



The Treatment of Dupuytren's Contracture with Flexor Tendon Sheath Involvement— The Sliding Volar Flap

Charles S. Lane, M.D.

When the flexor tendon sheath must be opened to release a Dupuytren's contracture of the finger, one is sometimes left with an exposed flexor tendon. If the initial incisions in the finger are made to create a proximally based flap, adequate skin is left to cover the defect in the flexor tendon sheath and a split-thickness skin graft can be placed distally where the sheath has not been violated.

The problem of skin coverage following fasciotomy or fasciectomy has been addressed by many. One of the first published reports is that of Kanavel et al [8] in which the authors suggest application of a skin graft to cover skin defects after fasciectomy. McIndoe and Beare [10] suggest Z-plasties at the base of the fingers to add additional skin to the fingers after fasciectomy. This technique was endorsed by Howard [6], Skoog [13], and others. Deming [3] describes Y-V advancement flaps, advancing the points of the incision into the Vs to gain more skin. Harrison and Morris [5] describe a somewhat complex dorsal transposition flap to cover skin defects, as does Bruner [1].

In 1964, McCash fairly stunned the surgical world by advocating leaving the palm open after limited fasciotomy and using limited sliding flaps in the fingers to cover the finger defects. The effectiveness of this technique has been supported by Carroll [2], Noble [12], and others.

In 1971, Gonzalez [4] addressed the problem of flexion contracture of the proximal interphalangeal joints of the fingers by advocating limited fasciotomy along with direct application of a split-thickness skin graft. He suggested that if the flexor tendon sheath need be opened, an immediate cross-finger flap be performed. Moberg [11] likewise recognized this problem and subscribed to the idea of the cross-finger flap.

Hueston most directly described the problem in 1963 [7]. He states, "Correction of the flexion deformity can usually be achieved without opening the sheath, but there have been four instances in the fourteen cases to date where the sheath was itself a limiting factor preventing proximal interphalangeal joint correction. Incision of the sheath allowed further extension but free graft replacement over the sheath deficiency was impossible. Local transposed flaps on the end or side of the wound have been used over the exposed flexor tendons with a supplementary Wolfe graft on each side of this flap."

Hueston goes on to say that "the principal concern in preparing an adequate bed for a free graft is the dissection of the fibrous flexor tendon sheath. Whereas this structure appears never to be involved in a virgin case of Dupuytren's contracture, it is involved in those digits showing multiple local recurrences."

It is in just this sort of case that we think our technique has the most to offer. Before operating we determine if there is a contracture at the level of

From the Hand Clinic, Cedars-Sinai Medical Center, Los Angeles, CA.

Address reprint requests to Dr. Lane, 9301 Wilshire Blvd, Beverly Hills, CA 90210.

the proximal interphalangeal joint not relieved by flexing the metacarpophalangeal joint. If the proximal interphalangeal joint can be extended in this manner, a contracture of the flexor tendon sheath does not exist.

However, if a contracture of more than 70 degrees is present at the proximal interphalangeal joint, and relaxation of the metacarpophalangeal joint does not allow for greater straightening of this contracture, then one must be suspicious of a contracture of the flexor tendon sheath and plan one's surgical approach so as to cover a potential defect in the sheath if it needs to be released.

Clinical Data

From 1973 to 1978, 74 cases of Dupuytren's disease underwent surgery. In 10 of these, the tendon sheath had to be opened to obtain full extension. Of the 10, 7 had had previous surgery. All cases involved the fifth finger and of the 10 cases, 4 rotational flaps were carried out to cover the defect in the flexor tendon sheath, 2 of these required a split-thickness skin graft at a distance. Six sliding flaps were carried out.

Of the 6 sliding flaps, the average preoperative range of motion at the proximal interphalangeal joint was 65 to 96 degrees, with an average preoperative range of motion of 26 degrees. Postoperatively, the range of motion was 38 to 95 degrees, with an average of 79 degrees.

Of the 4 fingers handled by other skin coverage techniques, the average preoperative range of motion at the proximal interphalangeal joint was 87 to 97 degrees, with an average total range of motion of 10.6 degrees. The average postoperative range of motion was 11 to 86 degrees, with an average total range of motion of 76 degrees.

There were 2 complications in those who had releases of the flexor tendon sheath plus the capsule, resulting in 2 unstable proximal interphalangeal joints, 1 requiring an arthrodesis to restore function.

The average healing time with the sliding flap plus skin graft was 10 to 14 days; that with the rotational flaps was 14 to 40 days. With the sliding flap, the skin had fewer volar scars and was softer and more pliable.

Technique

An incision is made along the neutral midlateral border of the finger from its base to the distal flexor crease. It then extends transversely just proximal to

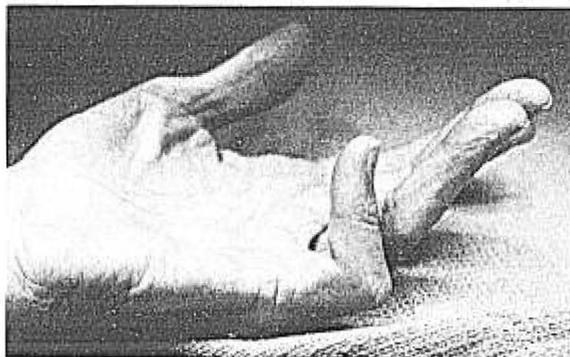


Fig 1. Flexion contracture limited to the proximal interphalangeal joint.

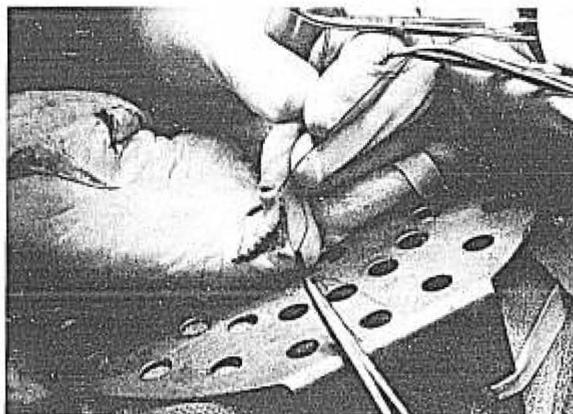


Fig 2. Incisions made along neutral midlateral borders.

the flexor crease to the opposite midneutral border and then extends proximally to the middle flexor crease (Figs 1, 2).

The flap thus created is elevated superficial to the neurovascular bundles and dissected proximally (Fig 3). This dissection enables the neurovascular bundles to be identified away from the area of maximal involvement of Dupuytren's disease and permits them to be followed into the area of fascial thickening.

If thickened fascia is densely adherent to the flap, it is left in place and no attempt is made to dissect it free. Only a fasciotomy is planned to release the con-

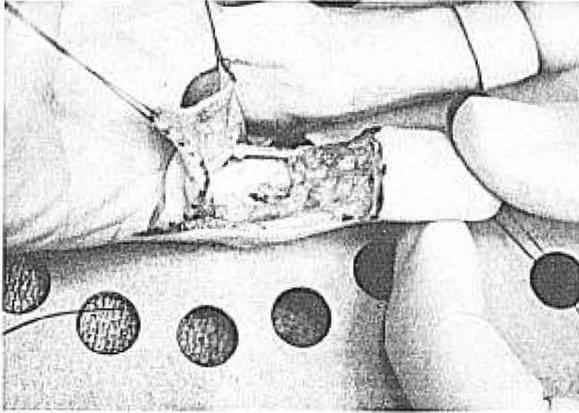


Fig 3. Flap is elevated superficial to the neurovascular bundles.

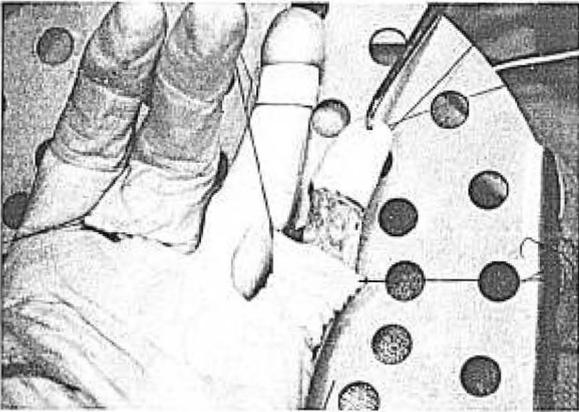


Fig 4. Finger extended. Flap slides proximally covering defect in tendon sheath.

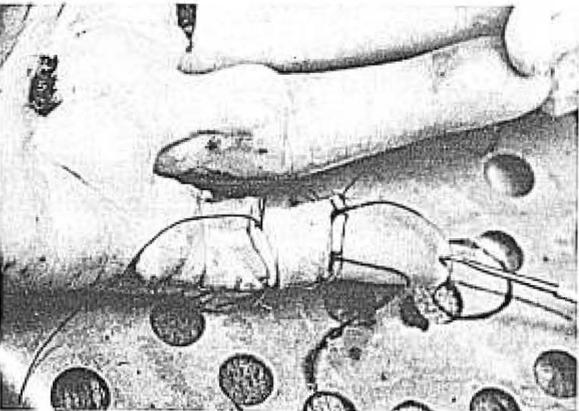


Fig 5. Skin graft applied over intact sheath.

tracted tissues. Any thickening of Grayson, Landsmeer, or Cleland's ligaments is likewise released, with particular care being taken to preserve the neurovascular bundles.

If, after these releases, there is still limitation of extension of the finger, a transverse incision is made in the flexor tendon sheath just proximal to the proximal interphalangeal joint. Last, contracted collateral ligaments and the volar plate are released in a very limited fashion, since postoperative instability of the proximal interphalangeal joint will ensue if release of the joint is too generous. It is better to settle for residual contracture than an unstable joint.

The finger is then fully extended and the flap created is allowed to retract proximally (the sliding volar flap) (Fig 4), covering the defect in the flexor tendon sheath. The longitudinal incisions may be extended to allow the flap to lie as flat as possible. One need not be concerned if the flap is contorted due to contractural bands being left in the flap, since with the relaxation of the flap the dimpling and contortion of the skin will resolve, for the most part, with time.

A defect is then left over the middle digit segment where the flexor tendon sheath has been left intact. This defect is covered with a free full-thickness skin graft (Figs 5, 6). A stent-type dressing is applied to the skin graft and the finger is splinted in a relaxed position of about 30 degrees flexion. At five to seven days, the stent dressing is removed and a period of active exercises and dynamic splinting is instituted.

Conclusion

With moderate contracture of the proximal interphalangeal joint due to Dupuytren's disease, the possibility of being left with a defect in the flexor tendon sheath without adequate skin to cover it after fasciotomy should be anticipated.

A proximally based sliding volar flap gives excellent exposure of the volar surface of the finger and allows for adequate viable skin to cover a potentially exposed flexor tendon. Subsequent skin grafting can be performed over the intact flexor tendon sheath distally.

This technique avoids the morbidity of cross-finger flaps, minimally manipulates the neurovascular bundles, keeps immobilization to a minimum, and decreases the problem of postoperative stiffness and edema.

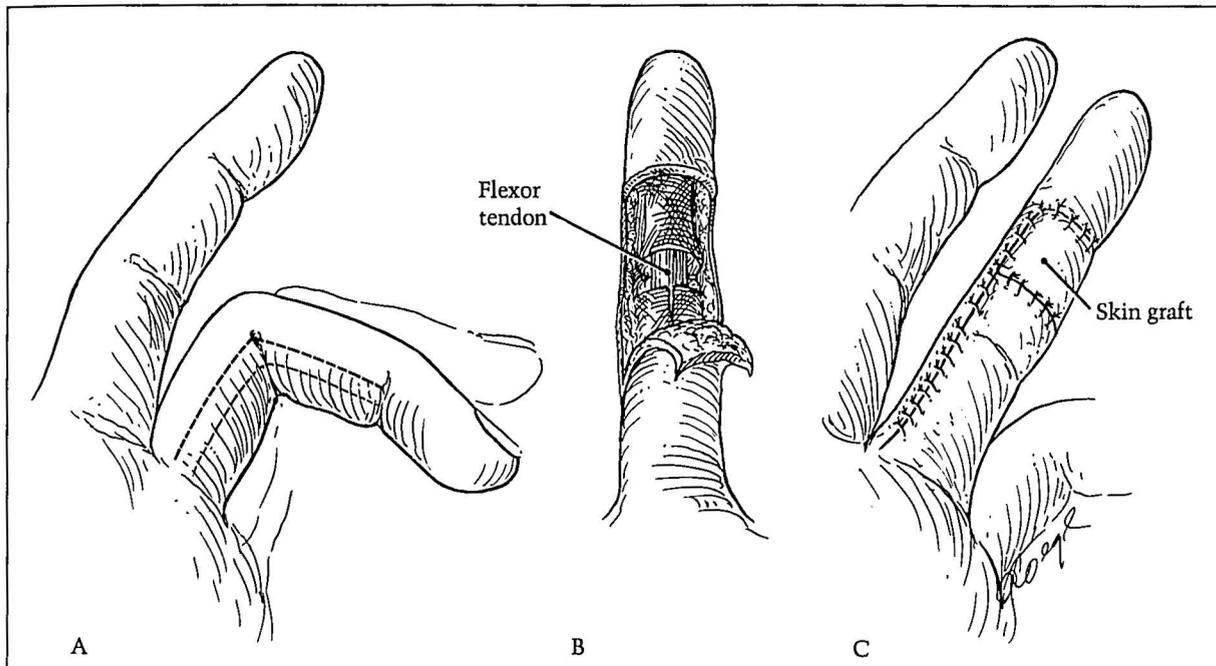


Fig 6. Steps in sliding volar flap procedure.

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