

THE “JACOBSEN FLAP” FOR THE TREATMENT OF STAGES III–IV DUPUYTREN’S DISEASE: A REVIEW OF 98 CASES

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The treatment of severe Dupuytren’s disease of the little finger is controversial: several techniques have been described with variable reported results and postoperative complications. This paper reviews 98 cases that underwent surgery between 2001 and 2006 using the Jacobsen flap procedure, a modification of the McCash technique. We found this technique relatively simple and it allowed significant correction of the contracture, with a low rate of complication. We believe this is an excellent alternative to dermofasciectomy or amputation.

Keywords: Jacobsen flap, Dupuytren’s contracture, severe flexion, little finger

There are several techniques of skin closure after the surgical treatment of Dupuytren’s disease. In advanced disease with severe contracture, primary closure is difficult because of the poor elasticity and contracted nature of the skin. In these cases, the McCash technique, which leaves the palm wound open (McCash, 1964), or a dermofasciectomy with full-thickness skin grafting is commonly used with variable rates of complications, recurrence and stiffness (Lubahn, 1999).

This retrospective study reports our experience of use of the Jacobsen flap (Jacobsen and Holst Nielsen, 1977), a modification of the McCash technique, in the treatment of advanced Dupuytren’s disease.

PATIENTS AND METHODS

From January 2001 to December 2006, 108 patients, 80 men and 28 women with advanced Dupuytren’s disease of the little finger, underwent the Jacobsen flap procedure in the Institut Européen de la Main de Nancy-France (Polyclinic Gentilly) et Luxembourg (Kirchberg Hospital). Their mean age was 63 years and 30 were workers (69 retired). Seventy patients were undergoing primary, and 38 revision surgery after a recurrence. Fifty-five fingers were in the right hand and 53 in the left. None had undergone previous Jacobsen flap surgery. The indication for the Jacobsen flap in all cases was a Dupuytren’s contracture in the palm and the little finger with skin shrinkage, stage III or IV (Fig 1), according to the Tubiana classification system (Tubiana, 1998), which is based on the total passive extension deficit of each ray (stage I: 0–45°; stage II: 45–90°; stage III: 90–135° and stage IV: 135–180°). Eighty fingers were at stage IV and 28 at stage III. After the surgery, all the patients were seen in the clinic at the “Institut Européen

de la Main” where the postoperative recovery physical therapy (3 sessions × 30 minutes/week, up to an average of 10 weeks with home exercises) was organised. The patients were visited 13 months after the surgery and a questionnaire was completed, which enquired about their satisfaction and hand mobility.

Procedural technique

The Jacobsen flap was performed as described by Jacobsen and Holst Nielsen (1977). After axillary block anaesthesia and the application of the tourniquet, a longitudinal incision was made in the ulnar midlateral line, running from the distal crease of the little finger to the distal flexor crease of the palm. A transverse incision was then made in the palm and an L-shaped full-thickness skin flap was raised with its blood supply based on the radial side of the palm. A selective fasciectomy was performed especially at the base of the finger, carefully protecting the neurovascular bundles. The finger was then straightened, which caused the flap to move distally, and the longitudinal arm of the L-shaped incision was closed, leaving a 15-mm skin defect open in the palm (Fig 2). In those cases in which the ring finger was also contracted, we prolonged the palmar transverse incision further across the palm and utilised a zig-zag incision in this finger. In some cases, release of the check-rein ligaments of the palmar plate and the collateral ligaments of the proximal interphalangeal joint improved the correction of the contracted finger. Two patients required an interphalangeal joint tenoarthrolysis.

The open wound in the palm was left to close spontaneously, leaving a linear scar within 3 to 5 weeks (Fig 3). A dynamic orthoplast splint was required for a mean of 10 weeks.

RESULTS

The patients were reviewed after a mean of 13 months. Two with stage IV disease had died and three did not participate further in the follow-up because of severe health problems. Two fingers were amputated because of significant vascular problems (see below). Three patients with stage III disease could not be traced. At the final review, 98 cases of 108 were examined and the measurements that had been taken preoperatively were repeated and the questionnaire was completed. The patients were divided into different groups according to the postoperative stage (Fig 4). Of the 73 patients who

had been in stage IV preoperatively, 34 were in stage 0, 22 in stage I, nine in stage II and six in stage III at follow-up. Two patients did not improve by the operation and were still in stage IV. Of the 25 patients with stage III disease pre-operatively, 14 were stage 0, five stage I, three stage II and three stage III at follow-up. Thus, 49% of 98 patients were in stage 0. Seventy-nine percent of the patients were satisfied with their outcome, thus judging the final result as "excellent" (38%) or "good" (44%). Nineteen percent, all of whom had had complications, considered their outcome "poor".

Complications

Digital nerve and artery injuries occurred in two and one case, respectively. The nerves were repaired with 9-0 nylon sutures and the artery with 10-0 nylon. Marginal necrosis of the flap occurred in one case and was treated with an escharectomy. There were no haematomas or infections.

Twelve patients (seven men, five women) had a recurrence and eight of them underwent further surgery using the same technique. In six, there were no further recurrences during the follow-up period. In the other two patients (stage IV pre-operatively), poor circulation occurred, probably due to excessive tension on the digital neurovascular bundles and little finger amputation was required.

Ten patients (six men and four women) developed complex regional pain syndrome, which was treated with analgesics and physical therapy for a mean of 3 months with complete remission.



Fig 1 Stage IV Dupuytren's disease of the little finger in a 67 year-old man.

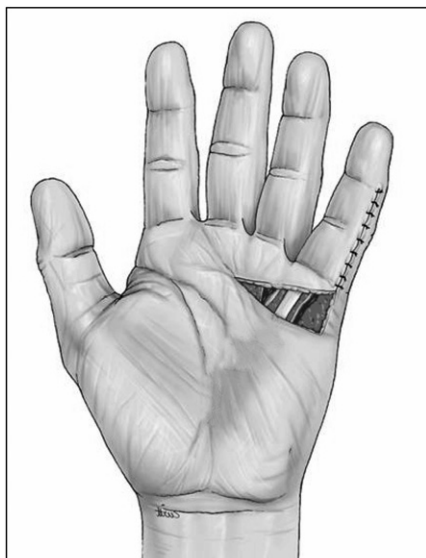


Fig 2 The "Jacobsen flap". The L-shaped full-thickness flap is created using two incisions: the first in the ulnar midlateral line of the little finger and the second is across the palm, in the distal crease.

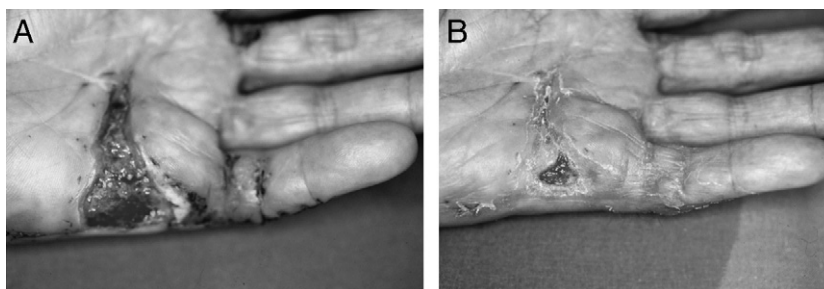


Fig 3 Postoperative view of the "Jacobsen flap"; (A) after 2 weeks and (B) after 5 weeks.

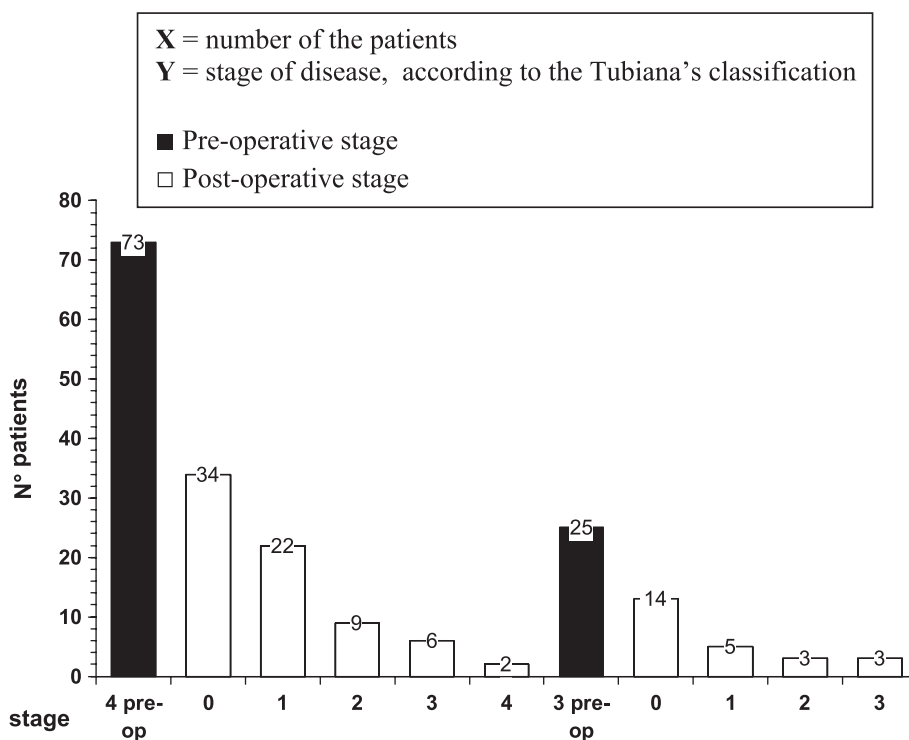


Fig 4 Pre- and postoperative assessment of the patients by the Tubiana classification.

DISCUSSION

Skin closure with Brunner zig-zag incisions, V-Y plasties or Z-plasty closure of a longitudinal midline finger incision can generally only be performed with stages I and II Dupuytren's contracture. In stages III and IV disease, which is characterised by contracture of the palmar and finger skin, use of these techniques of closure is associated with a high risk of oedema, marginal necrosis and wound breakdown.

Dermofasciectomy, using a full-thickness skin graft, is used in cases of recurrences with significant skin involvement (Hall et al., 1997). Although clinical studies show good long-term results with respect to graft take

and extension gain of the fingers (Abe et al., 2007; Brotherston et al., 1994), with a lower rate of recurrence than found with skin preserving surgery (Armstrong et al., 2000), there are potential disadvantages to this procedure. These include haematoma formation, graft failure and stiffness, as a result of immobilisation of the hand during the grafting procedure.

The McCash technique leaves the palmar wound open and avoids skin suture under tension. This ensures a good blood supply to the wound margin (Lubahn et al., 1984). This technique is generally used in conjunction with skin closing techniques in the digits (Lubahn, 1999). The Jacobsen flap, which is a modification of the McCash technique, allows the surgeon to expose the

disease in both the palm and the fingers using only two linear incisions. The contracted skin is stretched, achieving full extension of the joints, in most cases. Sometimes it is also necessary to release the check-rein ligaments of the palmar plate and the collateral ligaments of the proximal interphalangeal joint to adequately straighten the finger (Watson et al., 1979), although a recent study (Beyermann et al., 2004) found no difference between the outcomes obtained in fingers that required a capsular release in addition to fasciectomy and those that were corrected with fasciectomy alone. The Total Anterior Teno-Arthrolisis (TATA) procedure is only occasionally necessary (Loréa et al., 2007; Saffar and Rongeval, 1978).

The advantages of the Jacobsen flap are clear. The open wound in the palm reduces the risk of haematoma and oedema and skin grafting is not necessary, such that there are no donor site scars and immediate active mobilisation of the hand can occur, which will reduce oedema formation and hasten restoration of hand movement.

However, the Jacobsen technique is not without problems. The need to wear a dynamic orthoplast splint for about 10 weeks, and to undergo the physical therapy three times a week must be accepted by the patient. The open wound in the palm could become infected and should be carefully monitored, especially in patients with metabolic diseases such as diabetes. Necrosis can occur at the angle of the L-shaped flap and, if the ring finger is also affected, then a zig-zag or a Bruner incision is required in this digit. Finally, the distal interphalangeal joint can develop a progressive flexion deformity due to the shrinkage of the skin (Merle, 2007).

References

Abe Y, Rokkaku T, Kuniyoshi K, Matsudo T, Yamada T (2007). Clinical results of dermofasciectomy for Dupuytren's disease in Japanese patients. *Journal of Hand Surgery*, 32E: 407–410.

- Armstrong JR, Hurren JS, Logan AM (2000). Dermofasciectomy in the management of Dupuytren's disease. *The Journal of Bone and Joint Surgery*, 82B: 90–94.
- Beyermann K, Prommersberger KJ, Jacobs C, Lanz UB (2004). Severe contracture of the proximal interphalangeal joint in Dupuytren's disease: does capsuloligamentous release improve outcome? *Journal of Hand Surgery*, 29B: 238–241.
- Brotherston TM, Balakrishnan C, Milner RH, Brown HG (1994). Long-term follow up of dermofasciectomy for Dupuytren's contracture. *British Journal of Plastic Surgery*, 47: 440–443.
- Hall PN, Fitzgerald A, Sterne GD, Logan AM (1997). Skin replacement in Dupuytren's disease. *Journal of Hand Surgery*, 22B: 193–197.
- Jacobsen K, Holst Nielsen F (1977). A modified Mc Cash operation for Dupuytren's contracture. *Scandinavian Journal of Plastic and Reconstructive Surgery*, 11: 231–233.
- Loréa P, Medina Henriquez J, Navarro R, Legaillard P, Foucher G (2007). Anterior tenoarthrolysis for severe flexion contracture of the fingers (the "Tata" operation): a review of 50 cases. *Journal of Hand Surgery*, 32E: 224–229.
- Lubahn JD (1999). Open-palm technique and soft-tissue coverage in Dupuytren's disease. *Hand Clinics*, 15: 127–136.
- Lubahn JD, Lister JD, Wolfe T (1984). Fasciectomy and Dupuytren's disease: a comparison between the open-palm technique and wound closure. *Journal of Hand Surgery*, 9A: 53–58.
- McCash CR (1964). The open palm technique in Dupuytren's contracture. *British Journal of Plastic Surgery*, 17: 271–280.
- Merle M. La maladie de Dupuytren. In: Merle M (Ed). *Chirurgie de la main: Affections rhumatismales, dégénératives, Syndromes canaux, Elsevier Masson, France, 2007, Vol. 3: 245–308.*
- Saffar P, Rongeval JP (1978). La ténoarthrolyse totale antérieure. *Annales de Chirurgie*, 32: 579–582.
- Tubiana R. La maladie de Dupuytren. In: Tubiana R (Ed). *Traité de chirurgie de la main, France, Masson, 1998, Vol. 6.*
- Watson HK, Light TR, Johnson S (1979). Check rein resection for flexion contracture of the middle joints. *Journal of Hand Surgery*, 4A: 67–71.

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