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Needle aponeurotomy for Dupuytren's contracture

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ABSTRACT

Purpose. To review the efficacy and safety of needle aponeurotomy for Dupuytren's contracture in Chinese patients.
Methods. Seven men and one woman aged 50 to 80 (mean, 67) years underwent needle aponeurotomy for Dupuytren's contracture. Five were manual workers and the other 3 were retired. Their chief complaints were difficulty moving the fingers, clumsiness of the hand, and occasional pain in the palm. No patient had any family history of Dupuytren's contracture.
Results. 41 points were released in 13 fingers (3 middle, 3 ring, and 7 little). Immediately after release, the respective mean flexion contracture correction of the metacarpophalangeal and proximal interphalangeal joints were 50 (from 50 to 0) and 35 (from 46 to 11) degrees. At 22-month follow-up, the respective mean residual flexion contracture of both joints were 12 and 27 degrees; the corresponding long-term improvements were 70 and 41%. No patient had a wound complication or neurovascular injury. All had a normal score for Disabilities of the Arm, Shoulder, and Hand.
Conclusion. For Chinese patients with Dupuytren's contracture, needle aponeurotomy is safe and effective. Long-term correction is better maintained in metacarpophalangeal than proximal interphalangeal joints (70 vs 41%).

Key words: *Dupuytren's contracture; hand; surgical procedures, minimally invasive*

INTRODUCTION

Dupuytren's contracture is uncommon among Chinese. Although it is usually not painful, advanced Dupuytren's contracture restricts finger movements. Surgical excision of the contracture cords risks wound breakdown, delayed wound healing, nerve damage, and recurrence.[1–4] Percutaneous aponeurotomy is more effective and has fewer complications; its latest modification is needle aponeurotomy, which entails dividing the cords percutaneously with a fine needle.[5,6] Compared to conventional surgery, this out-patient procedure confers shorter recovery times and lower complication rates, and may be repeated for recurrences. We reviewed 8 Chinese patients who underwent needle aponeurotomy for Dupuytren's contracture.

MATERIALS AND METHODS

Between 2002 and 2005, 7 men and one woman aged 50 to 80 (mean, 67) years underwent needle aponeurotomy for Dupuytren's contracture. Five were manual workers and the other 3 were retired.

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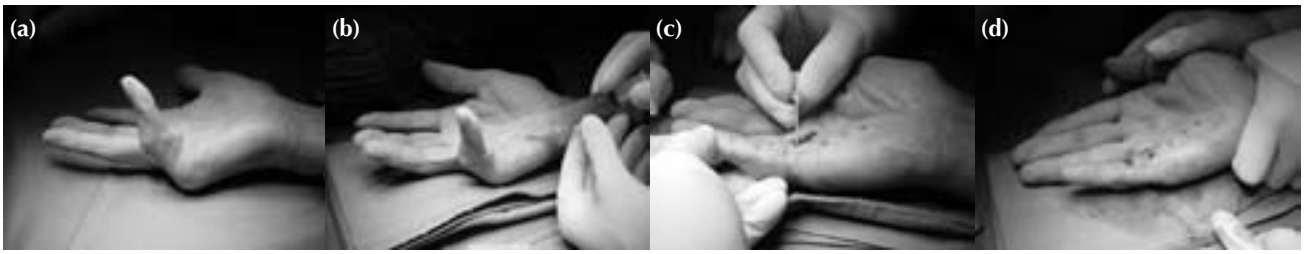

Figure **(a)** Dupuytren's contracture of the little finger in a 67-year-old man involving predominantly the metacarpophalangeal joint. **(b)** Local anaesthetic is injected to points of release. **(c)** The needle is inserted percutaneously, with the cord put under tension. **(d)** The finger regains near full extension after release at 2 points.

Their chief complaints were difficulty moving the fingers, clumsiness of the hand, and occasional pain in the palm. No patient had any family history of Dupuytren's contracture.

Technique

Needle aponeurotomy was carried out under local anaesthesia without a tourniquet, and involved a 23G hypodermic needle (Fig.).[7] The cord was palpated under tension and puncture-release sites were chosen, usually on the palm and the proximal phalanx, but the flexure crease over the proximal interphalangeal joint (PIPJ) was avoided. A small amount of lignocaine 1% without adrenaline was injected at each site. The needle was carefully inserted through the same injection puncture, with the bevel orientated longitudinally. After skin penetration, the needle was rotated so that the sharp bevel edge was perpendicular. With the cord put under tension, the needle was stroked a few times to a depth of a few millimetres, and angulated sideways in a small divergent angle to cut fibres on the sides, and then swiped transversely. Care was taken to avoid injuring neurovascular bundles and lancinating the skin near the edge of the insertion. During needle puncture, the cord was put under tension by passive extension of the finger, and breakage of fibres was felt with the needle. It was not necessary to achieve the maximal release with a single puncture. Other punctures were applied in a similar manner along the cord. After release, the finger was kept in extension by splintage. The first dressing change was at postoperative days 3 to 7, when active mobilisation was started. Splintage was continued for 8 to 12 weeks depending on individual needs.

RESULTS

41 points were released in 13 fingers (3 middle, 3 ring, and 7 little). The amount of local anaesthetic (lignocaine 1%) used ranged from 0.3 to 1.5 ml per patient. The mean operating time was 20 (5–45) minutes. All patients were discharged on the same day and none required regular postoperative analgesia.

There were 11 (27%) points of skin breach; all wounds healed within 2 weeks with no infection. The mean distance between points was 3 to 4 mm. No finger sustained neurovascular injury nor any procedure repeated. The mean follow-up duration was 22 (range, 3–45) months.

Immediately after release, the mean flexion contracture correction of the metacarpophalangeal joints (MCPJs) was 50º (improving from 50º [range, 30º–90º] to 0º [range, 0º–5º]), with a 100% improvement. At the 22-month follow-up, the mean residual flexion contracture of the MCPJs was 12º (range, 0º–45º), with a 70% long-term improvement.

For PIPJs, the mean immediate flexion contracture correction was 35º (from 46º [range, 30º–70º] to 11º [range, 0º–30º]), with a 76% improvement. At 22-month follow-up, the mean residual flexion contracture was 27º (range, 0º–75º), with a 41% long-term improvement.

The mean grip strength on the operated hand was 27.8 kg (27 kg on the opposite hand). All patients had a score for Disabilities of the Arm, Shoulder, and Hand within normal limits. The mean patient satisfaction grade was 80 (range, 40–100; full score, 100). The compliance with splintage was poor.

DISCUSSION

Conventional surgeries for Dupuytren's contracture carry a higher risk of complications,[1] with recurrence rates of 34 to 66% after limited local excision,[2,3] or 11.6% after extensive excision of the entire palmar aponeurosis.[4] Needle aponeurotomy, first introduced by a French rheumatologist,[5,6] is less invasive and more acceptable to patients. It releases the contracted cords by cutting the fibres with a needle inserted

percutaneously. Careful consideration of the patho-anatomy of the abnormal cords and sites of release is essential for avoiding injury to the neurovascular structures. For cords proximal to the MCPJs, it is safer to release the deeper part of the cord first. For cords distal to the MCPJs, caution is necessary, because the thickened spiral cord tends to loop the digital neurovascular bundle towards the midline and becomes very superficial and prone to injury. For cords in the proximal phalanx, the needle should be inserted laterally, just beneath the cord so as to release only its deep portion. The superficial part is left untouched and is broken by traction to avoid neurovascular injury.

The amount of lignocaine injected was minimised in order to preserve sensory perception via the digital nerve during the procedure. Irritation of the nerve by the needle can be noted by the patient and therefore helps to avoid injury. By asking the patient to flex the fingers from time to time (while ensuring that the needle did not move with the movement), it enabled the integrity of the flexor tendons to be checked.

In a prospective series of 211 patients treated with needle aponeurotomy, the mean gain in extension was 76% (79% in the MCPJs and 65% in the PIPJs); there was only one digital nerve injury and no other complication.[8] Of 90 patients (123 hands) followed up over 5 years, results were good or excellent in 81% in the short term and 69% after 5 years; the recurrence rate was 50%, skin breakage rate 16%, and the nerve injury and wound infection rates 3% each.[5] Among 3736 procedures performed in 992 hands, 81% achieved good results (>70% correction), with complication rates of 3.7 to 8.9%, and 2 instances of tendon rupture.[6] Of 82 patients with 10-year follow-up after percutaneous fasciotomy, two thirds underwent a second release within 5 years.[9] At 3.2-year follow-up, a recurrence rate of 58%, disease 'activity' of 69%, and re-operation rate of 24% were reported.[8] Up to half of the patients experience a gradual recurrence, and most undergo second release after 5 years. At 22-month follow-up, our patients had a reduction in the gain in extension, but no repeat procedure had been performed for any recurrence. Had our patients used an extension splint regularly, the improvement may have been better maintained. Whether a repeat needle aponeurotomy for recurrence is associated with any major complication is unknown.

Adherence to the guideline on needle aponeurotomy[10] is expected to provide safe and at least short-term improvement for patients with Dupuytren's contracture, despite a recurrence rate of 50% around 3 to 5 years. Patients with less severe disease or predominantly MCPJ contracture appear to benefit most, with a complication rate of not exceeding 1%. Although needle aponeurotomy has a higher long-term recurrence rate than conventional techniques, it can be safely repeated and confers less morbidity and faster recovery. Therefore, the guideline states that "current evidence on the safety and efficacy of needle fasciotomy (aponeurotomy) appears adequate to support the use of the procedure."[10] It is important that the surgeons are thoroughly familiar with the patho-anatomy of Dupuytren's contracture and experienced with open excision. Patients should be selected and examined carefully, and the points for release meticulously calculated.

CONCLUSION

Our preliminary experience shows that needle aponeurotomy is reliable and effective for Chinese patients with Dupuytren's contracture. Long-term correction is better maintained in metacarpophalangeal than proximal interphalangeal joints (70 vs 41%).

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