

The “Jacobsen Flap” Technique: A Safe, Simple Surgical Procedure to Treat Dupuytren Disease of the Little Finger in Advanced Stage

Massimiliano Tripoli, MD, Adriana Cordova, MD, and Francesco Moschella, MD

Abstract: The surgery for advanced stages of Dupuytren disease of the little finger is controversial. In the literature, several techniques have been described with variable reported results and postoperative complications. Percutaneous needle fasciotomy, McCash technique, and dermofasciectomy are often performed for surgical treatment but they present significant complications and limits. This study reviews our experience of using the Jacobsen flap technique, a modification of the McCash procedure. We found that the Jacobsen flap technique for the significant correction of the contracture, the low rate of complications, and the relatively simple surgical approach is an excellent alternative to percutaneous needle fasciotomy, dermofasciectomy, or amputation.

Key Words: Dupuytren disease, Jacobsen flap, skin shrinkage, little finger

(*Tech Hand Surg* 2010;14: 173–177)

HISTORICAL PERSPECTIVE

For segmental aponeurectomy in patients with Dupuytren disease at stages 1 to 2, midaxial longitudinal incisions with serial Z-plasties, Bruner zig-zag incisions, and V-Y plasties over the palm and most severely affected fingers are preferred. The advantages of these incisions and approaches are good intraoperative visualization of the fibrous tissue, rapid dissection, minor tissue trauma, and a tension-free wound closure. In cases of palmar fibromatosis at stages 3 and 4 with severe digital flexion, inelastic overlying skin, and skin shrinkage, these incisions may not be useful as they may increase the risk of edema, skin necrosis, and wound breakdown. In these cases, needle percutaneous fasciotomy, dermofasciectomy with full-thickness skin grafting, and the McCash technique¹ are more often performed with different rates of complications and recurrence.^{2,3}

Percutaneous needle fasciotomy has a beneficial short-term effect, as it achieves correction of the digital deformity without skin incisions and the risk of necrosis. However, the recurrence of fibromatosis is frequent (65%).^{4,5} In addition, it is associated with a significant risk of neurovascular injury (3.5%)⁶ at the metacarpophalangeal joint, especially in the presence of the spiral cord which often surrounds the neurovascular bundle, displacing it superficially and medially, where it can be injured during the operative procedure.

From the Chirurgia Plastica e Ricostruttiva, Dipartimento di Discipline Chirurgiche ed Oncologiche, Università degli Studi di Palermo.

The authors have not received any funding for this work from any of the following organizations: National Institutes of Health, Wellcome Trust, Howard Hughes Medical Institute, and other(s).

Address correspondence and reprint requests to Massimiliano Tripoli, MD, Chirurgia Plastica e Ricostruttiva, Dipartimento di Discipline Chirurgiche ed Oncologiche, Università degli Studi di Palermo, Via del Vespro 129, Palermo 90127, Italy. E-mail: matripoli@yahoo.it.

Copyright © 2010 by Lippincott Williams & Wilkins



FIGURE 1. A and B, The Jacobsen flap. The L-shaped full-thickness flap is created by performing 2 linear incisions: the first in the transverse crease of the palm, the second in the midlateral line of the little finger to the distal interphalangeal joint.

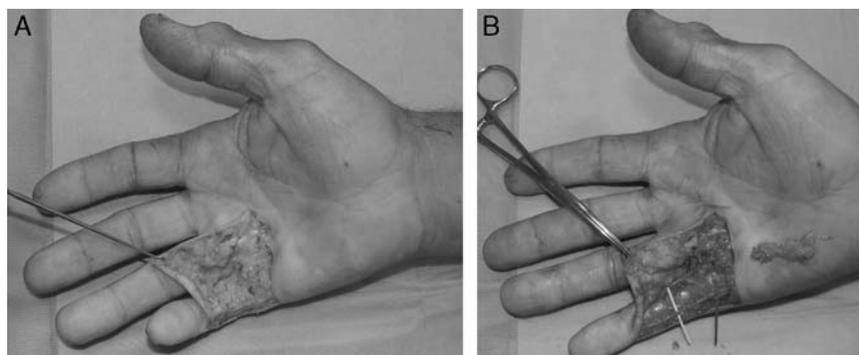


FIGURE 2. A, The skin flap with its blood supply based on the radial side of the palm. B, Selective aponeurectomy.

Dermofasciectomy, which is the local resection of both the fibrotic skin and digital fascias with subsequent coverage by a full-thickness skin graft, is advised in young adults with digitopalmar fibromatosis infiltrating the skin, in cases of aggressive progression, Dupuytren diathesis, or multiple relapses.^{7,8} Although clinical studies show good long-term results with respect to graft take and extension gain of the fingers⁹ with a lower rate of relapse underneath the full-thickness skin grafts,^{10,11} there are potential disadvantages to this procedure. These include hematoma, graft failure, and digital stiffness because of the immobilization of the hand during the graft takes. In addition, there is the possibility of hypertrophic scar formation in the skin graft donor site.

The McCash technique uses only transverse incisions in the palmar and digital creases. The transverse incisions in the palmar crease remain open, avoiding skin suture under tension, ensuring a good blood supply to the wound margins, and permitting the palmar skin to spread during secondary wound healing.¹² There are 2 disadvantages of this technique: the digital dissection always ends at the proximal interphalangeal joints, so the release of the distal interphalangeal joints necessitates a second operation. If a primary closure of the digital incisions cannot be achieved without tension, then full-thickness skin grafts are required. This retrospective study reports our results of use of the Jacobsen flap,¹³ a modification of the McCash procedure, in treatment of Dupuytren disease at stages 3 to 4 in the little finger.



FIGURE 3. The contracted skin is stretched, with full extension of the digits.

INDICATION

The indication for the Jacobsen flap is Dupuytren contracture in the palm and the little finger with skin shrinkage, stage 3 or 4 (Figs. 1A, B) according to the Tubiana's classification system¹⁴ based on the total passive extension deficit of each ray (stage 1: 0 to 45 degrees, stage 2: 45 to 90 degrees, stage 3: 90 to 135 degrees, stage 4: 135 to 180 degrees). Between 2006 and 2009, 15 patients, 10 men and 5 women with severe Dupuytren disease of the little finger underwent surgery in the Department of Plastic and Reconstructive Surgery of Palermo. Their mean age was 58 years. Twelve patients underwent primary surgery and 3 underwent revision surgery after a recurrence. None had undergone a Jacobsen flap surgery earlier. Nine fingers were at stage 3 and 6 at stage 4.

FLAP DESIGN AND OPERATIVE TECHNIQUE

Under the brachial plexus block, after application of the tourniquet inflated to 300 mm Hg, a longitudinal incision is made in the ulnar midlateral line of the little finger, running from the distal crease to the distal flexor crease of the palm. A transverse incision is then made at the palmar distal crease, thus, raising an L-shaped full-thickness skin flap with its blood supply based on the radial side of the palm (Fig. 2A). A selective aponeurectomy is performed, with special attention in the metacarpophalangeal joint at the bifurcation of the common digital palmar artery into the proper digital arteries (Fig. 2B). The finger is then fully extended, which results in movement of the flap distally, and the longitudinal arm of the L-shaped incision is closed leaving a 15 mm skin defect open in the palm (Fig. 3). In 2 cases in which more than 30 degrees of flexion persisted despite this correction of the contracted finger, an arthrolysis of the proximal interphalangeal joint with release of the check-rein ligaments of the palmar plate and the collateral ligaments of the proximal interphalangeal joint was performed.

The open wound in the palm healed for second intention within 4 to 6 weeks (Figs. 4A, B).

COMPLICATIONS

No hematomas, infections, skin flap necrosis, or neurovascular injuries occurred in any of the cases. One patient developed reflex sympathetic dystrophy with pain, hyperhidrosis, and edema, but treatment with analgesics and physical therapy for 2 months led to a complete remission of the symptoms. One patient, a heavy smoker with type 2 diabetes, had delayed wound healing at the palm. This was treated by the application of

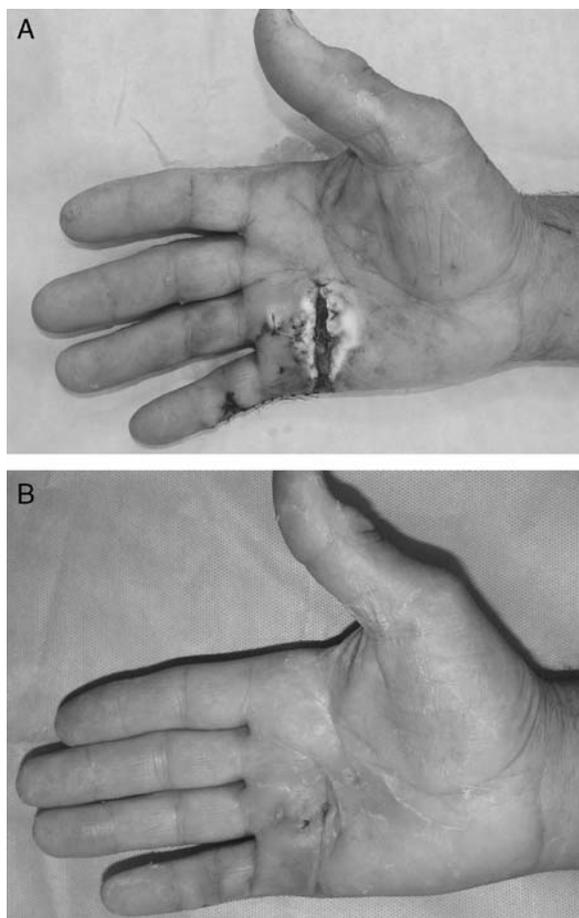


FIGURE 4. The open wound in the palm heals by secondary intention: postoperative views after 1 week (A) and 4 weeks (B).

collagenase ointment and careful monitoring of the diabetes three weekly, which resulted in complete recovery in about 10 weeks.

REHABILITATION

Forty-eight hours after the operation, the dressings were changed, and thereafter at intervals of 2 to 4 days until the wound was healed. Then a dynamic extension splint was applied for a mean duration of 10 weeks. After the operation, a strict rehabilitation program (physical therapy 3 sessions \times 30 min/wk, up to an average of 10 wk with home exercises) was carried out. The mean follow-up period was 1.8 years (range, 4 mo to 3 y). Follow-up included the patient's level of satisfaction, hand mobility, and the aesthetic appearance of the scar. Follow-up was obtained by clinical examination and the use of a questionnaire. All the patients were at stage 0, postoperatively. All the patients were very satisfied with their outcome, and our rating of the final result was "excellent" (89%) or "good" (11%) (Figs. 5A–C).

CONCLUSIONS

The Jacobsen flap technique, a modification of the McCash procedure, permits exposure of the fibrotic tissue in both the palm and in the fingers using only 2 linear incisions. Release of the contracted skin results in full extension of the digits. In

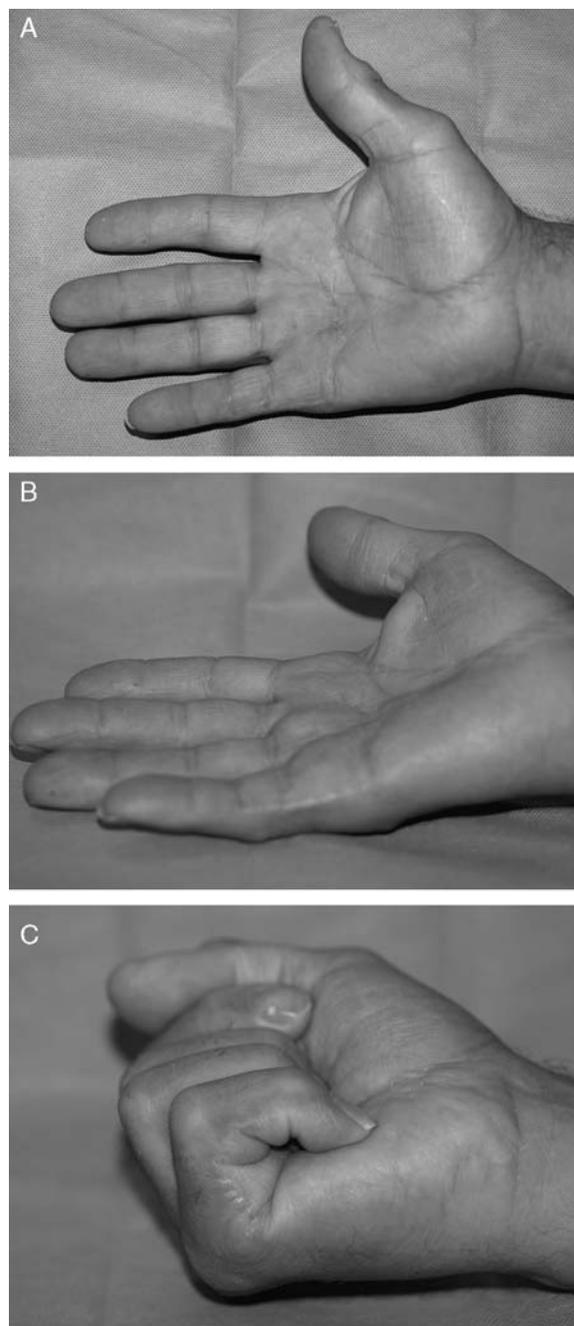


FIGURE 5. A–C, Two years postoperative views.

cases in which a 30-degree flexion defect remains, it is also necessary to release the check-rein ligaments of the palmar plate and the collateral ligaments of the proximal interphalangeal joint to improve the extension of the joint.^{15,16} The open wound in the palm reduces the risk of hematoma and edema, skin grafting is not required, there are no donor site scars, and the active mobilization of the hand is immediate with a more rapid restoration of hand function. In cases of fibromatosis involving the proximal palmar area and the metacarpophalangeal joint of the fourth finger, it is possible to extend the skin incision at the transverse crease in the palm,



FIGURE 6. A and B, A zigzag incision allows removal of the fibrous tissue in the proximal area of the palm. C, Intraoperative view. D–F, Two years postoperative result.

and in combination with a zigzag incision proximally, to remove the fibrous tissue at this level (Figs. 6A–F).

However, the Jacobsen technique presents some disadvantages. The patient must wear a dynamic splint for about 10 weeks and undergo physical therapy 3 times a week. Careful monitoring of the open wound in the palm is required to avoid infections and delayed healing, especially in patients with metabolic disorders. It is also noted that progressive flexion deformity of the distal interphalangeal joint may occur because of the shrinkage of the skin.¹⁷

REFERENCES

1. McCash CR. The open palm technique in Dupuytren’s contracture. *Br J Plast Surg.* 1964;17:271–280.
2. Lubahn JD. Dupuytren’s fasciectomy: open palm technique. In: Blair WF, Steyers CM, eds. *Techniques in Hand Surgery.* Baltimore, Philadelphia London: Williams & Wilkins; 1996:508–518.
3. Lubahn JD. Open-palm technique and soft-tissue coverage in Dupuytren’s disease. *Hand Clin.* 1999;15:127–136.
4. van Rijssen AL, Werker PM. Percutaneous needle fasciotomy in Dupuytren’s disease. *J Hand Surg Eur.* 2006;31B:498–501.
5. van Rijssen AL, Gerbrandy FS, Ter Linden H, et al. A comparison of the direct outcomes of percutaneous needle fasciotomy for Dupuytren’s disease: a 6-week follow-up study. *J Hand Surg Eur.* 2006;31:717.
6. Foucher G, Medina J, Malizos K. Percutaneous needle fasciotomy in Dupuytren disease. *Tech Hand Up Extrem Surg.* 2001;5:161–164.
7. Brotherton TM, Balakrishnan C, Milner RH, et al. Long-term follow up of dermofasciectomy for Dupuytren’s contracture. *Br J Plast Surg.* 1994;47:440–443.
8. Hall PN, Fitzgerald A, Sterne GD, et al. Skin replacement in Dupuytren’s disease. *Br J Hand Surg.* 1997;22B:193–197.
9. Abe Y, Rokkaku T, Kuniyoshi K, et al. Clinical results of dermofasciectomy for Dupuytren’s disease in Japanese patients. *J Hand Surg Eur.* 2007;32:407–410.

10. Tonkin MA, Burke FD, Varian JPW. Dupuytren's contracture: a comparative study of fasciectomy and dermofasciectomy in one hundred patients. *Br J Hand Surg.* 1984;9B:156-162.
11. Armstrong JR, Hurren JS, Logan AM. Dermofasciectomy in the management of Dupuytren's disease. *J Bone Joint Surg Br.* 2000;82:90-94.
12. Lubahn JD, Lister JD, Wolfe T. Fasciectomy and Dupuytren's disease: a comparison between the open-palm technique and wound closure. *Br J Hand Surg.* 1984;9A:53-58.
13. Jacobsen K, Holst Nielsen F. A modified Mc Cash operation for Dupuytren's contracture. *Scand J Plast Reconstr Surg.* 1977;11:231-233.
14. Tubiana R. La maladie de Dupuytren. In: Tubiana R. *Traité de chirurgie de la main.* Vol 6. France: Masson; 1998.
15. Watson HK, Light TR, Johnson S. Check rein resection for flexion contracture of the middle joints. *Br J Hand Surg.* 1979;4:67-71.
16. Beyermann K, Prommersberger KJ, Jacobs C, et al. Severe contracture of the proximal interphalangeal joint in Dupuytren's disease: does capsuloligamentous release improve outcome? *Br J Hand Surg.* 2004;29B:238-241.
17. Merle M. La maladie de Dupuytren. In: Merle M. *Chirurgie de la Main (Vol. 3): Affections Rhumatismales, Dégénératives. Syndromes Canalaires.* France: Elsevier Masson; 2007:245-308.