CONSERVATIVE SURGERY FOR DUPUYTREN'S CONTRACTURE

A. J. THURSTON

From Wellington Clinical School of Medicine, Wellington, New Zealand

The trend towards conservativism in the management of Dupuytren's contracture has resulted in less radical surgery than was previously advocated to release disabling contractures of the fingers.

38 cases of Dupuytren's contracture in the palm have been treated by Z-plasty of skin and underlying contracted band without fasciectomy. Proximal interphalangeal joint contractures were treated by fasciectomy and skin closure with Z-plasties as required. Only one of 16 patients reviewed after two years had evidence of recurrence.

Skin compliance has been measured and a return to near-normal levels was found in all but the one patient with a recurrence.

Contracture of the palmar aponeurosis producing flexion of the fingers is a disease to which the name of Baron Guillaume Dupuytren is attached. He described the appearance and clinical history of contractures of the ring and adjacent fingers of both hands in a coachman named Jean Joseph Demarteau. A post-mortem examination of such a hand revealed to Dupuytren that the source of the contraction was the palmar aponeurosis and simple division of the contracted band corrected the deformity (Hutchison, 1917; Verheyden, 1983). However, Dupuytren was not the first to recognise this disease or to describe it.

An early description of a possible 'Dupuytren's' contracture was by Felix Platter (according to Verheyden, 1983). Platter was born in Switzerland in 1536 and in his “Observationum” published in 1614, described a contraction of the little finger in a stonemason's hand. Platter thought that it was a contracted tendon which is interesting because in “De Corpusis Humani” he had already indicated a distinction between tendons and palmar fascia (Verheyden, 1983).

An accurate description of the disease with an account of its treatment was provided, in 1808, by Henry Cline of St. Thomas's Hospital London. He described the contraction and thickening of the tendinous columns of the palmar aponeurosis thus bending the fingers into the palm. He repeated “The treatment is easy and efficacious; it consists in cutting through the aponeurosis with a common knife” (Windsor, 1834).

In Sir Astley Cooper's account of the disease in 1822, he stated that “When the digital thecae are contracted, nothing should be attempted for the patient's relief, as no operation or other means will succeed; but when the aponeurosis is the cause of the contraction, and the contracted band is narrow, it may with advantage be divided by a pointed bistoury”.

Hueston (1965), in an Hunterian lecture entitled “Dupuytren's Contracture: The Trend of Conservatism” pointed out that the rationale of radical fasciectomy was based on the palmar aponeurosis being the sole origin of the condition. Since then much has been written supporting the technique of limited fasciectomy, with many authors advocating limited local fasciectomy in the palm which almost always corrects the metacarpophalangeal joint contracture and a more extensive, subtotal fasciectomy in the finger in an attempt to correct the proximal interphalangeal joint and the occasional distal interphalangeal joint contracture. Tubiana (1964) supported fasciectomy in the fingers but suggested either the use of Luck's nodulectomy in the palm to remove active tissue of the use of fasciotomy. Lengthening of the skin by Z-plasties was described by McGregor, 1958.

The role of fasciotomy was summed up by an editorial in the British Medical Journal in 1976: "fasciotomy is for severely contracted bands in the palms or fingers of old debilitated patients given that there will be slowly progressive recurrence of the contracture".

Hueston (1984) concurs with this policy and advocates open fasciotomy for the senile type. Kelly (1954), Rodrigo (1976), Urbanski (1982), Colville (1983), Moermans (1984), Rowley (1984) suggest that the results of fasciotomy can be entirely satisfactory in selected cases and that the indications for fasciotomy are somewhat wider than initially thought. But all agree that a significant number will recur.

Method and Surgical Technique
All patients presenting to the author's clinic with Dupuytren's contracture of the palm were considered for Z-plastic release. The most suitable cases were those...
patients with a discrete contracted band in the palm. Patients with adjacent rays involved were considered, although the procedure is technically more difficult in these cases. Contraindications for the technique included:

1. Plaque-like Dupuytren’s contracture.
2. Significant natatory band contracture.
3. “Dupuytren’s diathesis”.

Under either regional or general anaesthesia and in a bloodless field, the line of the contracture was marked in the palm in the region of the distal palmar crease. The flaps of the Z-plasty were then designed and these flaps were raised (Figures 1a and 1b) including skin, subcutaneous tissues and fibrotic band — half the band ran in one flap and half in the other. In raising these flaps, it was necessary in some cases to dissect under the bases of the flaps in order to identify the neurovascular bundles to ensure that these are not damaged. The flaps were then transposed and sutured into position (Figure 1c) and a padded dressing applied. No diseased fascia was excised: it was just moved, together with the overlying attached skin.
To release a centrally placed band over the proximal phalanx, a second Z-plasty over the skin crease at the base of the finger was employed (Figure 2). However, since the normal bands of the palmar aponeurosis pass to the sides of the proximal phalanges, the contracted bands frequently pass to one or other sides of the proximal phalanx as well making this Z-plasty technique technically difficult and inappropriate in this situation. In such cases, a Z-plasty in the palm at the level of the distal palmar crease was combined with a fasciectomy in the finger. A contracture of the proximal interphalangeal joint was managed by fasciotomy with or without a Z-plasty in the palm.

Where adjacent rays are involved, Z-plasties in parallel are possible but they are technically difficult and are limited by the transverse tension that is placed on the palmar skin. The alternative is to correct one finger at a time, allowing a period for healing between correcting successive fingers.

The day after surgery, the patient was referred to the Physiotherapy Department where the dressing was taken down and the hand was exercised in Centistoke* 20 silicone oil under the supervision of a physiotherapist.

* A measure of viscosity; Centistoke 1 having a viscosity equivalent to that of water.
Another dressing was then applied. This programme was repeated daily until the wounds had healed. The sutures were removed on the tenth day after operation. The patient continued to see the physiotherapist until full flexion had been restored (Figure 3). Patients were reviewed at three months, six months, and a year after the operation and then yearly.

Non-invasive in vivo measurement of skin compliance was achieved by a Schioetz tonometer (Figure 4), as used for glaucoma. Compliance of normal skin, diseased skin and skin over Dupuytren's tissue treated by Z-plasty was measured. This method was found to be sufficiently accurate to detect the change in the stiffness of the skin following surgery for Dupuytren's Contracture.

Results
38 hands have been treated by Z-plasty at the level of the distal palmar crease with or without a second Z-plasty at the level of the crease at the base of the finger. In all cases, the contracture of the metacarpophalangeal joint was corrected. One patient developed a superficial infection in the basal digital crease which settled with antibiotics. There were no neurovascular complications and no instance of flap necrosis. The mean time to healing was 15 days.

16 patients were reviewed after two years. At this review, only one patient had a recurrence in the operation site. This patient also had recurrence in his other hand and in his foot, both of which had been treated by limited fasciectomy.

Results of the change in skin compliance after Z-plasty are shown in Figure 5. These show that the non-compliant skin overlying Dupuytren's tissue softens after the contracture is released and the tissues have had time to mature, so that its compliance approaches that of normal skin.

Discussion
The use of the Z-plasty in the relief of linear contractures has been recognised and practised for many years. Its use in the hand and the modifications of the technique for the hand were well described by McGregor (1967). The technique is based on the transposition of triangular flaps to produce lengthening along the axis of the contracture. The optimum angle for the greatest lengthening in the axis of contracture, without producing excessive transverse tensions, is 60°. This gives a theoretical increase in the length of 73.2% and a similar amount of shortening along the axis at right angles to the original contracture.

The relevance of this to hand surgery lies in the fact that palmar skin differs from skin elsewhere, in that it exhibits a marked lack of elasticity and has firm
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attachments to the deep fascia. When Z-plasty is used in other parts of the body a good index of design and execution is that, once cut, the flaps should almost fall into their transposed position. However, in the palm, with its inelastic skin, this is seldom true. This reluctance to move is coupled with the fact that there is very little skin to spare in the palm and even less in the fingers. The use of the multiple Z-plasty, which achieves adequate lengthening without the shortening in the transverse axis occurring all in the one place, is well documented in the management of Dupuytren's contracture (McGregor, 1967).

![Skin Compliance Graph](image)

Fig. 5 Results of measurement of skin compliance showing a return to near normal values after Z-plasty without fasciectomy. Patient number seven (arrowed) suffered a recurrence.

The surgical treatment of Dupuytren's contracture, not by excision of the Dupuytren's tissue and Z-plasty of the skin, but by a Z-plastic release of all contracted tissue achieves three objectives:

1. Release of the contracture and correction of the deformity.
2. A physical break in the line of the contracted tissue, so that scar tissue does not form in a straight line between the divided ends and thus restore the line of tension.
3. Release of tension on the band which breaks the theoretical cycle of stress-microrupture-fibrosis-contracture.

The use of fasciotomy alone is a well recognised technique but it suffers from a high incidence of recurrence. Rodrigo (1976) has suggested that the metacarpophalangeal joint contracture recurs over a year after fasciotomy and in Richards' series (1954) all recurrences after limited fasciectomy were evident before 18 months. The finding of only one recurrence in our series after two years probably represents a favourable result and illustrates the advantage of this technique over simple fasciotomy. The incidence of complications with fasciectomy is high. Hueston (1961) reported a 15% incidence of flap necrosis with the longitudinal incision which is closed by multiple Z-plasties. Gelberman (1982) reported a 12% incidence of flap necrosis using the zig-zag (Bruner, 1967) incision. There were no instances of flap necrosis in our series, which is thought to be due to the thickness of the flaps which maintain an intact blood supply. The incidence of flap necrosis when using the McCash (1964) technique is as low as 5% (Noble and Harrison, 1976). However, the complication of digital nerve laceration is high with the McCash technique, a 10% incidence being reported by Tubiana (1967). There were no digital nerve lacerations in our series because the neurovascular bundles are easily visualised in the base of the wound and the operation does not involve difficult dissection under a bridge of skin as in the McCash technique.

The most fascinating aspect of this Z-plasty technique is the way in which the contracted band softens with time. The results of the measurement of skin compliance show a striking reduction in the stiffness of the skin associated with softening of the underlying Dupuytren's cord. Watson (1984) reported the use of the same technique in nine patients and found that the firmness of the contracture appeared to melt away post-operatively. His follow-up was from 2.4 years to 5.5 years and re-operation had not been necessary in any of the nine.

The technique of Z-plastic release of Dupuytren's contracture without fasciectomy commends itself because of its simplicity, reduced morbidity and safety, which make it suitable for the occasional operator. In addition, operating time is reduced to about fifteen minutes compared with an hour to an hour and a half for a fasciectomy and multiple Z-plasties.

This method is simple, safe and appropriate for the discrete band contracture in the palm. It obviates the need for extensive dissection of the palm and it does not preclude combination with other procedures to release contracted proximal interphalangeal joints.

References


D. T. GAULT


