



## Fasciectomy and conservative full thickness skin grafting in Dupuytren's contracture. The fish technique

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We reviewed 79 patients with a total of 100 digits affected by Dupuytren's disease, who were treated surgically in our institution between 1990 and 1998. The mean follow-up was 4.4 years with a range of 2 to 10 years. Only patients with PIP joint deformity of more than 30 degrees were included in the study. All patients had radical excision of diseased fascia tissue to the mid axial line and application of a full thickness skin graft over the proximal phalanx without any skin excision. Twenty two rays had two-stage operations involving percutaneous fasciotomy and application of S-Quattro followed by the definitive procedure after an interval of 6-8 weeks. Patients were clinically assessed for recurrence, extension of disease, 2-point discrimination, finger sensation, graft or donor site problem and patient satisfaction. Seven fingers had recurrent disease, none of which crossed the graft. The present study shows that radical excision of Dupuytren's tissue with full thickness graft without excision of involved skin as a primary procedure reduces recurrence. These results are comparable to those for dermofasciectomy, as reported in previous series.

**Keywords :** Dupuytren contracture ; severe deformity ; primary excision ; skin grafting, outcome.

### INTRODUCTION

The role of the skin as a primary cause in Dupuytren's disease is controversial. MacCallum and Hueston (11) and Gabbiani and Manjo (5) had

proposed that Dupuytren's disease begins as a nodule in the fibro-fatty tissue between the fascia and skin and secondarily affects these tissues. This has been supported by the work of Hoopes *et al* (8) which established different enzymatic activities in the dermis overlying Dupuytren's nodules and bands compared to the normal overlying skin. Various studies in the literature have demonstrated minimal or no recurrence following dermofasciectomy and skin graft supporting this theory.

The rate of recurrence following extensive fasciectomy may be as high as 50% (6). The recurrence after fasciectomy can be reduced by excising the affected skin along with the Dupuytren's tissue and replacing it with a full thickness skin graft. The possible explanation is the experimental work of Rudolph (13) who demonstrated inhibition of myofibroblasts by full thickness grafts in a rat model. Brotherston *et al* (1) showed that a skin graft

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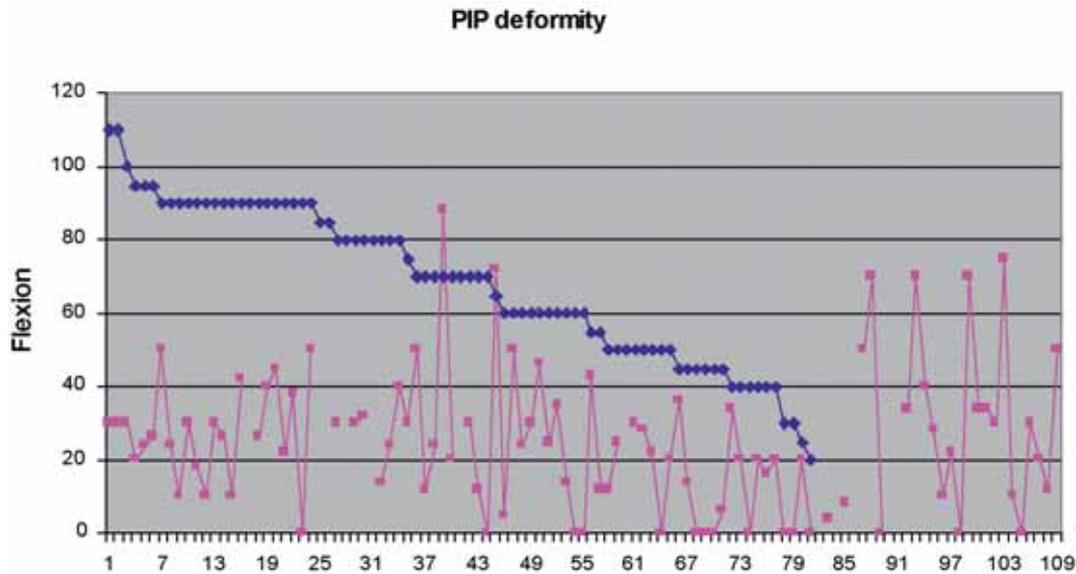


Fig. 1. — Pre and post operative PIP deformity

extending from the distal palmar crease to the DIP joint would significantly reduce the risk of recurrent Dupuytren's disease in the potential risk area.

Disadvantages of dermofasciectomy and skin grafting include increased operating times and the potential risk of loss of the graft. Cosmetic problems include hairy graft, hypoaesthesia of the area, additional scar formation and colour mismatch. The present study was set up to review the results of full thickness skin grafting following excision of Dupuytren's tissue without excising the skin.

#### MATERIAL AND METHODS

Patients operated on between 1990 and 1998 were recalled to research clinic. Only patients with PIP joint contracture  $> 30$  degrees (fig 2) were included in this study. Patients with flexion deformity of the PIP joint  $> 80^\circ$  had two stage procedures with application of S-Quattro, an external fixator devised by Fahmy for the hand, made of K-wires and serpentine spring wires to achieve distraction (4), and percutaneous fasciotomy as a first stage with definitive surgery performed after an interval of 6-8 weeks. Revision fasciectomy cases were not included in this series. All operations were performed either by the senior author or under his direct supervision. Fingers were exposed via Bruner's zigzag incision. All fingers underwent radical excision of

Dupuytren's and fibro fatty tissue, denuding the flexor sheath and the neurovascular bundles up to the mid-axial lines extending to the DIP joint (fig 3). Following excision of the tissue, the finger was held in the achievable corrected position and the skin margins were sutured. This normally left an elliptical (Fish shaped) skin defect over the proximal phalanx. An elliptical full thickness graft was harvested from the volar aspect of the wrist (fig 4) and sutured to the defect (fig 5). Dressing and sutures were removed at 2 weeks and a removable finger splint was applied.

Patients and records were assessed for the following criteria :

- Original deformity, correction achieved at operation and present status.
- Assessment of deformity - recurrence, skin tightness, scarring or joint stiffness and extension of disease.
- Post operative complications.
- Static 2-point discrimination and finger tip sensation.
- Sensitivity of the affected finger to cold.
- Patient satisfaction.
- Any graft or donor site problem.

#### RESULTS

Seventy nine patients were reviewed, with a total of 100 fingers operated upon. The mean age of the patients was 74 years. Forty eight patients were



*Fig. 2.* — Fixed flexion deformity of  $> 30^\circ$  of the little finger



*Fig. 4.* — Graft being harvested



*Fig. 3.* — Radical soft tissue excision



*Fig. 5.* — Graft on recipient site

manual workers, twenty-one were office workers and the rest were either housewives or retired. Thirty six patients had a positive family history of Dupuytren's disease and 58 patients had bilateral involvement. Garrod's pads were noted in 17 cases (16 male and 1 female) and 4 patients had plantar nodules. Three of the patients suffered from diabetes mellitus. Single ray fasciectomy was routinely performed. The little finger was the finger most commonly operated upon (table I). Average duration of follow-up was 4.4 years, ranging from 2 to 10 years. Twenty two fingers had a 2-stage procedure for severe deformity. Average pre operative deformity at the PIP joint was 70 degrees (30-



*Fig. 6.* — After 3 months

Table I. — Distribution of affected fingers

	Thumb	Index	Middle	Ring	Little
Right	1		1	31	34
Left		1	5	13	37

110 degrees). This was partly due to long waiting list times. Full correction could not be achieved at the time of operation for 9 of the operated fingers.

At review no patient had contracture of the MCP joint. Mean fixed flexion deformity at the PIP joint was 26 degrees (from 0 to 90) (fig 1). Six patients had flexion deformity > 60 degrees. Most of the cases of fixed deformity were due to joint stiffness and scarring. We found 7 cases of recurrence : 5 proximal to the graft in the operated area, stopping at the graft, and 2 cases crossing lateral to the skin graft. There were no cases of bands crossing underneath the graft. Skin tightness was noted in 10 cases, leading to incomplete correction of the deformity. Further progression of the disease process, outside the operated area, was noted in 30 hands. One patient had necrosis of the skin margin.

Thirty one patients reported sensitivity to cold. Sharp touch was reduced in 15 cases and blunt touch in 16 cases compared to the adjacent finger. Static 2-point discrimination was decreased in 22 fingers. This is partly due to the extent of the dissection to remove all pathologic tissue and denuding the neurovascular bundle from the metacarpophalangeal (MCP) to the distal interphalangeal (DIP) joint. Two patients complained of sensitivity, and one patient reported itching at the donor site. None of our patients complained of the cosmetic appearance of the scar on the wrist, which over time mimicked an additional wrist crease. Fifty six patients were fully satisfied with their operation with 16 having some reservations. Sixty six patients would recommend this operation to others with similar problems.

## DISCUSSION

The indications for skin replacement in Dupuytren's surgeries are : skin devitalisation

during surgery, skin deficiency following correction of fixed flexion deformity, recurrent contracture and as a primary surgery in young patients with Dupuytren's diathesis. However, it is not very popular amongst surgeons because of the dissection involved, longer convalescence and potential risk of loss of graft. Other disadvantages are hairy graft, additional scar at the donor site and colour mismatch.

Various studies (1, 14) have demonstrated its advantage in preventing recurrence, thus avoiding revision surgery which may put the neurovascular bundle and skin flaps at risk. Primary closure of the wound following fasciectomy with severe deformities involves either multiple Z-plasties or closure in a flexed position. This may compromise the advantage of the correction achieved and may prolong physiotherapy to stretch out the tight skin. Several studies have demonstrated that fasciectomy gives good long-term correction to the MCP joint, but long-term correction is not maintained in cases of deformity of the PIP joint (3). MacFarlane (12) has shown that full thickness skin grafts give the best results in treating PIP joint contracture in Dupuytren's disease. Reducing the incidence of recurrence by skin graft and radical excision should be the goal in the first instance. The technique used in our study addresses longitudinal skin shortage following primary closure of the wound. The advantage of harvesting graft from the volar aspect of the wrist includes better colour matching, and the scar is eventually hidden in the wrist crease. Available skin from the wrist crease can be used to cover two finger defects (fig 4). Furthermore the surgery can be completed under the same tourniquet control. The scar stretches out with time and skin from the wrist crease can be harvested for future surgery.

MacCallum and Hueston (11) described dermofasciectomy following excision of Dupuytren's contracture and coined the term "firebreak graft". Rudolph (13) demonstrated inhibition of myofibroblast activity under full thickness graft in a rat model. People with diathesis have a very high chance of recurrence following fasciectomy. As a result, dermofasciectomy has increased in popularity for revision surgery and for patients with

Table II. — Recurrence rates

Author	Cases	Follow-up (months)	Recurrence
Tonkin <i>et al</i> (14)	41	37.7	3
Logan <i>et al</i> (10)	15	24	1
Brotherston <i>et al</i> (1)	34	100	0
Hall <i>et al</i> (7)	90	48.4	6
Present study	100	52	7

diathesis, and the results have been encouraging. Ketchum (9) recommends the use of a full thickness graft to decrease the incidence of recurrences, haematomas, infection and necrotic skin flaps. Hall *et al* (7) had reported recurrence rates of 8%, whereas Varian and Hueston (15) had reported two recurrences behind the neurovascular bundle. Following reports of cases of recurrence behind the neurovascular bundle in patients where full thickness graft was applied, Hall *et al* (7) recommended excision of all potentially affected tissue, denuding the flexor sheath and the neurovascular bundle and extending the graft to the mid axial line. The present series shows a similar recurrence rate compared to previous series, which have undergone dermofasciectomy (table II).

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