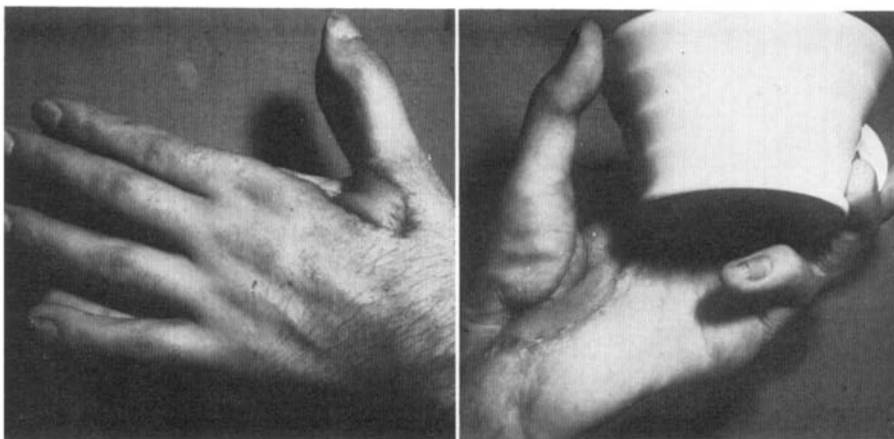


Fig. 10 Suturing of the volar flap.

Fig. 11 After detachment of the flaps, suturing performed obliquely to the interdigital web.

In cases of severe contracture of the thumb, after incision and removal of any contracted fibrotic skin, the thumb can often only be partially abducted due to the loss of elasticity of the fascia and to muscle fibrosis. This condition arises generally as a result of burns or compression.

In such cases we repair the skin defect but not before incising both the contracted fasciae over the first dorsal interosseus muscle and the adductor and, frequently, the bellies of these muscles if fibrosis is present. Subsequently adduction is always possible thanks to the action of the opponens muscle.



Figs. 12 and 13 After six months: complete abduction of the thumb with restoration of the princer function.

Complete surgical exposure of the first space results in the loss of a large inverted triangular area of dorsal and of volar tissue with apices at the base of the first and second metacarpal (Fig. 8). The raw area is covered with two flaps cut from the antero-medial aspect of the middle section of the upper arm (Figs. 1 and 2).

These flaps are triangular in shape and the apices are sutured, one volar and one dorsal, on a level with the angle formed at the base of the first and second metacarpal (Figs. 3 and 10). The raw area left when the flaps are raised is covered with a split skin graft taken from the thigh (Fig. 9).

While the flaps are "taking", the thumb and index finger straddle the arm so as to ensure the best possible abduction of the thumb (Fig. 10). A plaster cast is applied for about three weeks, care being taken to leave the elbow of the donor arm free so that the patient has a degree of independence.

When the flaps are detached it is important that they are cut obliquely so that the suturing of the free edges lies, not along, but oblique to the crest of the interdigital fold, thus avoiding secondary scar contracture (Figs. 4, 5, 6 and 11).

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