NATIONAL INSTITUTE FOR CLINICAL EXCELLENCE

INTERVENTIONAL PROCEDURES PROGRAMME

Interventional procedures overview of needle fasciotomy for Dupuytren's contracture

Introduction

This overview has been prepared to assist members of the Interventional Procedures Advisory Committee in making recommendations about the safety and efficacy of an interventional procedure. It is based on a rapid non-comprehensive review of the medical literature and specialist opinion. It should not be regarded as a definitive assessment of the procedure.

Date prepared

This overview was prepared in April 2003.

Procedure name

Needle fasciotomy.
Percutaneous fasciotomy.
Percutaneous needle fasciotomy (PCNF).
Percutaneous needle aponevrotomy.

Specialty society

British Society for Surgery of the Hand.

Description

Indications

Dupuytren's contracture is a benign, slowly progressive condition of unknown origin. The disease is characterised by a thickening of the connective tissue in the palm of the hand, leading to difficulties extending the fingers.

Although the origin of the condition is unclear a significant majority of patients relate a positive family history, which suggests a possible genetic influence. Men are more likely to be affected than women, and the symptoms of the disease are more severe in older men and in people of northern European descent.

Most individuals with Dupuytren's contracture are affected in both hands. In unilateral cases the right side is more typically affected than the left. The most commonly involved digit is the ring finger, followed by the little finger and then the middle finger. The index finger and thumb are typically spared.

Current treatments and alternatives

Treatment seeks to restore hand function and prevent progression, because the underlying disease will remain. Both surgical and non-surgical options exist. Data are lacking on the effectiveness of most non-surgical treatments for Dupuytren's

contracture such as splinting, radiation, dimethylsulfoxide, vitamin E cream and ultrasonic therapy.

Surgery is usually indicated for individuals who have a significant functional disability as a result of the condition. However, recurrence rates after surgery range from 26% to 80% [1].

What the procedure involves

Needle fasciotomy is an outpatient procedure in which one or more fibrous bands (contractures) are cut (sectioned) using a blade or the bevel of a needle. The procedure can be performed in either the palm or the fingers.

Sectioning is achieved by moving the needle in a sawing motion against the fibrous band. This movement is repeated several times until the band breaks, or until partial sectioning has been achieved and the finger can be extended causing the band to snap. A dry bandage is then secured over the site by elastic tape for at least 48 hours.

Depending on the severity of the condition some individuals may require more than one session, particularly if there is contracture of the proximal interphalangeal joint.

Efficacy

- Based on the evidence, the main benefit offered by this procedure is a short-term reduction in the degree of contracture. Recurrence rate is approximately 50% at 3–5 years and seems to depend on the severity of the disease.
- Some data also suggested that those individuals with less severe disease and or those with metacarpophalangeal joint contracture benefited most from this procedure.
- Narrative reviews on this procedure report that patient satisfaction is greater and that the procedure has fewer complications than open surgery. However, patient satisfaction has not been measured in any of the studies.
- One Specialist Advisor commented that although the procedure was not as efficacious in the long term as open surgery, patients experienced less morbidity and had faster recovery.

Safety

- Common complications reported in the studies include skin breaks, localised pain and nerve injuries.
- The Specialist Advisors listed nerve injury, tendon injury and infection as the major complications of the procedure, with one Advisor stating a complication rate of 1% or less.

Literature reviews

Rapid review of literature

The medical literature was searched to identify studies and reviews relevant to needle fasciotomy for Dupuytren's contracture. Searches were conducted using the following databases: MEDLINE, PREMEDLINE, EMBASE, Cochrane Library and Science Citation Index, and covered the period from their commencement to February 2003. Trial registries and the Internet were also searched. No language restriction was applied to the searches.

The following selection criteria (Table 1) were applied to the abstracts identified by the literature search. Where these criteria could not be determined from the abstracts the full paper was retrieved.

Table 1 Inclusion criteria for identification of relevant studies

Characteristic	Criteria
Publication type	Clinical studies included. Emphasis was placed on identifying good quality published studies. Abstracts were excluded where no clinical outcomes were reported, or the paper was a review, editorial, laboratory or animal study.
Patient	Patients with Dupuytren's contracture.
Intervention/test	Fasciotomy (with needle and blade).
Outcome	Articles were retrieved if the abstract contained information relevant to the safety and/or efficacy.
Language	Non-English-language articles were excluded unless they were thought to add substantively to the English-language evidence base.

List of studies included in the overview

The overview is based on seven case series papers.

The result of two of these papers [2-3] are presented in non-English journals.

The results by Badois (1995) [3] are published on the website of the investigator and should be viewed with caution given the absence of information on study methodology.

Table 2 Summary of key efficacy and safety findings for needle fasciotomy for Dupuytren's contracture

Numbers of patients/ Patient source	Key efficacy findings	Key safety findings	Comments
Foucher et al (2001a) [4] Non-controlled study France 171 patients • 198 hands • 241 fingers Procedure: needle • 154 cases in palm only • 82 cases in palm and fingers • 5 fingers • 11 cases web contraction • 16 skin pits	**Angular extension gain** MP: metacarpophalangeal joint PIP: proximal interphalangeal joint Pre-op / Post-op / Gain Total n = 212: 46.7° / 13° / 72.1% MP n = 202: 36.1° / 7.3° / 79.6% PIP n = 96: 27° / 13° / 53.7% In the 65 hands with a follow-up of 2.5 years a loss of extension was noticed in 35 patients **Recurrence/Re-operation** 21/198 hands (11%) **Disease Activity** (65 patients – mean follow-up 2.5 years) 54% had disease activity	**Complications** • 9 skin ruptures (healing 10 days) • 7 cases of postoperative pain • 29 nodes sensitive to pressure after 1 month • 2 tinel signs and 3 hemi-digital paraesthesia • 1 neuroma • 1 bleeding • 1 case of oedema • 1 suspicion of RSD • 1 immediate failure One case also abandoned the technique. The authors noted that many of the complications are transient	Unclear when outcomes were measured. It is possible that recurrence rates may be higher in patients with longer-term follow-up. No breakdown is given of the staging of patients. The denominator is often given as hands rather than patients – can be unclear. Little information is presented on patient characteristics.

Numbers of patients/ Patient source	Key efficacy findings	Key safety findings	Comments
Foucher et al (2001b) [2] Non-controlled (Article in French/Abstract in English) consecutive patients France 100 patients evaluated • 165 cases palm only • 111 palm and the finger • 35 digit level Mean follow up: 3.2 years to assess disease and recurrence Mean age: 65 years Mean duration of symptoms: 6 years	**Angular extension gain** Post operative gain was prominent at the metacarpophalangeal joint **Recurrence** Recurrence 58% (denominator 100 patients) Re-operation rate 24%. 59 patients needed further surgery	Reported that 'complications were scarce without infection or tendon injury but one digital nerve was found injured during the second procedure.'	Only relying on the information supplied in the abstract. Procedure done on 211 patients (261 hands and 311 fingers) – only looks at first 100.
Duthie and Chesney (1997) [5] Non-controlled study Retrospective 82 patients/ 106 digits (originally 160 patients) 1981–1982 Follow up: 10 years	**Fixed flexion contracture (MP+PIP)** • Mean pre-operative contracture 71^{O} (SD 31^{O}) • Mean post operative contracture 22^{O} (SD 15^{O}) • Mean ten years contracture 57^{O} (SD 35^{O}) Within the 10 year time frame 54 patients (66%) underwent further surgery (mean time to surgery 60.4 months) Fixed flexion contracture was 85^{o}	**Complications** Three recorded complications all involving splitting of the palmar skin.	Not described as consecutive but as a 'non-selected' group. All cases who were still alive were examined. Unclear when complications were recorded. The authors provided no detail as to the severity of Dupuytren's contracture in the study population. Little information.

Numbers of patients/ Patient source	Key efficacy findings	Key safety findings	Comments
Rowley et al (1983) [6] Non-controlled study 78 patients (107 digits) • Metacarpophalangeal joint contracture predominant in 53.6% • Proximal interphalangeal joint predominant in 41.7% • Mean age 62 years (36–80 years) Follow up: Mean 14 months (12–9 years)	**Fixed flexion contracture** The data presented indicates that individuals with metacarpophalangeal joint contracture had better outcomes with needle fasciotomy.	**Complications** Authors reported that no neurovascular complications were noted in the immediate or late post-operative period. It is unclear whether other non-neurovascular complications were recorded or noted.	Patients were excluded if the operation failed to produce a satisfactory initial correction. Although graphs are presented on the improvement of contracture in patients with metacarpophalangeal joint and proximal interphalangeal joint contracture no specific figures are given. No statistical analyses have been reported. Overall this paper contains little detail.

Numbers of patients/ Patient source	Key efficacy findings	Key safety findings	Comments
Badois et al (1993) [7] Non-controlled study 90 patients 123 hands (originally 138 patients) Tubiana's criteria • Stage I: 37 • Stage II: 35 • Stage III: 30 • Stage IV: 21 Mean age at onset: 58 years Follow up: 5 years	**Tubiana score** (using the scaling system lower = better) Authors note that Tubiana's score fell from 3.15 before treatment to 0.66 immediately after treatment and 0.99 after five years. **Hoet system** (based on Tubiana score) Excellent 52.8% (short-term) 38.2% (long-term) Good 28.5% 30.9% Average 18.7% 22% Failure 0% 8.9% **Results by Stage** The proportion of 'satisfactory' outcomes declined as disease severity increased. Stage I 91.9% 91.9% Stage II 88.6% 74.3% Stage III 83.3% 56.7% Stage IV 47.6% 38.1% **Recurrence** • Stage I 43.2% • Stage II 48.5% • Stage III 53.3% • Stage IV 61.3% Five-year recurrence rate: 50.4%	**Complications** Adverse events were recorded in 20% of cases • skin breaks (16%) • transient dysaesthesia due to collateral nerve injury (2%) • local infection (2%) Transient local pain was commonly recorded	Unclear what happened to the 48 (35%) patients - lost to follow-up? No information was given on the severity of Dupuytren's in these patients. Short-term results also termed results 'immediately after the last needle fasciotomy' (on 90 patients). However, it is unclear when these were measured. Authors attempted to compare results with results from surgical fasciectomy. No statistical comparisons were done between the groups. Validity of the measures is unclear.

Numbers of patients/ Patient source	Key efficacy findings		Key safety findings	Comments
Colville (1993) [8] Non-controlled study UK Procedure: blade 95 patients 137 fingers Follow up: 2 years	**Average of Contractures in 137 fingers**	Degree 102° 45° 31° 50° 56° 75° (107 fingers)	**Complications** Not reported	Limited information. Authors comment at 3 years, people who were satisfied were more likely not to attend. Article reports on the 20 cases with the best results.
	Pre-op Immediately post-op 3 months 6 months 1 year 3 years			

Numbers of patients/ Patients Source	Key efficacy findings					Key safety findings	Comments
Badois (1995) [3] results published on the Internet (source quoted as published article in a French journal) Non-controlled study 799 patients • 992 hands • 1557 sessions • 3736 procedures	**No. hands**	**Stage I**	**Stage II**	**Stage III**	**Stage IV**	**Complications** Assume the denominator is hands (n) • 75 Cracks/breaks of the skin • 29 Minor nerve injuries • 12 Chronic pains • 7 Minor infections • 6 Faintness • 4 Inflammatory reactions • 3 Haematomas • 2 Flexor tendon ruptures	Difficult to assess given the limited amount of information available.
	Excellent	321 79.7%	134 41.6%	45 23.6%	7 9.2%		
	Good	52 12.9%	116 36.1%	91 47.6%	36 47.3%		
	Medium	19 4.7%	52 16.1%	36 18.9%	19 25.0%		
	Bad	11 2.7%	20 6.2%	19 9.9%	14 18.5%		
	Total	403	322	191	76		

Validity and generalisability of the studies

- In general the studies are of poor methodological quality. Little information was reported on factors such as patient characteristics, selection and measurement of outcomes.
- In a number of papers the severity of the condition in study participants was unclear, and one paper excluded from the analysis those patients who initially did not have a successful outcome.
- While recurrence rates after the procedure ranged from 11% to 65%. These rates should be interpreted with some caution, given the different populations and time points in which they were measured.
- Considerable loss to follow up was reported in the Badois and co-workers (1993) paper. It is unclear whether there was similar loss to follow up in the results of the 1995 study. It is also unclear what impact this loss to follow up might have on re-operation and/or recurrence rates.
- The papers by Foucher and co-workers (2001a, b), although separate reviews, do include a subset of the same patients. This is also the case for the results reported by Badois and co-workers (1993).
- A considerable amount of literature on this procedure is published in French. This literature does not include comparative information; instead most of the studies seem to be case-series papers.
- In general, papers reported on a limited number of outcomes and it was often unclear at what time point outcomes were measured. The number of hands was frequently used as a denominator to measure outcomes.

Specialist Advisors' opinions

- The procedure is established practice.
- Less than 10% of specialists are engaged in this area of work.
- This procedure has been used in Europe for many years. Many surgeons in Britain perform it in the palm, but significantly fewer in the fingers.
- Surgeons with appropriate training should undertake the procedure.
- Media coverage about this procedure has perhaps been misleading.

Issues for consideration by IPAC

- The published literature on this procedure appears to be divided into two eras: early literature where a blade is used to perform the procedure, and later literature where a needle is used.
- One Specialist Advisor noted that it is unlikely that reports on this procedure will be published in major journals (personal communication 12 June 2003).
- There is a considerable body of evidence published in French.

References

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