

TECHNIQUE

The Surgical Treatment of Dupuytren Contracture with the Reverse Flow Dorsal Metacarpal Island Flap

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Contractures of the digits were documented as early as 1641 (5). In 1832, Baron Dupuytren reported on the occurrence of plantar and palmar lesions in laborers, in whom there was a progression of contracture of the palmar aponeurosis. In 1887, Langhans described what he believed were the essential pathologic features of the lesion, in specimens that had been removed from the palmar fascia (8). We do not know the cause of Dupuytren's disease. The highest incidence of Dupuytren's disease occurs in men in the fifth to seventh decades of life who are of Scandinavian or Celtic origin (5). In our population, that is, of Mediterranean origin, we also see large numbers of Dupuytren patients. Unfortunately, the lack of understanding of the cause of this disease also contributes to the lack of a uniform surgical approach. Observation alone is indicated in the absence of digital contracture, whereas in the presence of contracture there are different surgical approaches.

■ MATERIALS AND METHODS

Between April 1995 and July 1998, the reverse-flow dorsal metacarpal island flap was applied for closure of the palmar defects after partial fasciectomy in 27 patients (8 women, 19 men) with Dupuytren's contracture. The average age of these patients was 58.4 (minimum, 44; maximum, 71). Four patients had a history of chronic alcohol usage, five patients suffered from non-insulin-dependent diabetes mellitus, and only one patient had a family history of Dupuytren's contracture. Three patients

had bilateral disease and were operated on at 3-month intervals to accommodate the rehabilitation process. After the operation, volar splints were used on all patients for a period of 1 week. After the removal of the splint, patients embarked on active rehabilitation programs. The average duration of hospitalization was 5 days (minimum, 3 days; maximum, 8 days), and the outpatient observation period averaged 31 months (minimum, 9 months; maximum, 48 months).

■ SURGICAL TECHNIQUE

In patients who had severe involvement, with marked metacarpophalangeal and proximal interphalangeal joint contractures and shortening of the palmar skin, a transverse incision across the palm was made, beginning at a level just proximal to the metacarpal heads and parallel to the distal palmar crease, with an extension proximally over the hypothenar eminence from the little finger. Excision of the contractures with partial fasciectomy resulted in a 3- to 4-cm skin gap. After the skin defect was created in the palmar area, a reverse-flow metacarpal island flap (Fig. 1) was harvested from the dorsum of the hand. Depending on the location of the contracted ray, the flap can be based on either the third or fourth dorsal metacarpal arteries. The pedicle is dissected distally, and the pivot point of the pedicle is the anastomotic branch to the palmar interdigital artery (2-4). The vascular pedicle is passed through a tunnel that is formed in the intermetacarpal space. The dorsal metacarpal artery is long enough to transfer the flap from dorsum to the palmar area through the tunnel (2-4). After the adaptation of the flap to the gap, a minovac drainage system is used to prevent subcutaneous hematoma in all cases (Fig. 2). A

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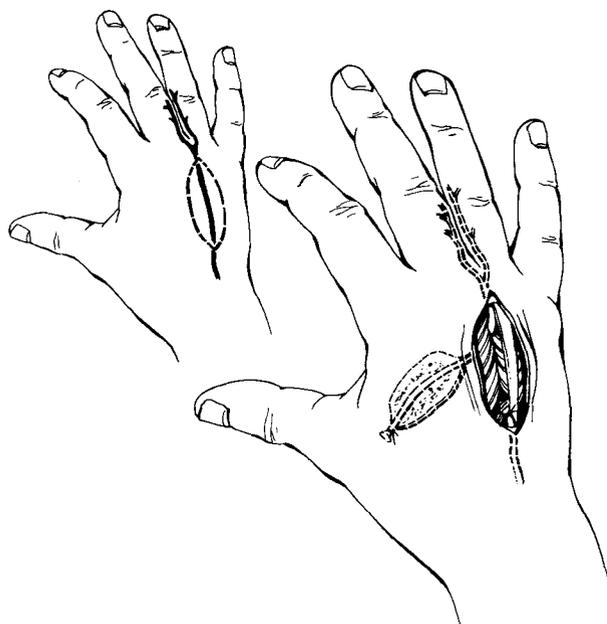


FIG. 1. Reverse flow metacarpal island flap, the flap can base on either third or fourth dorsal metacarpal arteries. The pedicles is dissected distally, and pivot point of pedicle is the anastomotic branch to the palmar interdigital artery. *Illustration by Jennifer Smith.*

short arm splint is applied for 1 week, and the rehabilitation program begins after its removal.

■ RESULTS

The follow-up period of the cases was approximately 31 months (minimum, 9; maximum, 48). Flap necrosis and wound infection did not develop in any of the cases. None of the patients showed signs of recurrence of the contracture. In one patient, who suffered from non-insulin-dependent diabetes mellitus, reflex sympathetic dystrophy developed but resolved after 6 months.

■ DISCUSSION

The least extensive procedure, subcutaneous fasciotomy, is used for patients who are elderly or arthritic or whose general health is poor. Because this procedure will allow stretching of the palmar skin, it also may be useful as a preliminary operation to fasciectomy. Fasciotomy should be considered a temporary measure, because 72% of contractures so treated recur to such a degree that further surgery may be required (6).

Partial (selective) fasciectomy is usually indicated

when only the ulnar one or two fingers are involved. It is the operation used more frequently because postsurgical morbidity occurs less often, and there are fewer complications than after complete fasciectomy. Even though the rate of recurrence after partial fasciectomy is high, at 50%, the need for another surgical procedure is only 15%. In this operation, only the mature deforming tissue is excised. Several incisions have been described, and the preferred one is the zigzag incision on the fingers, or a variant of it, because this procedure better exposes the diseased tissue (1).

Complete fasciectomy is rarely if ever indicated, because it is frequently associated with complications of hematoma, joint stiffness, and delayed healing, and it does not guarantee that the disease will not recur (7).

Fasciectomy with skin grafting, as advocated by Hueston, may be indicated for young patients for whom the prognosis is poor because of such factors as epilepsy, alcoholism, or the presence of the disease elsewhere in the body, and in whom the lesion has recurred after one excision. The skin and underlying abnormal fascia are excised, and a full-thickness or thick split skin graft is applied. Recurrence has not been reported in areas of the palm treated in this manner.

Amputation, although rarely necessary, may be indicated if flexion contracture of the proximal interphalangeal joint, especially of the little finger, is severe and cannot be corrected enough to make the finger useful.

In 1983, McFarlane reported that reflex sympathetic dystrophy occurred in 10% of Dupuytren's contracture cases in which Z-plasty and partial fasciectomy operations occurred (5,8). The skin defects that formed after the operations were covered with full-thickness grafts. However, wound care and early rehabilitation cannot be instituted early in patients treated with skin grafts, whereas in the operation described here, these two concerns are not a problem.

As a result, immediate wound coverage is provided by covering the skin defects, formed after partial fasciectomy or dermatofasciectomy, with the reverse-flow dorsal metacarpal island flap in Dupuytren contracture cases that are at the progressive stage. The reverse-flow dorsal metacarpal island flaps have been studied extensively by Dautel and Merle (2) Maruyama (4), and this is accepted as a reverse kite, with the skin territory centered on the apex of the first intermetacarpal angle. All of the defects, located on the dorsum of the hand, between the wrist and the middle of the proximal phalanges, can be closed with first dorsal metatarsal artery. We close palmar defects after resection of contractures, and we perform Doppler ultrasonography to determine any problem in the circulation of the flap after the transposition between the metacarpals. There has been no problem with

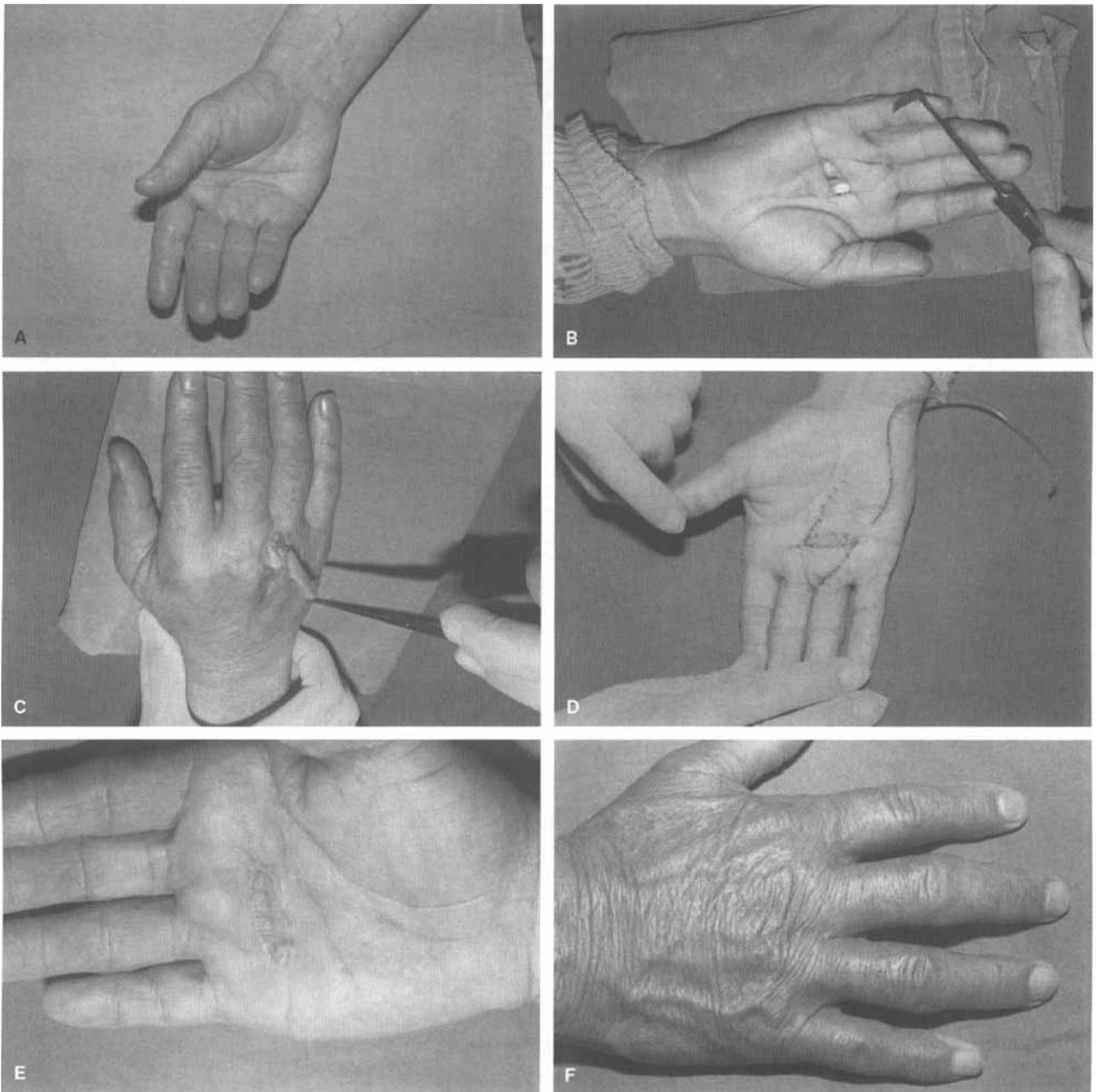


FIG. 2. **A:** 54-year-old man with Dupuytren's contracture. **B:** Defect in palmar area after partial fasciectomy of contracture. **C:** Reverse-flow metacarpal island flap from third dorsal metacarpal artery. **D:** Closure of wound and zig-zag incisions after the vascular pedicle was passed through a tunnel that is formed in intermetacarpal space. **E:** Postoperative palmar view of wound, after 6 months. **F:** Postoperative dorsal view of wound, after 6 months.

the circulation of the flap. Reverse-flow dorsal metacarpal island flaps is our treatment of choice to close the defects that occur after Dupuytren's contracture surgery. In the interest of manual mobility after the operation, rehabilitation can be applied at an earlier period, and positive results can be obtained with respect to function and cosmetic appearance. Because of the short hospital-

ization period (an average of 5 days) and early return to work, the technique is also cost-effective.

■ REFERENCES

- 1) Albin R, Brickley D. Dupuytren's contracture an active cellular process. *J Bone Joint Surg Am* 1975;57:726.

- 2) Dautel G, Merle M. Dorsal metacarpal reverse flaps: Anatomical basis and clinical application. *J Hand Surg Br* 1991;16:400.
- 3) Foucher G, Khouri R. Digital reconstruction with island flaps. *Clin Plast Surg* 1997;24:1.
- 4) Maruyama Y. The reverse dorsal metacarpal flap. *Br J Plast Surg* 1990;43:24.
- 5) McFarlane R. *Textbook of surgery of the musculoskeletal system*, 2nd ed. New York: Churchill Livingstone, 1990.
- 6) Rodrigo JJ, Niebauer JJ, Brown RL, Doyle JR. Treatment of Dupuytren contracture, long term results after fasciotomy and fascial excision. *J Bone Joint Surg Am* 1976;58:380.
- 7) Sennwald GR. Fasiectomy for treatment of Dupuytren's disease and early complications. *J Hand Surg Am* 1990; 15:755.
- 8) Shum DT, McFarlane RM. Histogenesis of Dupuytren's disease: an immunohistochemical study of 30 cases. *J Hand Surg Am* 1988;13:6.