

THE DISTALLY-BASED DORSAL HAND FLAP FOR RESURFACING SKIN DEFECTS IN DUPUYTREN'S CONTRACTURE

L. EKEROT

From the Department of Hand Surgery, Malmö General Hospital, Lund University, Sweden

Surgery for recurrence of Dupuytren's disease often results in a volar skin defect. The use of the distally-based dorsal hand flap for resurfacing is reported. 17 flaps were used to cover 16 fingers after radical digital fasciectomy. All flaps survived with minor areas of partial necrosis in four of them. The raising of the flap was a simple procedure and good quality skin cover was achieved. There were no complaints about the donor site or the flap pedicle passing between the digits. The short post-operative immobilization time might result in less stiffness and a better functional result. It is concluded that the flap is a useful technique in treating skin defects in this condition resulting from surgical excision of the disease and involved skin.

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The defect created by skin excision in surgery for Dupuytren's disease has been bridged by free skin graft (Kelly and Varian, 1992; Ketchum and Hixson, 1987; Searle and Logan, 1992) and by extra-palmar flaps of normal skin and subcutaneous tissue (Harrison and Morris, 1975; Harrison and Newton, 1991; Moberg 1973). The introduction of the distally-based dorsal hand flap (Quaba and Davison, 1990) offers another therapeutic possibility.

MATERIAL

During a 4-year period (1990-1994) 16 hands (15 patients/17 flaps) with recurrence of Dupuytren's disease underwent surgery. One patient had surgery to both hands and another had two flaps to one finger. The average age was 57 years, with a range of 42 to 77 years. They were all men. The contracture was restricted to the little finger in eight hands, to the ring finger in one hand and involved two or more fingers in seven hands. The average number of previous operations in the fingers involved was 1.6 (1-3). The dorsal hand flap operation was performed from 6 months to 9 years (average 4.8 years) after the preceding operation, which in all hands had been a subtotal fasciectomy. Skin had not been replaced previously in any of the fingers. The mean PIP joint flexion contracture was 77° (range 60-90°). In most of cases, the MP joint was also involved as a result of palmar contracture. The PIP joint contracture was due to recurrence of Dupuytren's disease, shortage of scarred volar skin and secondary stiffness.

The surgical approach

Radical fasciectomy was performed with capsulectomy and K-wire immobilization of the PIP joint when necessary. The local skin was carefully trimmed but preserved if vital. The resulting skin defect was covered by a dorsal hand flap. The skin was taken from the metacarpal interspace radial to the finger to be covered, in 15 hands from the fourth and in one hand from the third and

fourth interspaces. A rectangular flap with tapered ends measuring about 1.5 × 6 cm was outlined from the distal edge of the extensor retinaculum to a point slightly beyond the expected pivot point between the MP joints (Fig 1). The flap was raised from proximal to distal as

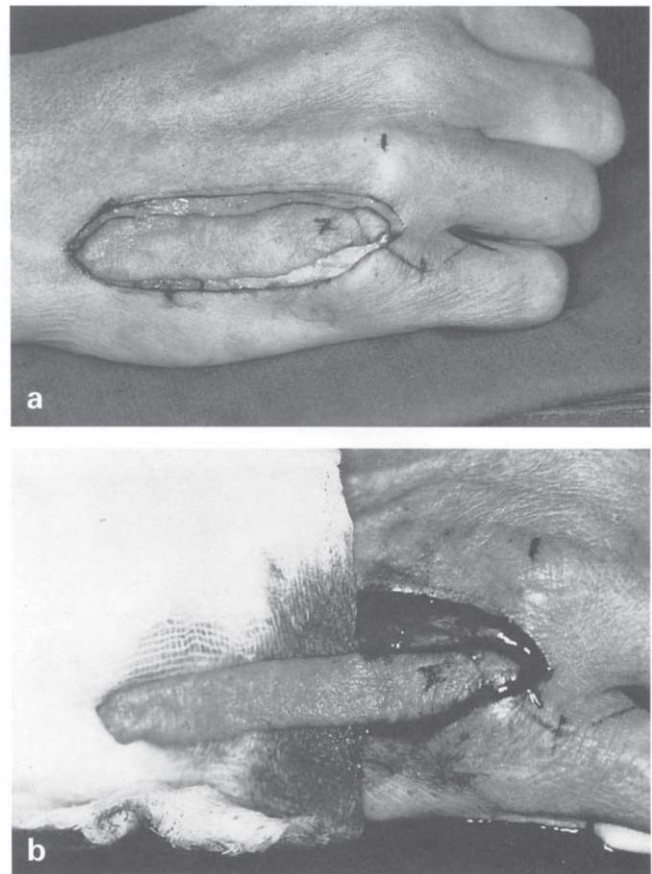


Fig 1 The plan of a dorsal hand flap from the fourth metacarpal interspace. (a) The flap is outlined and the skin incised. The expected position of the perforating artery is indicated. (b) The flap is allowed to perfuse in place.

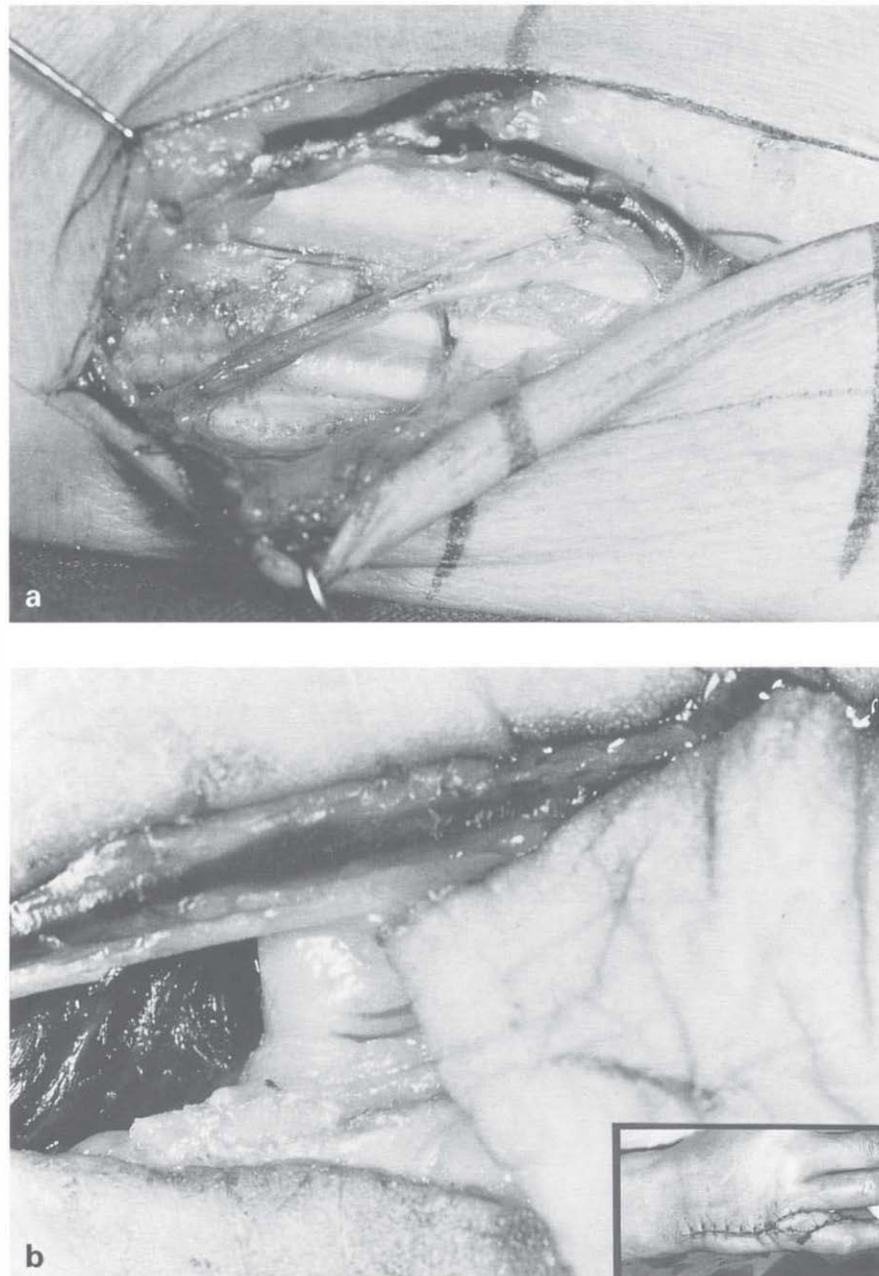


Fig 2 The flap is raised from proximal to distal. (a) Proximal: the dorsal branch of the ulnar nerve crossing the dorsal interosseus artery and its venae comitantes and a cutaneous vessel branch arc identified. (b) Distal: the subfascially raised flap is rotated 180° on its perforating vessel pedicle.

a fasciocutaneous flap (in three early cases the fascia was left behind) including the dorsal interosseus artery and its venae comitantes. In the fourth interspace care was taken to preserve the dorsal branch of the ulnar nerve which was dissected free from the radial part of the flap. The subfascial course of the vessel stalk necessitated division of the intertendinous connection between the extensor tendons. This was not always repaired. The distal perforating artery and the veins were identified at

the level of the necks of the metacarpals (Fig 2). The tourniquet was released and the flap allowed to flush before it was rotated 180° on its vessel pedicle. Care was taken not to twist or stretch the vessels. The interdigital web was incised and the flap inlayed and sutured to cover the volar defect, with the distal tip placed in the ulnar midlateral line of the finger. The donor site was closed directly in all hands with a single flap (Fig 3). The dressing was changed the next day to

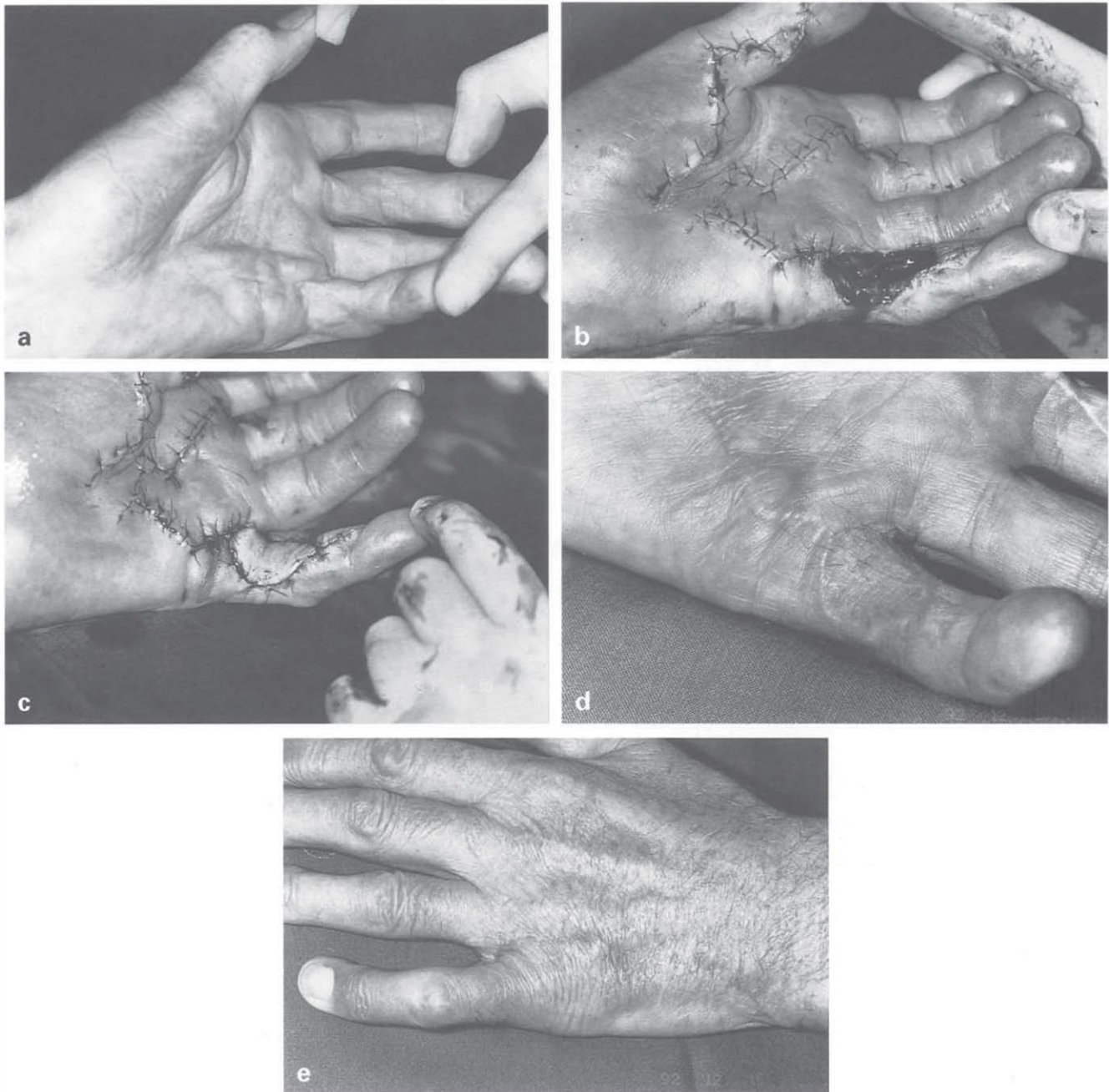


Fig 3 Recurrence of Dupuytren's disease. (a) Pre-operatively. (b-c) At operation: the skin defect and its resurfacing with the dorsal flap. (d-e) Post-operatively: The flap and the donor site 2 years later.

avoid post-operative compression of the flap. A plaster of Paris splint was applied for 3 to 4 days. Gentle finger flexion was then induced and an extension splint was applied as the sutures were removed 10 to 12 days post-operatively. Rehabilitation was continued for 3 to 5 months. In those cases where PIP capsulectomy and transfixation was used a short splint was worn as long as the K-wire was in place.

RESULTS

Out of the 16 fingers, ten were operated on without excision of trimmed skin flaps. An extensive PIP joint capsulectomy was performed in four fingers, three of which were pinned for 3 to 4 weeks. The PIP joint contracture was corrected from an average of 77° to an average of 15° (range $10\text{--}30^\circ$). All MP joints were fully corrected.

No flaps were lost but four developed distal, subtotal necrosis. Four flaps showed venous congestion for some days post-operatively. The only ring finger in the series had been operated on three times before and had symptoms of neurovascular injury, but another operation was prompted because of the advanced problems. The local skin flaps necrosed but the dorsal hand flap survived. The new skin defect was resurfaced with a long, second dorsal hand flap from the fourth interspace to cover the volar aspect of the PIP joint and the most proximal part of the middle phalanx. It was one of those developing venous congestion and distal necrosis.

No haemorrhage or infection occurred. The flap portion passing between the digits was left. Within 2 months it shrunk, causing no complaints. The donor site healed by primary intention and caused no problems. There were no dorsal sensory disturbances or neuromas.

Nine fingers have been followed up for more than 6 months (maximum 2 years). The PIP joint contracture in these nine fingers is mean 30° (range 10–65°) post-operatively, compared to mean 83° (range 60–90°) pre-operatively. In two of these fingers the PIP joints were capsulectomized and transfixed. They had 35° and 15° flexion contractures respectively 6 months post-operatively. Three patients are complaining about increased local cold intolerance.

DISCUSSION

Radical digital fasciectomy with an attempt to block further recurrence by replacement of skin is the first line of treatment in recurrent disease. Imported resistant skin is regarded as an efficient barrier. No method of skin substitution is ideal. A free skin graft, in particular a full thickness graft, demands a perfect bed which might diminish the possibility of a radical dissection. With the less demanding split thickness graft the covered area would be less resilient and the risk of a future scar contracture would increase. A local transposition flap adds skin containing fat tissue but because of scar lines and fibrosis it is difficult to mobilize a sufficient amount of skin, and the donor site requires a skin graft. The cross finger flap might jeopardize the function of a healthy adjacent finger and it cannot be used when the recurrence affects two or more fingers. A second operation is also needed, leading to additional swelling and fibrosis. All these methods demand longer post-operative immobilization, with the risk of stiffness and delay in rehabilitation.

The proposed method using the dorsal hand flap as

a source of skin has its limits. The width of the flap is restricted and its course via the interdigital web steals length. Its maximum safe covering area extends only to the PIP flexion crease. However, the flap offers good quality skin cover in a rather simple way. It is a "flap of low costs"; leaving a functionally trouble-free scar line on the dorsum of the hand. The flap in the present design seems to be safe in spite of the description of the supplying vessels in the fourth interspace (Arria and Gilbert, 1992). Thus, the absence of the dorsal interosseous artery, and even of the anastomosis between the proximal and distal subcutaneous branches, would not permit the elevation of a proximal island flap of adequate pedicle length. The incorporation of only distal skin branches might be sufficient, implying that the proximal half of the flap as outlined is in fact a random flap. Tunnelling of the flap through the commissure is not possible. Except for loss of length there has been no disadvantage in this. Furthermore, the dorsal hand flap supplies circulation which might be of importance after repeated operations.

The dorsal hand flap allows a more radical excision and permits earlier mobilization and training than other resurfacing procedures, potentially reflected in a better functional final result and less persistent extension defect of the PIP joint. The dorsal hand flap is a useful additional solution to volar skin defects in Dupuytren's disease although the efficacy of this fascia-containing flap as a blocker of recurrence has to be demonstrated.

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Lars Ekerot, MD, Malmö General Hospital, Department of Hand Surgery, S-21401 Malmö, Sweden.

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