Surgery for Dupuytren’s contracture of the fingers (Review)

Rodrigues JN, Becker GW, Ball C, Zhang W, Giele H, Hobby J, Pratt AL, Davis T

This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in The Cochrane Library 2015, Issue 12

http://www.thecochranelibrary.com

WILEY
# Table of Contents

1. **Header**
2. **Abstract**
3. **Plain Language Summary**
4. **Summary of Findings for the Main Comparison**
5. **Background**
6. **Objectives**
7. **Methods**
8. **Results**
   - Figure 1
   - Figure 2
   - Figure 3
   - Figure 4
   - Figure 5
   - Figure 6
9. **Additional Summary of Findings**
10. **Discussion**
11. **Authors’ Conclusions**
12. **Acknowledgements**
13. **References**
14. **Characteristics of Studies**
15. **Data and Analyses**
   - Analysis 1.1. Comparison 1 Preoperative measurements, Outcome 1 DASH.
   - Analysis 1.2. Comparison 1 Preoperative measurements, Outcome 2 Total active extension.
   - Analysis 1.3. Comparison 1 Preoperative measurements, Outcome 3 Total active flexion.
   - Analysis 2.1. Comparison 2 Effects of 3 months of postoperative night splinting (intention-to-treat), Outcome 1 DASH score at 3 months.
   - Analysis 2.2. Comparison 2 Effects of 3 months of postoperative night splinting (intention-to-treat), Outcome 2 Total active extension at 3 months.
   - Analysis 2.3. Comparison 2 Effects of 3 months of postoperative night splinting (intention-to-treat), Outcome 3 Total active flexion at 3 months.
   - Analysis 3.1. Comparison 3 Effects of 3 months of postoperative night splinting (per-protocol), Outcome 1 DASH score at 3 months.
   - Analysis 3.2. Comparison 3 Effects of 3 months of postoperative night splinting (per-protocol), Outcome 2 Total active extension at 3 months [degrees].
   - Analysis 3.3. Comparison 3 Effects of 3 months of postoperative night splinting (per-protocol), Outcome 3 Total active flexion at 3 months [degrees].
16. **Additional Tables**
17. **Appendices**
18. **History**
19. **Contributions of Authors**
20. **Declarations of Interest**
21. **Sources of Support**
22. **Differences between Protocol and Review**
Surgery for Dupuytren’s contracture of the fingers

Jeremy N Rodrigues¹, Giles W Becker², Cathy Ball³, Weiya Zhang⁴, Henk Giele⁵, Jonathan Hobby⁶, Anna L Pratt⁷, Tim Davis⁸

¹Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences (NDORMS), University of Oxford, Oxford, UK.
²Department of Surgery, University of Arizona Medical Center, Tucson, Arizona, USA.
³Kennedy Institute of Rheumatology, University of Oxford, Oxford, UK.
⁴Division of Academic Rheumatology, The University of Nottingham, Nottingham, UK.
⁵Department of Plastic, Reconstructive and Hand Surgery, Oxford University Hospitals, Oxford, UK.
⁶Trauma and Orthopaedic Surgery, North Hampshire Hospital, Basingstoke, UK.
⁷College of Health and Life Sciences, Brunel University, Uxbridge, UK.
⁸Trauma and Orthopaedics, Nottingham University Hospitals, Nottingham, UK.

Contact address: Tim Davis, Trauma and Orthopaedics, Nottingham University Hospitals, Queens Medical Campus, Nottingham, NG7 2UH, UK. Tim.davis@nuh.nhs.uk.

Editorial group: Cochrane Musculoskeletal Group.
Review content assessed as up-to-date: 20 May 2015.


ABSTRACT

Background

Dupuytren's disease is a benign fibroproliferative disorder that causes the fingers to be drawn into the palm via formation of new tissue under the glabrous skin of the hand. This disorder causes functional limitations, but it can be treated through a variety of surgical techniques. As a chronic condition, it tends to recur.

Objectives

To assess the benefits and harms of different surgical procedures for treatment of Dupuytren's contracture of the index, middle, ring and little fingers.

Search methods

We initially searched the following databases on 17 September 2012, then re-searched them on 10 March 2014 and on 20 May 2015: the Cochrane Central Register of Controlled Trials (CENTRAL), The Cochrane Library, the British Nursing Index and Archive (BNI), the Cumulative Index to Nursing and Allied Health Literature (CINAHL), EMBASE, the Latin American Caribbean Health Sciences Literature (LILACS), Ovid MEDLINE, Ovid MEDLINE-In-Process and Other Non-Indexed Citations, ProQuest (ABI/INFORM Global and Dissertations & Theses), the Institute for Scientific Information (ISI) Web of Science and clinicaltrials.gov. We reviewed the reference lists of short-listed articles to identify additional suitable studies.

Selection criteria

We included randomised clinical trials and controlled clinical trials in which groups received surgical intervention for Dupuytren's disease of the index, middle, ring or little finger versus control, or versus another intervention (surgical or otherwise). We excluded the thumb, as cords form on the radial aspect of the thumb and thus are not readily accessible in terms of angular deformity. Furthermore, thumb disease is rare.
Data collection and analysis

A minimum of two review authors independently reviewed search results to select studies for inclusion by using pre-specified criteria, assessed risk of bias of included studies and extracted data from included studies.

We grouped outcomes into the following categories: (1) hand function, (2) other patient-reported outcomes (e.g. satisfaction, pain), (3) early objective outcomes (e.g. correction of angular deformity), (4) late objective outcomes (e.g. recurrence) and (5) adverse effects.

Main results

We included 14 articles describing 13 studies, comprising 11 single-centre studies and two multi-centre studies. These studies involved 944 hands of 940 participants; of these, 93 participants were reported twice in separate articles describing early and late outcomes of one trial. Three papers reported the outcomes of two trials comparing different procedures. One trial compared needle fasciotomy versus fasciectomy (125 hands, 121 participants), and the other compared interposition firebreak skin grafting versus z-plasty closure of fasciectomy (79 participants). The other 11 studies reported trials of technical refinements of procedures or rehabilitation adjuncts. Of these, three investigated effects of postoperative splinting on surgical outcomes.

Ten studies (11 articles) were randomised controlled trials (RCTs) of varying methodological quality; one was a controlled clinical trial. Trial design was unclear in two studies awaiting classification. All trials had high or unclear risk of at least one type of bias. High risks of performance and detection bias were particularly common. We downgraded the quality of evidence (Grades of Recommendation, Assessment, Development and Evaluation - GRADE) of outcomes to low because of concerns about risk of bias and imprecision.

Outcomes measured varied between studies. Five articles assessed recurrence; two defined this as reappearance of palpable disease and two as deterioration in angular deformity; one did not explicitly define recurrence.

Hand function on the Disabilities of the Arm, Shoulder and Hand (DASH) Scale (scores between 0 and 100, with higher scores indicating greater impairment) was 5 points lower after needle fasciotomy than after fasciectomy at five weeks. Patient satisfaction was better after fasciotomy at six weeks, but the magnitude of effect was not specified. Fasciectomy improved contractures more effectively in severe disease: Mean percentage reduction in total passive extension deficit at six weeks for Tubiana grades I and II was 11% lower after needle fasciotomy than after fasciectomy, whereas for grades III and IV disease, it was 29% and 32% lower.

Paraesthesia (defined as subjective tingling sensation without objective evidence of altered sensation) was more common than needle fasciotomy at one week after fasciotomy (228/1000 vs 67/1000), but reporting of complications was variable.

By five years, satisfaction (on a scale from 0 to 10, with higher scores showing greater satisfaction) was 2.1/10 points higher in the fasciectomy group than in the fasciotomy group, and recurrence was greater after fasciotomy (849/1000 vs 209/1000). Firebreak skin grafting did not improve outcomes more than fasciectomy alone, although this procedure took longer to perform.

One trial investigated four weeks of day and night splinting followed by two months of night splinting after surgery. The other two trials investigated three months of night splinting after surgery, but participants in ‘no splint’ groups with early deterioration at one week were issued a splint for use. All three studies demonstrated no benefit from splinting. The two trials investigating postoperative night splinting were suitable for meta-analysis, which demonstrated no benefit from splinting: Mean DASH score in the splint groups was 1.15 points lower (95% confidence interval (CI) -2.32 to 4.62) than in the no splint groups. Mean total active extension in the splint groups was 2.21 degrees greater (95% CI -3.59 to 8.01 degrees) than in the no splint groups. Mean total active flexion in the splint groups was 8.42 degrees less (95% CI 1.78 to 15.07 degrees) than in the no splint groups.

Authors’ conclusions

Currently, insufficient evidence is available to show the relative superiority of different surgical procedures (needle fasciotomy vs fasciectomy, or interposition firebreak skin grafting vs z-plasty closure of fasciectomy). Low-quality evidence suggests that postoperative splinting may not improve outcomes and may impair outcomes by reducing active flexion. Further trials on this topic are urgently required.

Plain Language Summary

Surgery for Dupuytren's disease of the fingers

Review question
We conducted a review of the effects of surgery for people with Dupuytren’s disease of the fingers and found 13 studies with 940 participants; 93 participants were reported twice in separate articles describing early and late outcomes of one trial.

**Background**

Dupuytren’s disease is common. Patients develop scar-like tissue under the palmar skin of the hand that draws their fingers into the palm and can affect function.

This condition can be surgically treated by cutting out the disease, then stitching the skin back into place (fasciectomy) or replacing it with a graft of skin taken from elsewhere on the body (dermofasciectomy). Alternative approaches involve breaking the cord of disease to straighten the finger. This can be done by moving a needle back and forth through the cord until it snaps, as when rubbing a rope repeatedly over a rock (needle fasciotomy), or by injecting into it an enzyme that digests a piece of the cord (collagenase). This weakens one spot, allowing the surgeon to snap the cord and straighten the finger. As the condition is related in part to genetics, it tends to come back, even after successful treatment. As the latter two treatments leave the broken ends of the cord behind, recurrence may be quicker after these procedures than after traditional excisional surgery. However, recovery might also be quicker. The most effective treatment is unclear.

**Study characteristics**

After searching for all relevant studies up to May 2015, we found 13 studies (14 articles) that met our inclusion criteria. However, only three compared different operation types. The others compared aspects of one operation type. One study presented early and late outcomes.

**Key results**

*What happens to people with Dupuytren’s disease up to five weeks after needle fasciotomy compared with fasciectomy?*

- Hand function may be slightly better after needle fasciotomy than after fasciectomy (low-quality evidence).
- People who have had needle fasciotomy may be more satisfied than those who have had fasciectomy (low-quality evidence).
- Fasciectomy probably straightens fingers better than needle fasciotomy in people with advanced disease, but probably no difference is apparent in people with milder disease (low-quality evidence).
- A feeling of tingling in the fingers is probably more common after fasciectomy than after needle fasciotomy during the first week after treatment (low-quality evidence).

*What happens to people with Dupuytren’s disease five years after needle fasciotomy compared with fasciectomy?*

- Satisfaction may be better after fasciectomy than after needle fasciotomy (low-quality evidence).
- Recurrence may be more common after needle fasciotomy than after fasciectomy (low-quality evidence).

*What happens to people with Dupuytren’s disease up to 36 months after z-plasty closure of a limited fasciectomy compared with use of small ‘firebreak’ skin grafts (a form of dermofasciectomy)?*

- Little or no difference in outcomes is likely between patients who had z-plasty and those who had small skin grafts, although skin graft procedures take longer to perform (low-quality evidence).

*What happens to people with Dupuytren’s disease who wear a splint at night after surgery?*

- Wearing a splint at night after surgery probably does not help to straighten fingers nor to improve hand function, and it may slightly worsen the patient’s ability to make a full fist (low-quality evidence).

**Side effects in people with Dupuytren’s disease after surgery and in those who wear a splint at night after surgery**

Reporting of complications was variable. We often do not have precise information about side effects and complications, particularly rare but serious side effects. Side effects may include altered feeling in the fingers or reduced ability to make a full fist. Rare complications may include injury to the tendons that pull the fingers into the palm.
### Comparison of operation types: early results of needle fasciotomy vs limited fasciectomy for Dupuytren’s disease

**Patient or population:** 125 hands in 121 participants with Dupuytren’s disease of the fingers for early outcomes ([van Rijssen 2006](#)).

**Settings:** single-centre Dutch study.

**Intervention:** needle fasciotomy.

**Comparison:** limited fasciectomy.

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Illustrative comparative risks* (95% CI)</th>
<th>Number of participants (studies)</th>
<th>Quality of the evidence (GRADE)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DASH hand function score at 5 weeks</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major outcome group 1 (hand function)</td>
<td>Mean DASH hand function score in the fasciectomy group was 16</td>
<td>97 (1 study)</td>
<td>☓ ☓ ☓ ☓ Low*</td>
<td>P value = 0.017 as quoted in <a href="#">van Rijssen 2006</a>. 24/121 participants in the study did not adequately complete the DASH PROM tools. Insufficient detail in article to allow calculation of 95% CI (standard deviations not provided). Unclear whether this is the most appropriate time point for study of ‘early’ outcome.</td>
</tr>
<tr>
<td></td>
<td>DASH hand function score in the fasciotomy group was 5 lower than in the fasciectomy group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Patient satisfaction at 6 weeks</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major outcome group 2 (other PROM)</td>
<td>See comment</td>
<td>121 (1 study)</td>
<td>☓ ☓ ☓ ☓ Low*</td>
<td>Data not described in <a href="#">van Rijssen 2006</a>. Only level of significance provided. P value = 0.002 as quoted in <a href="#">van Rijssen 2006</a>.</td>
</tr>
</tbody>
</table>
Early angular outcome at 6 weeks for Tubiana grade I disease
(total passive extension deficit (TPED) of the MCPJ, PIPJ and DIPJ for preoperative contractures with a TPED of 0 to 45 degrees)

Early angular outcome at 6 weeks for Tubiana grade II disease
(total passive extension deficit (TPED) of the MCPJ, PIPJ and DIPJ for preoperative contractures with a TPED of 45 to 90 degrees)

Early angular outcome at 6 weeks for Tubiana grade III disease
(total passive extension deficit (TPED) of the MCPJ, PIPJ and DIPJ for preoperative contractures with a TPED of 90 to 135 degrees)

Early angular outcome at 6 weeks for Tubiana grade IV disease
(total passive extension deficit (TPED) of the MCPJ, PIPJ and DIPJ for preoperative contractures with a TPED > 135 degrees)

Major outcome group 3 (early objective measurement)

For Tubiana grade I disease, mean percentage reduction in TPED in the fasciectomy group was 82%
For Tubiana grade II disease, mean percentage reduction in TPED in the fasciectomy group was 78%
For Tubiana grade III disease, mean percentage reduction in TPED in the fasciectomy group was 75%
For Tubiana grade IV disease, mean percentage reduction in TPED in the fasciectomy group was 79%

Major outcome group 4 (recurrence)

See comment
See comment
See comment
See comment

Not studied in van Rijssen 2006
<table>
<thead>
<tr>
<th>Paraesthesia at 1 week</th>
<th>228 per 1000</th>
<th>67 per 1000</th>
<th>117 (1 study)</th>
<th>Low ⊕⊕⊕</th>
</tr>
</thead>
</table>

Major outcome group 5 (ad-verse effects) Defined as ‘‘tingling sensa-tions at any part of the treated digit without objective distur-bance of sensation at the tip of the digit” per hand

P value = 0.013 in van Rijssen 2006 Relative effect not calculated as only study available

*The basis for the assumed risk (e.g. median control group risk across studies) is provided in footnotes. The corresponding risk (and its 95% confidence interval) is based on the assumed risk in the comparison group and the relative effect of the intervention (and its 95% CI).

CI: Confidence interval; DASH: Disabilities of the Arm, Shoulder and Hand Scale; DIPJ: Distal interphalangeal joint; MCPJ: Metacarpophalangeal joint; PIPJ: Proximal interphalangeal joint; PROM: Patient-reported outcome measures; RR: Risk ratio; TPED: Total passive extension deficit.

GRADE Working Group grades of evidence.

High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

"Recurrence was not studied in van Rijssen 2006, as this article considered early outcomes only. Recurrence is a late effect, and recurrence in this trial is considered in the next ‘Summary of findings’ table.

All assumed risks are based on mean values for limited fasciectomy as reported in van Rijssen 2006.

Evidence downgraded from high to low for DASH at 5 weeks because of significant attrition. van Rijssen 2006 had significant risk of performance and detection biases, and imprecision.

Evidence downgraded from high to low for patient satisfaction at 6 weeks, as scale used was not validated. van Rijssen 2006 had significant risk of performance and detection biases, and imprecision.

Evidence downgraded from high to low for early angular outcomes in grade I disease at 6 weeks, as van Rijssen 2006 had significant risk of performance and detection biases, and imprecision.

Paraesthesia at 6 weeks downgraded from high to low, as scale was not validated. van Rijssen 2006 had significant risk of performance and detection biases, and imprecision.
**BACKGROUND**

**Description of the condition**

Dupuytren's disease may affect the hand and the sole of the foot. In the hand, it is characterised by slow but progressive fibroproliferative changes associated with the palmar aponeurosis, which lies beneath the skin of the palm, and its extensions into the fingers (Hurst 2000). Although it most commonly involves the ring and little fingers, this disorder can affect any digit. In early stages, nodules of Dupuytren's tissue are formed in association with palmar aponeurosis. These may coalesce to form cords of Dupuytren's tissue that run to the fingers. The cords may shorten and prevent full extension of the fingers, thus stopping patients from placing their hands flat on a surface. Patients may report difficulty in putting on gloves, washing their face or performing other dextrous tasks. If left untreated, this restriction of finger extension usually progresses, although the rate of progression is unpredictable. Changes are irreversible without treatment (Luck 1959). Loss of motion, particularly functional extension, results in activity limitations and motivates the patient to explore surgical options (Pratt 2009).

The prevalence of Dupuytren's disease varies with geographic location and patient sex and age. It is unusual among individuals younger than 50 years and is more common in men, although this sex difference may diminish with increasing age. Its prevalence is highest in men of Northern European origin, and in British men and women over the age of 75 years may be as high as 18% and 9%, respectively (Early 1962). The aetiology of Dupuytren's disease is not fully understood. Higher prevalence amongst family members has been accepted for a long time (Yost 1955), and the disorder is associated with diabetes mellitus and smoking (Burge 1997). However, its proposed association with epilepsy is unclear (Geoghegan 2004), and its reported association with socio-economic factors and manual work remains controversial (Early 1962; Herzog 1951). Although typical patients experience slow progression of disease and respond well to intervention, some experience aggressive disease progression, often from an early age, and earlier recurrence - a condition referred to as 'Dupuytren's diathesis' (Hueston 1963). Benefits of treatment may vary according to the anatomical location of Dupuytren's disease within the hand. One study reported more improved hand function when investigators compared proximal interphalangeal joint (PIP) treatment versus metacarpophalangeal joint (MCP) correction (Draviaraj 2004). However, achieving correction at the PIP is more difficult: Whereas MCPJ contractures usually can be fully corrected with surgery, PIPJ contractures frequently are incompletely corrected. Consequently, heterogeneity is evident in terms of disease presentation within the digits, response to surgery and functional benefit derived from surgery.

No cure is known for Dupuytren's disease; cure would require removal of Dupuytren's tissue from the palm of the hand and the flexor surfaces of digits, as well as inhibition of subsequent disease formation. Instead, the primary goal of treatment is to excise, divide, break or dissolve cords of Dupuytren's tissue that are preventing full finger extension, with the intention of improving or correcting finger contracture (loss of extension). However, as some cells that produce Dupuytren's tissue are inevitably left throughout the hand and within the region of the treated cord, Dupuytren's contractures can form later at other sites in the hand (disease extension), or a 'recurrent contracture' may develop within the operative site. Treatment usually is offered before the affected finger has contracted so far that hand function is significantly impaired, because small contractures that have developed recently have a better chance of correction than long-standing severe contractures, which may have allowed secondary joint stiffness to develop in the underlying 'flexed' joints. A 30-degree MCPJ contracture is often cited as a threshold for offering surgery (BSSH 2010). Such a figure may be chosen, as less significant contractures might not be expected to cause functional impairment, and because some believe that surgery itself might stimulate disease progression (Bisson 2003), although this theory has not been proved scientifically.

Non-operative strategies include radiotherapy, physical therapy (typically involving splinting) and ultrasonography. The value of radiotherapy for established contractures is uncertain, and outcomes of splinting and ultrasonography are variable (Ball 2002; Stiles 1966). A novel treatment approach consists of injecting collagenase into Dupuytren's cords, causing finger contracture (Hurst 2009). Collagenase synthesised by *Clostridium histolyticum* degrades collagen within Dupuytren's cords, thus weakening them, so they can be broken by forced extension of the affected finger on the following day. The Food and Drug Administration (FDA) has approved this treatment for use in the United States (FDA 2010), and it is now licenced for use in the European Union, although its effectiveness has not been fully evaluated (Thomas 2010). This topic will be considered in a separate review.

Currently, the mainstay of treatment for Dupuytren's contracture is surgery, and many surgical options for Dupuytren's disease are available, beginning with Baron Dupuytren's description of surgical release of the contracture, performed without anaesthesia in 1831 (Elliot 1999). Common management strategies are presented here by extent of surgery, starting with the least invasive approach. Relative benefits and disadvantages are summarised.

**Description of the intervention**

**Observation**

Treatment is not mandatory, and after informed discussion of the natural history of the condition and different treatment options, a patient may elect observation of the hand. Patients with mild disease and no functional impairment may also be observed. A subgroup, labelled "non-Dupuytren's disease" by one team of au-
No attempt is made to remove all of the Dupuytren’s cord causing the contracture, and segments are excised so that the finger straightens (Moermans 1991). No attempt is made to remove all of the Dupuytren’s cord causing the contracture. Benefits of this procedure are that it is relatively less invasive and involves a quick (two-week or three-week) recovery period. However, it is performed in an operating theatre and is thought to be associated with a high rate of recurrence of Dupuytren’s contracture - up to 38% (Moermans 1996) - which may occur because significant deposits of Dupuytren’s tissue persist in the hand and the finger. Although most surgeons agree that this procedure has a role in Dupuytren’s disease in the palm of the hand that is causing contracture of the MCPJ, it is less popular for treatment of cords in the hand itself, which constitute contracture of the PIPJ, because of associated risk of damage to the digital nerves and flexor tendons in the finger and inability to reliably release contractures of the PIPJ. A six-week follow-up study suggested that it might be a reasonable alternative to limited fasciectomy in the short-term management of selected cases such as those involving elderly patients, with acceptance of significantly higher recurrence after needle fasciotomy compared with fasciotomy and the tendency for quicker recurrence. This was seen in five-year follow-up data from the same study (van Rijssen 2012a).

How the intervention might work
Surgery, consisting of excision or division of Dupuytren’s cord, should allow immediate full extension of affected joints, as long as the underlying joint has not developed a fixed flexion deformity for other reasons (e.g. collateral ligament contraction, checkrein ligament shortening, arthritis).

Why it is important to do this review
Comparative analysis of the outcomes of different surgical treatment options for Dupuytren’s disease is needed to investigate whether more invasive procedures, such as dermofasciectomy, have lower ‘recurrent contracture’ rates, and whether any such benefit is outweighed by a higher rate of adverse events (complications) or an unacceptably longer or more difficult rehabilitation period. Although comparison of different operative techniques is important, it must be recognised that surgery is only part of a complex intervention needed for the treatment of Dupuytren’s contracture. The outcome of treatment may not be determined only by which

deep deposits of Dupuytren’s tissue persist in the hand and the finger.
Many surgeons selectively use this procedure in selected cases such as those involving elderly patients, with acceptance of significantly higher recurrence of recurrent contracture, and the procedure carries risks of tendon and digital nerve and artery damage. Although most surgeons agree that this procedure has a role in managing Dupuytren’s disease causing contracture of the MCPJ, it is less popular for the treatment of Dupuytren’s cords that are causing contracture of the PIPJ, because of associated risk of damage to the digital nerves and flexor tendons in the finger and inability to reliably release contractures of the PIPJ. A six-week follow-up study suggested that it might be a reasonable alternative to limited fasciectomy in the short-term management of selected cases such as those involving elderly patients, with acceptance of significantly higher recurrence after needle fasciotomy compared with fasciotomy and the tendency for quicker recurrence. This was seen in five-year follow-up data from the same study (van Rijssen 2012a).

Dermofasciectomy
This is a more extensive procedure in which all of the Dupuytren’s cords causing the contracture are excised. In addition, all subcutaneous fat and skin on the palmar aspect of the proximal and middle pulp spaces of the finger (overlying the cord) are excised, leaving only the flexor tendon sheath and the two neurovascular bundles. The resultant skin defect is covered with a full-thickness skin graft, which usually is harvested from the medial border of the forearm or upper arm, the front of the elbow or the ulnar aspect of the hand. Proponents of this procedure claim that through excision of skin and subcutaneous fat that may be involved in Dupuytren’s disease, the rate of recurrence of a Dupuytren’s contracture is reduced (Armstrong 2000). Many surgeons selectively use this procedure in young patients and in those with the ‘diathesis’, in whom risk of recurrence in later life is high. Specific disadvantages of dermofasciectomy include a longer rehabilitation phase and the need to harvest a skin graft. Complications include loss of the skin graft and, as for limited fasciectomy, the possibility of finger stiffness and complex regional pain syndrome.
type of surgery is performed, but also by the postoperative rehab-
ilitation regimen provided (splintage and hand therapy) and other
treatment factors such as patient selection and site of contractu-
re (MCPJ alone, PIPJ alone or both joints together). Also the out-
come of Dupuytren’s surgery is usually defined by the ‘recurrent
contracture rate’ (in contrast to ‘disease extension’ to other digits,
the rate of which is not affected by surgery). Only a few studies
have assessed outcomes by using patient-centred outcome tools, or
have investigated the severity and length of postoperative recovery
from surgery.

OBJECTIVES
To assess the benefits and harms of different surgical procedures
for treatment of Dupuytren’s contracture of the index, middle,
ring and little fingers.

METHODS

Criteria for considering studies for this review

Types of studies
We included randomised controlled trials (RCTs) and controlled
clinical trials (CCTs), irrespective of language or sample size.

Types of participants
Adult men and women from all ethnic origins, with or without
risk factors for Dupuytren’s disease, who had undergone a surgical
procedure for primary (not recurrent) Dupuytren’s contracture of
one or more of the index, middle, ring and little fingers.

Types of interventions
Any surgical intervention, including percutaneous needle fasci-
ocotomy (aponeurotomy), very limited fasciectomy, limited fa-
sciectomy and dermofasciectomy. Comparators included alter-
native surgical procedures, placebo/sham surgery and other ac-
tive non-surgical treatments (collagenase injection, hand therapy,
physiotherapy, radiotherapy). We did not anticipate studies un-
dertaken to compare active treatment versus observation alone. If
we identified such studies, we planned to discuss them.

Types of outcome measures
The validity and reliability of any outcome measures commonly
used in Dupuytren’s disease have not been well studied. We have
listed below outcomes expected to be reported by study investiga-
tors. We selected hand function as the top primary outcome,
as this represents an important patient-centred measure. In con-
trast, angular measurements are objective, surgeon-centred mea-
surements.

Major outcomes
• Level of hand function restored, as assessed by the
Disabilities of the Arm, Shoulder and Hand (DASH) Scale
(Hudak 1996), the Patient Evaluation Measure (PEM) (Macey
1995), grip strength measures or the Jebson-Taylor Hand
Function Test (Jebson 1969). We were uncertain about which
standardised outcome instruments we would encounter, but we
found that all were reported.
  • Patient satisfaction and other patient-rated outcomes (such
  as pain or health-related quality of life (HRQoL)). We will repor-
tall measures encountered.
  • Early angle outcomes and other objective outcomes. These
  may involve (1) improvement in contracture immediately after
  surgery - differences between finger angle measurements
  immediately after surgery and preoperative finger angle
  measurements, (2) residual contracture immediately after surgery
  - as assessed by angle measurement (goniometry) or (3) early
  results (as above) at time of discharge from care. Active or passive
  angles may be reported. Angles may be presented per joint, or
  per ray.
  • Recurrence of Dupuytren’s disease/contracture in the
  operated field. As recurrence is time-dependent, length of follow-
up is not standardised and a universally agreed upon definition
  of recurrence is not available, we have described recurrence rates
  and length of follow-up for each study in narrative format. We
  planned to perform time-to-event analyses when we found
  appropriate data. However, we did not expect that these data
  would be available. We would have performed meta-analyses
  only for studies with similar definitions of recurrence and
  providing recurrence data at similar follow-up times after surgery
  (‘similar definitions of recurrence’ would include those with
  recurrence involving a 20-degree to 30-degree increase in angle
  compared with early discharge data or preoperative data).

Minimum length of follow-up for eligibility in this analysis was
18 months. This was decided on the basis of two considerations:
Shorter follow-up gives insufficient time for recurrence; and no
consensus has been reached to define minimum length of follow-
up, which varies widely in published studies, ranging from three
weeks to 13 years (Becker 2010).
  • Adverse effects. Those anticipated included loss of finger
flexion, loss of finger sensation due to digital nerve injury,
vascular compromise, delayed healing and infection. As the
extent of reported adverse events was unknown, we collected and reviewed total adverse effects data. Review authors agreed to focus on five key adverse events, should these prove to be extensive.

**Minor outcomes**

- Economic costs of intervention. When provided, we would assess these costs as total documented costs of the procedure and rehabilitation. When time to recurrence was documented, we would calculate cost per year of recurrence-free survival. However, we anticipated that these data would not be commonly available.

**Search methods for identification of studies**

We performed all searches on 17 September 2012. We re-ran searches on 10 March 2014, and again on 20 May 2015, and we updated the results.

**Electronic searches**

We searched the following electronic databases to find reports of relevant RCTs and CCTs:

- The Cochrane Central Register of Controlled Trials (CENTRAL) (2012, Issue 8).
- British Nursing Index and Archive (BNI) - 1985 to September 2012.
- Cumulative Index to Nursing and Allied Health Literature (CINAHL) - 1981 to September 2012.
- Latin American Caribbean Health Sciences Literature (LILACS) - 1982 to September 2012.
- Ovid MEDLINE - 1948 to September 2012.
- Ovid MEDLINE-In-Process and Other Non-Indexed Citations - 1948 to September 2012.
- ProQuest (ABI/INFORM Global and Dissertations & Theses) - all entries to September 2012.
- Institute for Scientific Information (ISI) Web of Science.
- clinicaltrials.gov.

We provided the full search strategy for CENTRAL in Appendix 1.

We used variations of the Ovid MEDLINE search strategy to search the other databases listed above (Appendix 5; Appendix 6; Appendix 7; Appendix 8).

**Searching other resources**

We reviewed the reference lists of short-listed articles to identify additional suitable studies, and we searched Web of Science to identify studies that cited the items in the short list. We applied no language restrictions, and we translated potentially eligible foreign language studies.

**Data collection and analysis**

**Selection of studies**

From the title, abstract or descriptor, two review authors (JR, GB) independently screened all abstracts to identify potential studies for review, using a checklist of the criteria for inclusion (see Criteria for considering studies for this review and Appendix 9). The two review authors compared their lists of potential studies and produced an agreed upon short list. We obtained copies of the full articles of papers on the agreed upon short list. Two review authors (JR, GB) independently reviewed the full text of abstracts of the ‘agreed short list’ papers and identified those suitable for inclusion, using the selection checklist (Criteria for considering studies for this review). We resolved disagreements by discussion and by referral to a third review author (TD). We did not mask titles of journals nor names of study authors and supporting institutions.

**Data extraction and management**

Two review authors (JR, CB) independently extracted data regarding source, study design, intervention, population and outcomes using a piloted form. We resolved disagreements by consensus after additional review by a third review author (TD).

**Assessment of risk of bias in included studies**

Two review authors (CB, JR) independently used the tool for assessing risk of bias developed by The Cochrane Collaboration (Higgins 2011). We assessed all seven domains (sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective outcome reporting and other issues) of this tool by allowing classification of domains into ‘high risk of bias’, ‘low risk of bias’ or ‘unclear risk of bias’ (see Appendix 10). We judged by outcome when most of the seven domains were deemed to provide high risk or low risk. We resolved disagreements by discussion and by referral to a third review author (TD). As we had anticipated that few studies might employ blinding, we assessed use of blocked
randomisation in unblinded studies as a source of ‘other’ bias. In blocked randomisation, investigators use sequences of allocation assignment to balance enrolment between trial arms. In an unblinded study, this could contribute to risk of bias similar to that seen with poor allocation concealment. We assessed the quality of evidence by using Grades of Recommendation, Assessment, Development and Evaluation (GRADE) criteria, while taking into account risks of bias.

**Measures of treatment effect**

If appropriate, we had planned to use standardised mean differences (SMDs) to combine different outcome measures from different trials (Hedges 1982).

In studies that reported dichotomous data, we planned to calculate risk ratios (RRs) with 95% confidence intervals (CIs). For rare events (<10%), we planned to calculate Peto odds ratios with 95% CIs. We planned to combine results for meta-analysis using fixed-effect or random-effects models, depending on heterogeneity (see Data synthesis).

**Unit of analysis issues**

Review authors expected that most studies would use the hand as the unit of randomisation. Assessing outcomes such as hand function would not be possible if individual fingers from the same hand were used as the unit of randomisation. We recorded the unit of randomisation (participant, hand, finger or unclear) for each included study.

We did not expect to identify any cross-over studies, given that the interventions described here are single-stage definitive treatments. We expected to find no cluster-randomised studies.

**Dealing with missing data**

We anticipated two types of missing data: unreported and withdrawn. If data were not reported in included trials, we contacted study authors to request assistance. We planned to attempt no imputation.

**Assessment of heterogeneity**

If appropriate, we planned to test statistical heterogeneity by visually inspecting graphs and by performing $\chi^2$ and $I^2$ statistical tests. We considered a $\chi^2$ test result with $P$ value < 0.10 to be significant. We classified an $I^2$ test result greater than 50% as showing substantial heterogeneity.

**Assessment of reporting biases**

To reduce the risk of reporting bias, we searched multiple sources, including ProQuest (ABI/INFORM Global and Dissertations & Theses), to identify all published and unpublished results. We drew funnel plots to assess risk of publication bias.

We searched ISI Web of Science to identify relevant results that had not been published. If we identified such work, we planned to contact study authors to ask for a copy of the data.

**Data synthesis**

We compared data from selected studies by using the statistical software of The Cochrane Collaboration, Review Manager (Review Manager 2011). If studies were sufficiently similar, we planned to undertake a meta-analysis. If we needed to perform meta-analyses, we planned to use the random-effects model. When the same outcome measures were assessed with different scales, we would use SMDs.

However, we anticipated that data from different studies would be difficult to compare, and that a meta-analysis might be inappropriate. This would be the case particularly for the main outcome of ‘recurrence’ because of:

* differences in length of follow-up (recurrence rate increases with length of follow-up); and
* differences in the definition of ‘recurrence’.

We would use a fixed-effect model to combine data if outcomes were homogeneous. If results were heterogeneous, we would undertake subgroup analysis to identify the reasons for heterogeneity. We would apply the random-effects model if we could find no reason for heterogeneity.

If the nature of the included studies did not allow for statistical analysis, we would use narrative (qualitative) summaries to present study results.

**Subgroup analysis and investigation of heterogeneity**

If we found significant heterogeneity, we would not pool the data and we would present a summary of methodological quality and study results. We would consider reasons for heterogeneity by performing subgroup analysis with regard to:

* length of time to follow-up;
* PIPJ and MCPJ outcomes separately, as it is well recognised that MCPJ contractures correct better than PIPJ contractures;
* severity of disease before operation (when provided, we expect that this will be given in the form of total passive extension deficit (i.e. sum of the passive extension deficit at the MCPJ and the PIPJ);
* number of joints involved; and
* postoperative treatment offered.

**Sensitivity analysis**

Outcome measures (e.g. the definition of recurrence) have been explained differently (Becker 2010). If appropriate, we would perform a sensitivity analysis to examine whether results vary according to different definitions used.
We would undertake sensitivity analysis in cases of missing data (e.g. intention-to-treat vs per-protocol analysis) to examine variations between approaches to analysis.

**RESULTS**

**Description of studies**

**Results of the search**
The search yielded 2464 references (see Figure 1). We removed 103 duplicates before screening abstracts.
Figure 1. Study flow diagram.
Of the remaining 2361 studies, we reviewed 16 full-text articles. We could not classify two because the full-text article did not adequately describe the study design, and it was not clear if studies were randomised or pseudorandomised (Hazarika 1979; Ward 1976). Both articles are over 35 years old, and we could not obtain clarification from study authors. We included 14 full-text articles in the review (see Characteristics of included studies and Bhatia 2002; Bulstrode 2004; Chignon-Sicard 2012; Citron 2003; Citron 2005; Collis 2013; Degreef 2014; Howard 2009; Jerosch-Herold 2011; Kemler 2012; McMillan 2012; Ullah 2009; van Rijssen 2006; van Rijssen 2012a), and we excluded 2264 studies. These 14 articles described 13 studies, with one study described in both an early outcome paper (van Rijssen 2006) and a late outcome paper (van Rijssen 2012a).

Included studies

Eleven studies were single-centre studies; seven of these were based in the United Kingdom and one each in Canada, France, Belgium and New Zealand. Two articles were reports of one trial based in the Netherlands. We identified two multi-centre studies (Jerosch-Herold 2011; Kemler 2012). All five centres in Jerosch-Herold 2011 were located in the UK. Both centres in Kemler 2012 were located in the Netherlands. All studies were published in English. One study (Jerosch-Herold 2011) had an associated publication, which presented the trial protocol (Jerosch-Herold 2008). The 14 studies included 940 participants; the 93 reported in van Rijssen 2012a were the same as those described in van Rijssen 2006. Thus 847 individual participants were recruited across all studies.

Interventions studied

We identified no articles in which investigators compared surgery versus observation. Three articles described the outcomes of two trials that compared different surgical procedures (Ullah 2009; van Rijssen 2006; van Rijssen 2012a). One trial compared use of firebreak full-thickness skin grafts (a type of dermofasciectomy) versus z-plasty closure of a limited fasciectomy. Study authors refer to the original description of firebreak grafts in Hueston 1984. Here, firebreak grafts were described as small grafts strategically placed at flexion creases. In contrast, traditional dermofasciectomy may involve resurfacing of much larger areas of palmar skin (Seah 2012), which was achieved by conducting a limited fasciectomy, then excising palmar skin to accommodate the skin graft among those randomly assigned to this cohort. The other two articles reported early and late outcomes, respectively, for a single trial comparing needle fasciotomy versus limited fasciectomy.

Four of the other eleven articles compared surgical incision and wound management options (Bhatia 2002; Citron 2003; Citron 2005; Howard 2009). Bhatia 2002 and Howard 2009 compared staple closure against suture closure, and absorbable versus non-absorbable suture closures, respectively - both in limited fasciectomy. Citron 2003 and Citron 2005 studied types of incisions used for limited fasciectomy.

Three publications studied adjunctive treatments to surgery: One investigated bathing the operation site in 5-fluorouracil versus saline before closure (Bulstrode 2004), one compared use of steroid injections in conjunction with needle fasciotomy versus no adjunctive treatment (McMillan 2012) and the other compared tamoxifen versus placebo as neoadjuvant treatment in conjunction with fasciectomy (Degreef 2014).

The other four trials studied non-invasive adjuncts to surgery: Collis 2013, Jerosch-Herold 2011 and Kemler 2012 studied use of postoperative splints versus no splints, and Chignon-Sicard 2012 investigated use of a fibrin- and platelet-rich fibrin plug as a primary dressing versus a conventional low-adherence dressing for open palm surgery. These different interventions can be used to classify studies into:

- those studying different treatment options;
- those refining a treatment option (e.g., limited fasciectomy incisions, closure types, invasive adjuncts, equipment usage); and
- those refining rehabilitation.

The first group comprises Ullah 2009, van Rijssen 2006 and van Rijssen 2012a, three other articles describe refining rehabilitation (Collis 2013; Jerosch-Herold 2011; Kemler 2012) and the remaining eight explore ways to refine intraoperative techniques.

Inclusion and exclusion criteria

Criteria were not always specified. Two articles did not provide inclusion and exclusion criteria (Bhatia 2002; Howard 2009). Of the other 12 studies, four specified age-related cutoffs for recruitment: younger than 70 years (Bulstrode 2004) and over 18 years of age (Chignon-Sicard 2012; Jerosch-Herold 2011; Kemler 2012). One study did not describe the ratio of participant genders (Howard 2009). None of the others explicitly excluded potential participants on the basis of gender, although one comprised only male participants (Bulstrode 2004).

Four studies excluded patients undergoing revision surgery (Citron 2003; Citron 2005; Degreef 2014; McMillan 2012). Of these, one study also excluded patients who had previously undergone other types of hand surgery (McMillan 2012).

Three studies specified site of disease within the hand. Citron 2003 included only patients with palmar disease affecting the MCPJ. In contrast, Ullah 2009 included only those with 30 or more degrees of contracture at the PIPJ. Jerosch-Herold 2011 excluded thumb
and first webspace treatments. Citron 2005 recruited participants with Dupuytren’s disease in one ray only. Some studies used exclusion criteria related to co-morbidities that might influence outcome: Citron 2005, Ullah 2009, van Rijssen 2006 and van Rijssen 2012a excluded patients with bleeding tendencies. Diabetes mellitus was an exclusion criterion in Chignon-Sicard 2012 and McMILLAN 2012. Some specific criteria were related to study design. For example, in Bulstrode 2004, participants had to receive treatment for two rays in one procedure, as one was randomly assigned to receive 5-fluorouracil, and the other to receive the control treatment of normal saline. In van Rijssen 2006 (and therefore van Rijssen 2012a), participants had to have well-defined cords of disease. This is a requirement for suitability for needle fasciotomy. Degreef 2014 excluded premenopausal women, patients taking anti-inflammatory drugs, those with a history of malignancy and patients with known allergy to tamoxifen.

Unit of analysis
The predicted unit of analysis was that randomisation would be performed by ‘hand’. This could lead to enrolment of the same patient twice for surgery to each hand on separate occasions. van Rijssen 2006 and van Rijssen 2012a included four such cases. In contrast, in McMILLAN 2012, one participant with bilateral disease was entered only once in the trial. Similarly, in Citron 2005, six participants presented for randomisation twice for treatment of bilateral disease. They were enrolled only once in the trial. In the latter studies, the unit of randomisation was the ‘patient’. Other studies reported specific individualised methods. Bulstrode 2004 used an internal control, with one digit on a hand randomly assigned to treatment, and another to control.

In terms of reporting recurrence, van Rijssen 2012a presented the number of hands and the number of participants who had developed deformity greater than 20 degrees in one joint. Other studies presented recurrence per participant (Citron 2003; Citron 2005; Degreef 2014). The only other study investigating recurrence was Ullah 2009, in which recurrence was described as the percentage of fingers that showed recurrence, rather than as the proportion of hands or participants.

Outcome measures
Outcomes measured varied between studies (Table 1). Specific outcomes were used for particular studies. Length of follow-up varied between papers. Those investigating rehabilitation and early recovery varied from two-week follow-up (Bhatia 2002; Howard 2009) to six-week follow-up (van Rijssen 2006). Late outcome papers varied in length of follow-up from two years (Citron 2003; Citron 2005; Degreef 2014) to five years (van Rijssen 2012a).

Hand function
Several trials presented patient-reported outcomes. These included previously published patient-reported outcome measures (PROMs) such as DASH scale scores (Collis 2013; Degreef 2014; Jerosch-Herold 2011; van Rijssen 2006; van Rijssen 2012a) or the PEM (Ullah 2009). The design of studies such as Bulstrode 2004, with two digits on the same hand randomly assigned to different groups, would have prevented meaningful interpretation of patient-reported outcomes such as hand function.

Patient satisfaction and other patient-rated outcomes
Studies comparing procedure types (van Rijssen 2006; van Rijssen 2012a) reported patient satisfaction. However, although statistical significance was presented, investigators did not present full data. Furthermore, they did not describe or reference the development, validity and reliability of tools used to assess satisfaction. Collis 2013, Degreef 2014 and Jerosch-Herold 2011 also assessed satisfaction. Kemler 2012 assessed patient-perceived change. Some studies included self reported pain assessed by a visual analogue scale (VAS) (Bhatia 2002; Howard 2009; Kemler 2012). One study (Bhatia 2002) also reported patient-assessed wound appearance, although development, validity or reliability of the tool used was not described or referenced.

Early angles and other objective outcomes
Angular deformity was presented in different ways. Some investigators presented active finger angles (Bulstrode 2004; Collis 2013; Jerosch-Herold 2011; Kemler 2012; McMILLAN 2012), and others presented passive angles (van Rijssen 2006; van Rijssen 2012a). In some studies, it was not clear whether the angles presented were active or passive (Citron 2003; Citron 2005; Degreef 2014; Ullah 2009). Presentation of angular measurements varied between early and late outcomes of the same clinical trial (van Rijssen 2006; van Rijssen 2012a). Other objective outcomes measured included timings. Three studies presented analyses of time taken to perform key tasks involved in surgery or postoperative care (Bhatia 2002; Howard 2009; Ullah 2009). Bulstrode 2004 and Chignon-Sicard 2012 presented time to healing. Collis 2013 and Ullah 2009 studied grip strength.

Recurrence
Studies that reported comparisons of operative technique considered recurrence in late outcome papers (Citron 2003; Citron 2005; Degreef 2014; Ullah 2009; van Rijssen 2012a) and extension deficit at early outcome points (Ullah 2009; van Rijssen 2006). The definition of recurrence varied from reappearance of palpable disease in the operated field (Citron 2003; Citron 2005) to recurrent angular deformity (Degreef 2014; Ullah 2009; van Rijssen 2012a).
Within trials comparing different procedures, recurrence was defined as an increase in joint angle of 20 or more degrees in van Rijssen 2012a and was not explicitly defined in Degreef 2014 or Ullah 2009. However, researchers discussed ‘progressive recurrence of contracture’, suggesting that angular deformity rather than reappearance of palpable disease accounted for this.

Adverse effects
Adverse effect reporting varied from not studying complications in a study of rehabilitation adjuncts (Jerosch-Herold 2011), to describing ‘no intraoperative complications’ (Bulstrode 2004) or ‘no complications’ (Citron 2003), to describing and attempting to quantify specific complications (Chignon-Sicard 2012). No standardisation was evident regarding which adverse effects were studied, even between similar studies.

Cost-effectiveness
No included studies presented formal cost-effectiveness analyses, although several articles did assess cost-effectiveness. However, these studies were not randomised and were not pseudorandomised, so we excluded them. Three studies presented analyses of time taken to perform aspects of surgery or postoperative care (Bhatia 2002; Howard 2009; Ullah 2009) that would be expected to have cost-effectiveness implications.

Summary
The primary objective of this review was to study trials comparing different treatment options. This group comprises only three papers describing two trials, and these two trials compared different interventions using different inclusion and exclusion criteria. Ullah 2009 compared small firebreak full-thickness skin grafting versus z-plasty closure of limited fasciectomy for contractures involving the PIPJ. In contrast, van Rijssen 2006 and van Rijssen 2012a described a trial comparing needle fasciectomy versus limited fasciectomy, with inclusion criteria including contractures that may not necessarily affect the PIPJ.

Among trials refining intraoperative techniques, all compared different interventions. Among trials refining rehabilitation adjuncts, two (Collis 2013; Jerosch-Herold 2011) investigated the same intervention using comparable measures and time points, allowing meta-analysis.

Excluded studies
In all, we excluded 450 studies on the basis of Q1 in Appendix 9 (i.e. they did not report the outcome of a clinical trial), and 1847 on the basis of Q2 in Appendix 9 (i.e. study participants had not undergone surgery for Dupuyten’s disease of the fingers). We excluded two publications on the basis of Q3 in Appendix 9, as investigators reported a study protocol but no results (Jerosch-Herold 2008 reported the study protocol for Jerosch-Herold 2011). We excluded 34 studies on the basis of Q4 in Appendix 9 (i.e. two interventions were not compared, or no control group was included), and nine studies on the basis of Q5 in Appendix 9 (i.e. these studies were not randomised and were not pseudorandomised). We have described the studies in these three categories under Characteristics of excluded studies.

Three studies provided inadequate details in the abstract and references to allow a decision (Gazdzik 1997; Slullitel 1987; Yoshida 1998), and we could not obtain the original paper. We excluded them on this basis.

Risk of bias in included studies
We presented risk of bias for each study under Characteristics of included studies and summarised study results in Figure 2 and Figure 3.
Figure 2. Risk of bias graph: review authors’ judgements about each risk of bias item presented as percentages across all included studies.
Figure 3. Risk of bias summary: review authors’ judgements about each risk of bias item for each included study.
Allocation

Three trials did not explain the randomisation process used, and one used alternation. The remaining nine studies used acceptable randomisation processes. Allocation concealment was poorly described, with only three studies adequately describing secure processes. Allocation concealment processes were robust in Chignon-Sicard 2012, Citron 2005 and Jerosch-Herold 2011 only. The former two of these studies listed here described sealed, sequentially numbered opaque envelopes, whereas Jerosch-Herold 2011 used telephone randomisation from another site but did not specify how the random sequence was generated. Four other articles used numbered sealed containers (envelopes or boxes) but did not describe whether they were opaque (Degreef 2014; Ullah 2009; van Rijsen 2006; van Rijsen 2012a). Other studies provided similar inadequate details on concealment.

Blinding

As the treatment involved is a surgical procedure, it is acknowledged that many trials are likely to be at high risk of performance bias, as the surgical team performing the procedure cannot always be blinded. In Degreef 2014, double-blinding was possible, as the intervention was a medical adjunct to surgery. However, trials of wound closure and adjuncts could defer randomisation until after the corrective element of the procedure had been completed. This was done only in Ullah 2009. Several other studies (Bhatia 2002; Bulstrode 2004; Chignon-Sicard 2012; Howard 2009; McMillan 2012) could have deferred randomisation in this way to reduce the impact of performance bias on other parts of the procedure, but they did not.

Few studies explicitly described blinding of assessment. Bulstrode 2004 employed double-blinding of the participant as well as the assessor. It is acknowledged that such blinding may be difficult to achieve in comparisons of procedures that leave distinctive and very different scar patterns on the hand (such as needle fasciotomy and fasciectomy). Chignon-Sicard 2012 also described blinding of outcome assessment.

Incomplete outcome data

Several studies did not formally describe attrition. van Rijsen 2012a, the study with the longest follow-up period, described significantly different levels of attrition between groups, which could have been influenced by treatment outcomes. Articles classified as having ‘unclear’ risk did not explicitly describe levels of attrition experienced.

Selective reporting

One study (Howard 2009) excluded outliers despite formal testing of the normality of data distribution and the decision to use non-parametric statistics. The primary conclusion of the study could become invalid with these outliers included in the analysis. Researchers described no protocol for their exclusion. One further study (Ullah 2009) listed the greatest number of secondary outcomes but did not describe them in detail and presented some only graphically.

Other potential sources of bias

As many studies were expected to be unblinded, we considered risks of blocked randomisation in such studies. This risk was unclear in four articles (Chignon-Sicard 2012; Citron 2003; Collis 2013; Jerosch-Herold 2011), which provided inadequate detail to allow exclusion of this risk of bias.

Effects of interventions

See: Summary of findings for the main comparison Summary of findings table 1: comparison of operation types: early results of needle fasciotomy vs limited fasciectomy for Dupuytren's disease; Summary of findings 2 Summary of findings table 2: comparison of operation types: late results of needle fasciotomy vs limited fasciectomy for Dupuytren's disease; Summary of findings 3 Summary of findings table 3: comparison of operation types: firebreak skin grafting vs z-plasty closure of fasciectomy for Dupuytren's disease; Summary of findings 4 Summary of findings table 4: refining rehabilitation: three months of postoperative night splinting with hand therapy vs hand therapy alone for rehabilitation following surgery for Dupuytren's disease

Comparison of procedure types

Needle fasciotomy versus fasciectomy

One trial compared these procedures and reported early and late outcomes separately (van Rijsen 2006; van Rijsen 2012a). The early outcome article (van Rijsen 2006) reported 125 hands in 121 participants. The late outcome article (van Rijsen 2012a) included 93 participants from the original cohort. This comparison involved low-quality evidence related to study design limitations and imprecision.

Hand function

Low-quality evidence suggests that hand function, as determined by the DASH PROM, may be statistically significantly less after needle fasciotomy than after fasciectomy at all time points up to...
five weeks following surgery (P value = 0.017 at five weeks) (van Rijssen 2006). However, only 97 of 121 (80%) participants completed the PROM tool adequately to allow analysis. van Rijssen 2012a provided no evidence describing later functional outcomes.

Patient satisfaction and other patient-rated outcomes
Low-quality evidence indicates that patient satisfaction may be significantly greater for the needle fasciotomy group than for the fasciectomy group at six weeks (P value = 0.003 in van Rijssen 2006). Low-quality evidence also shows that by five years, patient satisfaction had reversed; satisfaction was significantly greater for fasciotomy (P value < 0.001 in van Rijssen 2012a), and overall satisfaction was less among patients with recurrence (P value < 0.001 in van Rijssen 2012a). However, the tools used may not have been robustly developed or validated, as has been discussed (Description of studies), and data presented were incomplete.

Early angles and other objective outcomes
Low-quality evidence suggests that correction of total passive extension deficit was not different between procedures for milder contractures (Tubiana stages I and II, which equates to total passive extension deficit across all joints less than 90 degrees) by six weeks, but limited fasciectomy achieved significantly better correction for more severe contractures (Tubiana stages III and IV, i.e. over 90 degrees of total passive extension deficit) (see Table 2).

Recurrence
Low-quality evidence indicates that recurrence may be significantly greater five years after needle fasciotomy (84.9% of hands after fasciotomy vs 20.9% of hands after fasciectomy; P value < 0.001 in van Rijssen 2012a).

Adverse effects
Low-quality evidence suggests that complication rates were similar between procedures in terms of infection, haematoma, wound slough, skin fissure, sympathetic dystrophy, altered sensation, digital nerve injury, tendon injury and revision surgery. The incidence of paraesthesia was statistically significantly greater after limited fasciectomy than after fasciotomy one week after treatment (P value = 0.013).

Cost-effectiveness
No published data were found comparing the cost-effectiveness of needle fasciotomy and fasciectomy.

Summary
Evidence indicates that needle fasciotomy delivered better satisfaction and function than fasciectomy at early outcomes, although poor rates of completion of the PROM were an issue. Fasciotomy was more effective in correcting severe disease. Recurrence was greater at five years after needle fasciotomy, although functional outcomes had not been described. The cost-effectiveness of performing multiple needle fasciotomies rather than a single fasciectomy over a given period had not been studied. Study design limitations and imprecision reduced the quality of the evidence. At present, evidence in key areas is insufficient to show which treatment is superior overall.

Dermofasciectomy versus fasciectomy
One study compared firebreak skin grafting versus direct closure of fasciectomy (Ullah 2009) and provided low-quality evidence. Investigators included 79 participants and presented a large quantity of data only graphically.

Hand function
Hand function, as determined by the PEM PROM, was not different between fasciectomies and firebreak dermofasciectomies at 36 months. Investigators presented earlier time points only graphically.

Patient satisfaction and other patient-rated outcomes
We found no published data that compared these outcomes for fasciectomies and firebreak dermofasciectomies.

Early angles and other objective outcomes
Grip strength, angular deformity and motion at the PIPJ all correlated at 36 months. No differences between groups were evident throughout the study, although the data supporting this were presented graphically only.

Recurrence
We noted no differences between firebreak dermofasciecetomies and fasciectomies in terms of recurrence, defined as progressive contracture, and time to recurrence.

Adverse effects
We found no differences between procedures in terms of antibiotic requirement, skin necrosis, wound dehiscence, radial hypoaesthesia or reflex sympathetic dystrophy. We noted a significantly greater incidence of ulnar hypoaesthesia after firebreak dermofasciectomy.
Cost-effectiveness
We identified no formal cost-effectiveness analysis data. However, we noted that firebreak dermofasciectomy took significantly longer to perform than fasciectomy involving z-plasty closure (79 vs 66 minutes; P value = 0.01).

Summary
Low-quality evidence indicates that firebreak dermofasciectomy and fasciectomy with z-plasty closure performed similarly. Given that firebreak dermofasciectomy took longer to perform, evidence does not support its routine use. However, we cannot extend this conclusion to other approaches to dermofasciectomy involving larger skin grafts. We obtained no data on comparison of other approaches versus dermofasciectomy and fasciectomy.

Technical refinements

Type of incision
Two articles studied incisions and included 30 and 100 participants, respectively. The first compared z-plasty closure versus direct closure of a transverse incision for fasciectomy (Citron 2003). The second compared a zig-zag (Bruner’s) incision with direct closure versus a longitudinal incision with z-plasty closure for fasciectomy (Citron 2005). Researchers provided low-quality evidence related to study design limitations and imprecision.

Hand function
We found no data that described this.

Patient satisfaction and other patient-rated outcomes
We found no data that described this.

Early angles and other objective outcomes
We found no evidence of differences between a zig-zag incision and a z-plasty closure in terms of deformity or extension.

Recurrence
Low-quality evidence suggests that z-plasty closure of a palmar fasciectomy had significantly less recurrence ( reappearance of palpable disease) than was seen with direct closure of a transverse incision (P value < 0.01 when trial recruitment was stopped at the interim analysis point in Citron 2003). Researchers reported no differences in recurrence defined this way between a zig-zag incision and a z-plasty closure.

Adverse effects
Investigators in Citron 2003 encountered no complications. In Citron 2005, researchers comparing a zig-zag incision versus a z-plasty reported no differences in total complications, algodystrophy and digital nerve injury.

Cost-effectiveness
We identified no formal cost-effectiveness analysis data.

Summary
Low-quality evidence supported z-plasty closure over direct closure of transverse incisions for MCPJ cords and showed no differences between a zig-zag incision and a z-plasty closure for fasciectomy.

Wound closure

Hand function
We found no data that described this.

Patient satisfaction and other patient-rated outcomes
Bhatia 2002 found no differences in patient-reported wound appearance at two weeks between those who received staples and those given non-absorbable sutures. Removal of staples was more painful than removal of non-absorbable sutures (P value = 0.008 in Bhatia 2002). Howard 2009 found no differences in visual analogue scale (VAS) pain scores between absorbable and non-absorbable suture groups at the first postoperative visit.

Early angles and other objective outcomes
Staple closure was quicker to perform than non-absorbable suture closure (P value < 0.001 in Bhatia 2002). Absorbable suture closure incurred less clinic time for management than non-absorbable suture closure, once outliers were excluded (P value = 0.003 in Howard 2009). However, exclusion of outliers from a non-parametric analysis may not have been appropriate and may invalidate this finding.

Recurrence
We found no data that described this.
Adverse effects
Neither study performed formal analyses of differences in complications between groups. However, complication rates were low for both groups in both studies.

Cost-effectiveness
We identified no formal cost-effectiveness analysis data. Analysis of timings as presented in Howard 2009 may not be robust, as has been explained.

Summary
Staple closure may be quicker to perform than suture closure and may achieve a comparable early wound appearance. However, removal of staples may be more painful.

Intraoperative adjuncts
Two studies investigated intraoperative adjuncts to surgery. Each considered a different intervention. Bulstrode 2004 investigated bathing a fasciectomy wound in 5-fluorouracil compared with control, included 15 participants and provided low-quality evidence. McMillan 2012 compared a postoperative series of steroid injections as an adjunct to needle fasciotomy versus no injections in 47 participants and provided low-quality evidence related to study design limitations and imprecision.

One other study (Degreef 2014) considered a medical adjunct spanning the perioperative period. Researchers compared tamoxifen versus placebo administered preoperatively and postoperatively as an adjunct to fasciectomy, included 30 participants and provided low-quality evidence.

Hand function
Degreef 2014 reported no differences in hand function as assessed by the DASH Scale at one year for tamoxifen versus placebo as an adjunct to fasciectomy. We found no other data that described this.

Patient satisfaction and other patient-rated outcomes
Degreef 2014 reported that satisfaction was not significantly different between groups at three months. We found no other data that described this.

Early angles and other objective outcomes
Bulstrode 2004 found no differences between 5-fluorouracil treatment and control treatment in terms of healing time, total active motion and loss of extension. In McMillan 2012, a series of steroid injections resulted in significantly greater percentage improvement in total active extension deficit at all time points. In Degreef 2014, relative improvement in extension deficit, as quantified by the Tubiana index, was significantly better in the tamoxifen group than in the placebo group.

Recurrence
Bulstrode 2004 found no differences between 5-fluorouracil treatment and control treatment in terms of loss of extension nor total active motion at 18 months. McMillan 2012 reported significantly greater percentage improvement in total active extension deficit at six months (65% correction for steroid group vs 41% for control group; P value = 0.04) and in MCPJs and PIPJs considered separately at six months. In Degreef 2014, only one participant in the tamoxifen group experienced recurrence.

Adverse effects
Bulstrode 2004 and McMillan 2012 reported no complications. Degreef 2014 provided a narrative description of adverse events.

Cost-effectiveness
We found no data that described this.

Summary
We found no evidence of benefit nor harm resulting from addition of a 5-fluorouracil bath at completion of a fasciectomy, although function and long-term outcomes (beyond 18 months) were not studied. Evidence suggests that a series of steroid injections provided after needle fasciectomy may achieve and maintain better correction of contractures than needle fasciectomy alone, although we found no long-term data, and available evidence was of low quality. Evidence indicates that a perioperative course of tamoxifen may improve early correction of deformity, but that any potential effect was lost by two-year follow-up.

Rehabilitation adjuncts
We identified four studies that investigated adjuncts that might aid rehabilitation. Collis 2013 and Jerosch-Herold 2011 compared three months of static postoperative splinting versus no postoperative splinting. Kemler 2012 also investigated postoperative splinting; the intervention arm underwent day and night splinting for a month, then night splinting for two months, and the study included 154 participants. Chignon-Sicard 2012 studied application of fibrin- and platelet-rich fibrin plug to open palmar wounds.
after fasciectomy to identify whether this improved healing. All studies provided low-quality evidence related to study design limitations and imprecision. The primary aim of this review had been to study operative techniques. However, as rehabilitation adjuncts are components of hand therapy in Dupuytren’s disease, these trials did meet the inclusion criteria specified in the protocol and have been included. The published article for Collis 2013 did not provide all relevant data. We contacted study authors, who provided the necessary data for per-protocol analyses.

Hand function

Hand function, as assessed with the DASH PROM, was not affected by postoperative splinting at three months, six months and 12 months (Jerosch-Herold 2011). Collis 2013 also found no effect when analysing individual time points up to three months postoperatively. In the latter study, investigators combined time points because no differences were found with a mixed-effect model.

Meta-analysis of these two studies demonstrated no significant heterogeneity at baseline (Analysis 1.1), and an intention-to-treat analysis showed no differences in function between splint and no splint groups at three-month follow-up (Analysis 2.1; Figure 4). However, per-protocol groups were different from intention-to-treat groups, as participants in the ‘no splint’ group who experienced early re-contracture were then given a splint, and some participants in the splint group were not compliant with splinting (defined as self report of < 50% compliance). No differences between ‘splint’ and ‘no splint’ groups were apparent when data were analysed per protocol (Analysis 3.1).

Figure 4. Forest plot of comparison: 2 Effects of 3 months of postoperative night splinting (intention-to-treat), outcome: 2.1 DASH score at 3 months.

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>No Splint Mean</th>
<th>SD</th>
<th>Total</th>
<th>Mean Difference IV, Random, 95% CI</th>
<th>Mean Difference IV, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collis 2013</td>
<td>11</td>
<td>16</td>
<td>29</td>
<td>10</td>
<td>1.00 [-5.85, 7.85]</td>
</tr>
<tr>
<td>Jerosch-Herold 2011</td>
<td>10.0</td>
<td>12.5</td>
<td>78</td>
<td>9.8</td>
<td>1.20 [-2.92, 5.32]</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>105</td>
<td>100</td>
<td>100.0</td>
<td></td>
<td>1.15 [-2.33, 4.62]</td>
</tr>
</tbody>
</table>

Patient satisfaction and other patient-rated outcomes

Patient satisfaction was not different among those receiving postoperative splinting and those not receiving splinting, as assessed by an 11-point verbal rating scale (Jerosch-Herold 2011). However, the validity and reliability of this scale were not described or cited. Patient-perceived changes were not significantly different between groups in Kemler 2012.

Early angles and other objective outcomes

As with hand function, no significant heterogeneity between studies was apparent at baseline (Analysis 1.2; Analysis 1.3). Total active flexion and total active extension were not different among those who received postoperative splinting at three, six or 12 months (Jerosch-Herold 2011). Collis 2013 found no differences in total active extension or flexion. Meta-analysis of three-month follow-up results from both studies revealed no differences in total active extension between splint and no splint groups (Analysis 2.2; Figure 5) but showed a significant difference in total active flexion, with splint group participants achieving 8.42 degrees less total active flexion than no splint group participants (Analysis 2.3; Figure 6). As discussed in the section on hand function above, intention-to-treat analyses were complicated by the fact that some in the ‘no splint’ group were given a splint if they experienced early re-contracture, and some in the ‘splint’ group were non-compliant. When meta-analyses were performed on the basis of per-protocol data, no differences were found between groups in terms of total active extension (Analysis 3.2), but the significant difference in total active flexion shown in Analysis 2.3 was more pronounced (Analysis 3.3).
Figure 5. Forest plot of comparison: 2 Effects of 3 months of postoperative night splinting (intention-to-treat), outcome: 2.2 Total active extension at 3 months [degrees].

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>No-Splint Mean [degrees]</th>
<th>No-Splint SD [degrees]</th>
<th>Total</th>
<th>Splint Mean [degrees]</th>
<th>Splint SD [degrees]</th>
<th>Total</th>
<th>Weight</th>
<th>IV, Random, 95% CI [degrees]</th>
<th>Mean Difference IV, Random, 95% CI [degrees]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2.1 Middle finger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collins 2013</td>
<td>30</td>
<td>5</td>
<td>41</td>
<td>18</td>
<td>7</td>
<td>7</td>
<td>2.9%</td>
<td>4.00 [3.26, 4.74]</td>
<td></td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No-Splint</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Splint</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: Not applicable Test for overall effect: Z = 2.27 (P = 0.02)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 6. Forest plot of comparison: 2 Effects of 3 months of postoperative night splinting (intention-to-treat), outcome: 2.3 Total active flexion at 3 months [degrees].

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>No-Splint Mean [degrees]</th>
<th>No-Splint SD [degrees]</th>
<th>Total</th>
<th>Splint Mean [degrees]</th>
<th>Splint SD [degrees]</th>
<th>Total</th>
<th>Weight</th>
<th>IV, Random, 95% CI [degrees]</th>
<th>Mean Difference IV, Random, 95% CI [degrees]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2.1 Middle finger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collins 2013</td>
<td>30</td>
<td>5</td>
<td>41</td>
<td>18</td>
<td>7</td>
<td>7</td>
<td>2.9%</td>
<td>4.00 [3.26, 4.74]</td>
<td></td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No-Splint</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Splint</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: Not applicable Test for overall effect: Z = 2.27 (P = 0.02)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chignon-Sicard 2012 reported statistically significantly shorter healing delay from application of a fibrin- and platelet-rich fibrin plug to the open palmar wound versus control (median 24 days vs median 29 days) but no differences in secondary endpoints.

Recurrence

Adverse effects
Chignon-Sicard 2012 studied bleeding and exudate and reported no significant differences between intervention and control groups. Investigators discussed other rare adverse events, including wound and chest infection.
Cost-effectiveness
No articles provided formal cost-effectiveness analysis data.

Summary
Evidence showing that postoperative splinting improves rehabilitation after fasciectomy or dermofasciectomy is lacking, but available evidence shows that three months of night splinting reduces total active flexion at three months.
**ADDITIONAL SUMMARY OF FINDINGS**

Comparison of operation types: late results of needle fasciotomy vs limited fasciectomy for Dupuytren’s disease

**Patient or population:** 93 participants (van Rijssen 2012a)
**Settings:** single-centre Dutch study
**Intervention:** needle fasciotomy
**Comparison:** limited fasciectomy

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Illustrative comparative risks* (95% CI)</th>
<th>Number of participants (studies)</th>
<th>Quality of the evidence (GRADE)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Assumed risk</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Corresponding risk</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limited fasciectomy</td>
<td>Needle fasciotomy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DASH hand function score at 5 years</td>
<td>See comment</td>
<td>See comment</td>
<td>See comment</td>
<td>See comment</td>
</tr>
</tbody>
</table>
| Patient satisfaction at 5 years | Mean satisfaction score in fasciectomy group was 8.3 | Mean satisfaction score in fasciectomy group was 2.1 lower than in fasciectomy group | 93 (1 study) | ⬤�������� 
**Low** | P value <0.001 as quoted in van Rijssen 2012a 
Likelihood of selecting treatment again significantly higher after fasciectomy (P value = 0.008) 
Insufficient detail in article to allow calculation of 95% CI (standard deviations not provided) |
<table>
<thead>
<tr>
<th>Major outcome group 3 (early angular outcome)</th>
<th>See comment</th>
<th>See comment</th>
<th>See comment</th>
<th>See comment</th>
</tr>
</thead>
</table>

**Recurrence at 5 years**

<table>
<thead>
<tr>
<th>Major outcome group 4 (recurrence)</th>
<th>See comment</th>
<th>See comment</th>
<th>See comment</th>
<th>See comment</th>
</tr>
</thead>
</table>

- **209 per 1000**
- **849 per 1000**
- **93 (1 study)**

*Progressive angular deformity defined in van Rijssen 2006 as an increase in TPED ≥ 30 degrees. In van Rijssen 2012a, different definitions used (increase of 20 degrees in a successfully treated joint) in other studies of Dupuytren's disease, such as Hurst 2009, acknowledged and applied. P value <0.001 in van Rijssen 2012a. Relative effect not calculated, as only study available. Recurrence rate influenced by the definition of recurrence used, and by length of follow-up period.*

**Major outcome group 5 (adverse effects)**

- **see comment**
- **see comment**
- **see comment**
- **see comment**

*Not discussed in van Rijssen 2012a; analysed in van Rijssen 2006.*

---

*The basis for the assumed risk (e.g. median control group risk across studies) is provided in footnotes. The corresponding risk (and its 95% confidence interval) is based on the assumed risk in the comparison group and the relative effect of the intervention (and its 95% CI). CI: Confidence interval; DASH: Disabilities of the Arm, Shoulder and Hand Scale; PROM: Patient-reported outcome measure; RR: Risk ratio; TPED: Total passive extension deficit.*

GRADE Working Group grades of evidence.

- **High quality**: Further research is very unlikely to change our confidence in the estimate of effect.
- **Moderate quality**: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
- **Low quality**: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
- **Very low quality**: We are very uncertain about the estimate.
Quality of evidence for patient satisfaction at 5 years downgraded from high to low because of significant risks of bias in van Rijssen 2012a, and as the result of imprecision.

Early angular outcomes and adverse effects not considered in this table, as these are relevant to early outcome assessment, and so are included in the previous 'Summary of findings' table.

Quality of evidence for recurrence at 5 years downgraded from high to low because of significant risks of bias in van Rijssen 2012a, and as the result of imprecision.

Early angular outcomes and adverse effects not considered in this table, as these are relevant to early outcome assessment, and so are included in the previous 'Summary of findings' table.
## Comparison of operation types: firebreak skin grafting vs z-plasty closure of fasciectomy for Dupuytren’s disease

**Patient or population:** 79 participants (*Ullah 2009*)  
**Settings:** single-centre UK study  
**Intervention:** firebreak skin grafting to close incision  
**Comparison:** z-plasty closure of incision

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Illustrative comparative risks* (95% CI)</th>
<th>Number of participants (studies)</th>
<th>Quality of the evidence (GRADE)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Assumed risk</td>
<td>Corresponding risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>z-plasty</td>
<td>Firebreak skin grafting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEM hand function score at 3 years</td>
<td>See comment</td>
<td>See comment</td>
<td>79 (1 study)</td>
<td>☃️compareToLow*</td>
</tr>
<tr>
<td>Major outcome group 1 (hand function)</td>
<td>(scores between 0 and 77, where 0 represents no impairment in hand function and 77 represents maximum impairment in hand function)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major outcome group 2 (patient satisfaction and other PROM)</td>
<td>See comment</td>
<td>See comment</td>
<td>See comment</td>
<td>See comment</td>
</tr>
<tr>
<td>Correction of MCPJ and PIPJ deformities at 2 weeks</td>
<td>All MCPJs fully corrected Mean PIPJ correction 6 degrees in the z-plasty group</td>
<td>All MCPJs also fully corrected Mean PIPJ correction no different (also 6 degrees) in the skin graft group from the z-plasty group</td>
<td>79 (1 study)</td>
<td>☃️compareToLow*</td>
</tr>
</tbody>
</table>

*Data represented graphically only; differences between groups described as not statistically significant; no P value provided.*
<table>
<thead>
<tr>
<th>Major outcome group</th>
<th>3 years</th>
<th>5 (adverse effects)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Progressive contracture by 3 years</strong>&lt;br&gt;Major outcome group 4 (recurrence)</td>
<td>109 per 1000</td>
<td>136 per 1000</td>
</tr>
<tr>
<td><strong>Hypoaesthesia</strong>&lt;br&gt;Major outcome group 5 (adverse effects)</td>
<td>Radial digital nerve territory: 217 per 1000&lt;br&gt;Ulnar digital nerve territory: 217 per 1000</td>
<td>Radial digital nerve territory: 341 per 1000&lt;br&gt;Ulnar digital nerve territory: 455 per 1000</td>
</tr>
</tbody>
</table>

| | 79 | (1 study) | ⚫⚫⚫(*) | Low *(c)* |
|---------------------|--------|---------------------|

P value = 0.17 in *Ullah 2009*
Rates assessed per finger (90 fingers treated among 79 participants)

P value = 0.2 for radial digital nerve territory in *Ullah 2009*
P value = 0.03 for ulnar digital nerve territory in *Ullah 2009*

*The basis for the **assumed risk** (e.g. median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

**CI:** Confidence interval; **MCPJ:** Metacarpophalangeal joint; **PEM:** Patient Evaluation Measure; **PIPJ:** Proximal interphalangeal joint; **PROM:** Patient-reported outcome measure; **RR:** Risk ratio.

**GRADE Working Group grades of evidence.**

- **High quality:** Further research is very unlikely to change our confidence in the estimate of effect.
- **Moderate quality:** Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
- **Low quality:** Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
- **Very low quality:** We are very uncertain about the estimate.

*Quality of evidence for PEM hand function score at 3 years downgraded from high to low, as neither data nor P value was provided to support statement, and as the result of imprecision.

*Quality of evidence downgraded from high to low because of risks of bias and imprecision.*
### Refining rehabilitation: three months of postoperative night splinting with hand therapy vs hand therapy alone for rehabilitation following surgery for Dupuytren’s disease

**Patient or population:** 210 participants with Dupuytren’s disease of the fingers in 2 studies (225 digits reported across all studies) (Collis 2013; Jerosch-Herold 2011)

**Settings:** multi-centre UK RCT and single-centre New Zealand RCT

**Intervention:** three months of night splinting in extension in addition to hand therapy (‘splint’)

**Comparison:** hand therapy alone (‘no splint’)

---

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Illustrative comparative risks* (95% CI)</th>
<th>Number of participants (studies)</th>
<th>Quality of the evidence (GRADE)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Assumed risk</td>
<td>Corresponding risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No splint</td>
<td>Splint</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DASH hand function score at 3 months</strong></td>
<td>Mean DASH ranged across ‘no splint’ groups from 10.8 to 11</td>
<td>Mean DASH in ‘splint’ groups was 1.15 lower (95% CI -2.32 to 4.62) than in ‘no splint’ groups</td>
<td>205 participants (2 studies)</td>
<td>⚫⚫⚫⚫ Low&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Major outcome group 1 (hand function) (scores between 0 and 100, where 0 represents no impairment in hand function and 100 represents maximum impairment in hand function)</td>
<td>See comment</td>
<td>See comment</td>
<td>See comment</td>
<td>See comment</td>
</tr>
<tr>
<td><strong>Total active extension at 3 months</strong></td>
<td>Mean TAE ranged across ‘no splint’ groups from 24 degrees to 33 degrees</td>
<td>Mean TAE in ‘splint’ groups was 2.21 degrees higher (95% CI -3.59 to 8.01) than in ‘no splint’ groups</td>
<td>225 digits (2 studies)</td>
<td>⚫⚫⚫⚫ Low&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>
### Major outcome group 4 (re-currence)

*See comment*

*See comment*

*See comment*

*See comment*

*Not assessed in these studies*

### Major outcome group 5 (ad-verse effects)

**Total active flexion at three months**

**Major outcome group 5 (ad-verse effects)**

**Total active flexion (TAF) of MCPJ, PIPJ and DIPJ; lower value indicates loss of flexion and a worse outcome**

<table>
<thead>
<tr>
<th>Major outcome group 5 (ad-verse effects)</th>
<th>See comment</th>
<th>See comment</th>
<th>See comment</th>
<th>See comment</th>
<th>Not assessed in these studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean TAF ranged across 'no splint' groups from 217.6 degrees to 245 degrees</td>
<td>Mean TAF in 'splint' groups was 8.42 degrees lower (95% CI 1.78 to 15.07) than in 'no splint' groups</td>
<td>225 digits (2 studies)</td>
<td></td>
<td></td>
<td>Conflicting findings from sub-groups Unclear whether this is the most appropriate time point for study of 'early' outcome</td>
</tr>
</tbody>
</table>

*The basis for the assumed risk (e.g. median control group risk across studies) is provided in footnotes. The corresponding risk (and its 95% confidence interval) is based on the assumed risk in the comparison group and the relative effect of the intervention (and its 95% CI).*

**CI:** Confidence interval; **DASH:** Disabilities of the Arm, Shoulder and Hand Scale; **DIPJ:** Distal interphalangeal joint; **MCPJ:** Metacarpophalangeal joint; **PIPJ:** Proximal interphalangeal joint; **RCT:** Randomised controlled trial; **TAE:** Total active extension; **TAF:** Total active flexion.

**GRADE Working Group grades of evidence.**

**High quality:** Further research is very unlikely to change our confidence in the estimate of effect.

**Moderate quality:** Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

**Low quality:** Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

**Very low quality:** We are very uncertain about the estimate.

*a,b,c* Quality of evidence was downgraded from high to low because of risks of bias and imprecision.
DISCUSSION

Summary of main results

Outcomes measured

Review authors noted variation between studies in primary outcome measures assessed. Although some of this might be expected, for example, time taken for staple removal rather than recurrence as a long-term outcome, the extent of variation within groups of studies limits the usefulness of the data presented, as well as their interpretation. Such variation is seen across lower-quality studies as well. Providing no definition of recurrence, as was the case in Ullah 2009, is commonplace (Becker 2010) and limits interpretation of data.

Recurrence defined as the reappearance of palpable disease, as in Citron 2003 and Citron 2005, is acknowledged as generating qualitative data (Werker 2012). When detection bias is a risk, as in Citron 2003, the combination of an unblinded assessor and outcomes defined in a binary but subjective manner might be expected to be unsound. Additionally, this outcome is not a sensible option for studying fasciotomy, as palpable disease is never cleared from the treated field in the first place. Therefore, its use in Citron 2003 is not appropriate.

Even within studies that use angular deformity to define outcomes and recurrence, wide variation is evident in what exactly is measured and how it is described and presented (Ball 2013). Angles may be presented as the passive angles obtained by an assessor, as in van Rijssen 2006 and van Rijssen 2012a, or as active extension achieved unsupervised by the participant, as in McMillan 2012. Such angles may differ, influencing study outcomes.

Although we could not perform meta-analysis to compare operation types because of the paucity of comparable trials, it is probable that even if additional data are generated in the future, meta-analysis would not be possible without standardisation of follow-up length and outcome measures used. As Dupuytren's disease is a slowly progressive condition (Luck 1959), recurrence is likely to increase with longer periods of follow-up. Furthermore, an understanding of the natural history of the condition (Luck 1959) suggests that recurrence defined as reappearance of palpable disease is likely to be encountered earlier than recurrence defined as deteriorating angular deformity. These inconsistencies contribute to the wide variation in recurrence rates reported in the existing literature - from 0% to 71% (Becker 2010). Other groups have noted the need for clarity and consistency (Werker 2012). This review reiterates this and calls for more detailed study of the validity and reliability of outcome measures to ensure that the most appropriate outcomes are assessed at consistent and meaningful time points. Furthermore, recurrence of palpable disease and recurrence of angular deformity may not be truly relevant endpoints. Assessment of hand function through patient-reported and patient-centred measures may be more appropriate. Some of the studies included in this review used patient-reported outcomes as a secondary endpoint.

Marked variation is evident in data reported by study authors as secondary outcomes. In part, this is a result of the study question selected, although outcomes handled as 'secondary' measures in studies were classified as appropriate primary outcome measures in this review, for example, patient-reported hand function. However, trials of procedure types and technical refinement varied in that some recorded numerous secondary measures (Ullah 2009) and others recorded virtually none other than complications (McMillan 2012). In Ullah 2009, not all outcomes were reported fully other than in graphs, raising an unclear possibility of reporting bias. Furthermore, even if the data had been fully reported, the value of capturing all outcomes is not clear. One secondary outcome measure of importance is assessment of health-related quality of life. Systems for analysing cost-effectiveness are informed by data describing this, and data are captured by PROMs such as the EuroQol 5 Domain scale (EuroQol-5D) (NICE 2008). Functional outcomes represent patient-centred outcomes and may be of pragmatic interest to commissioners of health care. Use of patient-reported data has been promoted nationally in the UK (Darzi 2008). This review cannot examine which of the range of PROMs available for use in Dupuytren's disease (Ball 2013) is most appropriate for use in future research. Recent reviews have called for further study of outcome measures (Ball 2013; Becker 2010; Werker 2012). To date, only a few studies have included patient-reported hand function. Data captured by the PEM in Ullah 2009 were not described in detail in the paper. The DASH scale used in Degreef 2014, van Rijssen 2006 and van Rijssen 2012a has been the most popular measure across all studies of Dupuytren's disease (Ball 2013). DASH data presented in van Rijssen 2006 did not support the same conclusions as were reached by measuring angles; needle fasciotomy fared better throughout early rehabilitation in terms of DASH scores, despite the fact that fasciectomy arguably provided better correction of angular deformity in general. Thus, the conclusions drawn in this paper are likely to vary considerably, depending on which outcome is considered to be of primary importance. van Rijssen 2012a did not include corresponding late outcome function data. Given the value of health-related quality of life data for accepted cost-effectiveness analyses (NICE 2008), and the wide variation in reporting of angles in the literature (Ball 2013), future pragmatic trials might consider patient-reported outcomes as the primary outcome measures, with joint angles demoted in importance. Furthermore, such a change might support the design of pragmatic studies. Ullah 2009 measured a variety of secondary outcomes. However, separating the primary outcome from complications may limit the clinical applicability of research findings. If an intervention achieves low rates of recurrence but does so with significant risk of complications such as chronic regional pain syndrome, cold intolerance and loss of grip strength or flexion, it may still fail to achieve meaningful clinical improvement for patients and cost-effectiveness for com-
missioning bodies. Reports of early and late outcomes of the trial comparing fasciectomy and needle fasciotomy (van Rijssen 2006; van Rijssen 2012a) considered patient satisfaction, as did a trial on the use of tamoxifen as an adjunct to surgery (Degreef 2014), although the validity and reliability of these assessments were not clear. As already discussed for angular measurements, further work is urgently required to establish the validity and reliability of patient-reported outcome measures.

Comparison of procedure types

We identified no studies in which surgery was compared with observation. Given that Dupuytren's disease typically is slowly progressive and is not life-threatening, such comparisons would be informative.

The trial reported in van Rijssen 2006 and van Rijssen 2012a suggests that needle fasciotomy may achieve angular correction comparable with that of limited fasciectomy for milder Tubiana I and II contractures, but inferior correction for Tubiana III and IV contractures. However, this procedure leads to less functional impairment in the early postoperative phase (up to five weeks in van Rijssen 2006), earlier recovery and higher early patient satisfaction. By five years, it results in significantly higher recurrence and lower satisfaction than fasciectomy. The considerable difference in recurrence rates between fasciotomy and fasciectomy may be interpreted as demonstrating that fasciotomy is an inferior treatment. However, attrition bias may have affected late outcomes, and late functional outcomes were not recorded. As fasciotomy is less invasive, with quicker recovery (van Rijssen 2006), recurrence alone may not comprehensively describe late functional outcomes. Patient satisfaction is an important outcome for measurement, but perhaps it should be combined with, rather than used instead of, valid measures of hand function, as it might be influenced by factors besides the functional efficacy of treatment.

It might not be reasonable to expect needle fasciotomy, a demonstrably less invasive procedure that can be repeated for recurrent disease (van Rijssen 2012b), to achieve a durable effect comparable with that achieved by the more invasive fasciectomy. A more pragmatic study might consider early and late functional outcomes in groups randomly assigned to receive one fasciectomy or multiple needle fasciotomies over a period of years, with cost-effectiveness calculated on the basis of functional outcomes and treatment pathway expenses.

Comparison of fasciectomy with z-plasty closure versus firebreak skin grafting in Ullah 2009 revealed no differences between groups, other than prolonged operation time for skin grafting. This suggests that firebreak skin grafting may not prevent recurrence better than fasciectomy. However, dermofasciectomy comprises a spectrum, with small skin grafts used as firebreaks in Ullah 2009 at one end, and much more extensive skin grafts at the other end (Seah 2012). Thus, further comparison between limited fasciectomy and dermofasciectomy is needed.

Investigations of postoperative splinting

This was the only area in which meta-analysis was possible. Recruitment for Collis 2013 began before Jerosch-Herold 2011 was published. However, earlier publication of the trial protocol for Jerosch-Herold 2011 (Jerosch-Herold 2008) facilitated standardisation. Indeed, this was the only published trial protocol that we identified. Advanced publication of trial protocols is encouraged, as this may facilitate future standardisation of outcome assessment. The functional outcome studied here was absolute DASH score at three months (rather than change in DASH score from preoperative to postoperative state), as preoperative DASH scores were not different between splint and no splint groups in either of the included studies (Collis 2013; Jerosch-Herold 2011). Furthermore, this final result represents patients' functional performance at that time. Individual splinting results from all three trials showed no beneficial or adverse effects over postoperative splinting, but meta-analysis of two of these studies showed statistically significant loss of flexion at three months caused by splinting. Whether the magnitude of the difference noted is of clinical significance, or whether it persists later in the rehabilitation period, is unclear. However, given the potentially expanded utilisation of resources needed to produce and maintain splints, we do not support their routine use.

Investigations of other questions

The primary objective of this review was to identify trials comparing different types of procedures. However, we have identified other trials within Dupuytren's disease surgery and have grouped them into trials investigating technical refinements of procedures, and trials investigating rehabilitation adjuncts. Although these studies might be considered tangential to the central aim of this review, we believe that appraising them is important to ensure that this review has been comprehensive, and that aspects of study methods and reporting have contributed to the conclusions presented here. In particular, analysing these studies informs implications for future research in this field. For example, Citron 2005 was the only included study that adequately described a randomisation process that used envelopes to provide adequate allocation concealment. As with studies comparing types of procedures, lack of comparable studies limited the performance of meta-analysis. Bhatia 2002 demonstrated that staple closure of fasciectomies may be quicker than suture closer, while showing that it resulted in greater pain at staple removal. However, this finding may be limited by the risk of bias in this study regarding allocation concealment. Citron 2003 was stopped early because a higher rate of recurrence was noted after direct closure than after z-plasty closure. However, this difference had reached P value < 0.1 rather than the more conventional P value < 0.05; also, this study had been assigned high risk of bias related to use of alternation rather than randomisation, and as the result of performance and detection biases.
Overall completeness and applicability of evidence

This systematic review has identified very few high-quality studies of Dupuytren’s disease surgery. Among the included trials, fewer still compared different procedures, and others studied refinements in practice. Despite the availability of many current treatment options for years or decades, the paucity of studies suggests that research in this field lacks direction.

Quality of the evidence

The quality of methods varied between studies. More modern studies were generally at less risk of bias. Our assessment of performance bias might be controversial. To minimise the potential for the surgeon to influence the quality of the procedure, we included blinding of the surgeon during the procedure. Achieving this blinding may be extremely challenging and may not be possible in some studies. However, clear efforts were made in Ullah 2009 to standardise the surgical procedure as far as possible, with randomisation performed intraoperatively rather than preoperatively, unlike other studies investigating an intervention of relevance to closing stages of the procedure. As a result of these efforts, excision of disease that might be considered the ‘correction’ portion of the surgery was not subject to lack of blinding, and only wound closure was unblinded. Taking such steps when possible may limit the effects of performance bias.

In addition to risks of bias related to study design limitations, we further downgraded the quality of evidence as the result of imprecision, with most comparisons based on one or two studies with small sample sizes and wide confidence intervals.

Potential biases in the review process

We explained deviations from the published protocol in the section titled Differences between protocol and review. We believe that these differences are minor and have not influenced review outcomes. Although we took explicit steps to review conference proceeding abstracts, we may have missed unpublished data. However, given the paucity of trial data identified across all sources, we believe it is unlikely that a significant volume of relevant data has not been published.

Agreements and disagreements with other studies or reviews

We are not aware of similar reviews on this topic. However, expert opinion supports the need for further research in this area to inform clinical practice.

Authors’ conclusions

Implications for practice

This review has identified insufficient evidence to inform the roles of different procedures (needle fasciotomy, fasciectomy, interposition firebreak skin grafting or z-plasty closure of fasciectomy) in the surgical treatment of patients with Dupuytren’s disease of the fingers, beyond discussion of the limited results of individual studies. Further research in this field is urgently required.

The meta-analysis performed here questions routine use of splinting following surgery for Dupuytren’s disease, and this warrants further research. Splinting may impair outcomes by reducing active flexion, although this is not clear from the data presented here. Furthermore, given the unclear role of splinting in early re-contraction, splinting should be considered on an individual patient basis until further evidence becomes available.

Implications for research

A marked paucity of randomised controlled trials on Dupuytren’s disease surgery has been noted. This is the case for comparisons of different treatment procedures, of which several are currently in use, including needle fasciotomy, fasciectomy and dermofasciectomy. The role of each of these treatments in relation to other treatments is not currently supported by high-quality evidence. Evidence related to collagenase will be considered in a separate review.

Given the need to justify the cost-effectiveness of treatments in modern healthcare systems, it might be advisable to target research towards comparisons of different procedures. At present, clinical practice in Dupuytren’s disease is not informed by high-quality evidence. Logically, studies aimed at refining treatment might be better conducted only once the effectiveness and roles of different treatments have been established.

To date, design quality and reporting of trials in Dupuytren’s disease surgery remain generally poor, with only a few examples showing good practice.

Future trials should ensure that risks of bias are minimised. As acknowledged, performance bias may prove difficult to minimise in some studies. That said, certain components of the studies included here have set precedents for processes by which risk of bias in random sequence generation, allocation concealment and outcome detection can be minimised. Future studies should endeavour to employ such robust processes, and to report them clearly.

Advanced publication of trial methods was encountered only once in this review, but it facilitated standardisation and meta-analysis. This practice is encouraged.

Before needed trials are undertaken, further study of outcome measures is needed to establish their validity and reliability for use in Dupuytren’s disease. Once this has been done, consensus and
consistency of outcome choices and time points of assessment are needed to ensure standardisation with other studies.

ACKNOWLEDGEMENTS

The authors would like to thank the Cochrane Musculoskeletal Group for support provided, and Tamara Rader and Louise Falzon for assistance in developing the search strategy.

REFERENCES

References to studies included in this review


References to studies excluded from this review

Atroshi 2014 [published data only]

Braga Silva 1999 [published data only]

Dias 2013 [published data only]

Ferry 2013 [published data only]

Galbiatti 1995 [published data only]

Cervo 2013 [published data only]
Cervo RS, Ferrando NF, Jornet JP. Use of resources and costs associated with the treatment of Dupuytren's contracture at an orthopedics and traumatology surgery department in Denia (Spain): collagenase Clostridium histolyticum versus subostal fasciectomy. BMC Musculoskeletal Disorders 2013;14:293.

Craft 2011 [published data only]

Dib 2008 [published data only]

Dickie 1967 [published data only]

Erne 2014 [published data only]

Evans 2002 [published data only]

Gomes 1984 [published data only]

Halliday 1966 [published data only]

Larson 2012 *(published data only)*

Malta 1984 *(published data only)*

Malta 2013 *(published data only)*

Moraes Neto 1996 *(published data only)*

Nancoo 2007 *(published data only)*

Nydick 2013 *(published data only)*

Orbezo 1999 *(published data only)*

Ould-Slimane 2013 *(published data only)*

Pereira 2012 *(published data only)*

Pesc 2008 *(published data only)*

Pess 2012 *(published data only)*

Reuben 2006 *(published data only)*

Rives 1992 *(published data only)*

Skoff 2004 *(published data only)*

van Rijssen 2012b *(published data only)*

Vollbach 2013 *(published data only)*

von Campe 2012 *(published data only)*

White 2012 *(published data only)*
References to studies awaiting assessment

Gazdzik 1997 (published data only)

Hazarika 1979 (published data only)

Slullitel 1987 (published data only)

Ward 1976 (published data only)
Ward CM. Oedema of the hand after fasciectomy with or without tourniquet. The Hand 1976; Vol. 8, issue 2: 179–85.

Yoshida 1998 (published data only)

Additional references

Armstrong 2000

Badois 1993

Ball 2002

Ball 2013

Becker 2010

Bisson 2003

BSH 2010

Burge 1997

Darzi 2008

Draviaraj 2004

Early 1962

Elliot 1999

FDA 2010

Geoghegan 2004

Hedges 1982

Hertzog 1951

Higgins 2011

Hudak 1996
Hudak PL, Amadio PC, Bombardier C. Development of an upper extremity outcome measure: the DASH (Disabilities of the Arm, Shoulder and Hand) [corrected]. The Upper

Hueston 1963

Hueston 1984

Hurst 2000

Hurst 2009

Jebsen 1969

Lefebvre 2011

Luck 1959

Macey 1995

Moermans 1991

Moermans 1996

NICE 2008

Pratt 2009

Rayan 2005

Review Manager 2011 [Computer program]

Seah 2012

SIGN 2011

Stiles 1966

Thomas 2010

van Rijssen 2006a

Weker 2012

Yost 1955

* Indicates the major publication for the study
Characteristics of included studies  
*ordered by study ID*

### Bhatia 2002

#### Methods

- Single-centre UK study
- Randomised controlled trial
- Recruitment between June 2000 and March 2001

#### Participants

- 31 participants
- 28:3 male/female ratio
- Mean age: 61 years
- Inclusion criteria: not specified
- Exclusion criteria: not specified

#### Interventions

- Automated staple device closure vs Polybutester nonabsorbable suture closure

#### Outcomes

- **Time taken for closure (rate per centimetre of wound) (recorded by independent observer)**
  - Staples quicker than sutures (P value < 0.001)
- **Visual analogue scale (VAS) pain on removal score (patient reported, at 1 week postop)**
  - Pain greater for staple removal than for suture removal (P value = 0.008)
- **Wound appearance grade at 1 week and at 2 weeks (recorded by unblinded surgeon)**
  - No differences between groups
- **Patient-reported wound appearance at 2 weeks (patient reported)**
  - No differences between groups
- **Complications reported? yes**
- **Details: 1 superficial wound infection treated with antibiotics; “no other complications”**

#### Notes

- Length of follow-up: 2 weeks
- Low-quality evidence due to risk of bias regarding allocation concealment and imprecision
- No funding sources acknowledged; no conflicts of interest declared

### Risk of bias

<table>
<thead>
<tr>
<th>Bias</th>
<th>Authors' judgement</th>
<th>Support for judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random sequence generation (selection bias)</td>
<td>Low risk</td>
<td>Random numbers table</td>
</tr>
<tr>
<td>Allocation concealment (selection bias)</td>
<td>High risk</td>
<td>Not discussed in paper; use of unsecured random numbers table assumed</td>
</tr>
</tbody>
</table>
### Bhatia 2002 (Continued)

<table>
<thead>
<tr>
<th>Bias Type</th>
<th>Risk</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incomplete outcome data (attrition bias)</td>
<td>Low</td>
<td>4 of 5 endpoints reported with complete data; 1 of 5 not reported (wound appearance category at 2 weeks)</td>
</tr>
<tr>
<td>All outcomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selective reporting (reporting bias)</td>
<td>Low</td>
<td>4 of 5 endpoints reported with complete data; 1 of 5 not reported (wound appearance category at 2 weeks)</td>
</tr>
<tr>
<td>Other bias</td>
<td>Low</td>
<td>No blocked randomisation in an unblinded study</td>
</tr>
<tr>
<td>Blinding of participants and personnel (performance bias)</td>
<td>High</td>
<td>Blinding not possible</td>
</tr>
<tr>
<td>All outcomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blinding of outcome assessment (detection bias)</td>
<td>High</td>
<td>3 of 5 assessments performed by surgeon or reported by participant; 1 other</td>
</tr>
<tr>
<td>All outcomes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Bulstrode 2004

<table>
<thead>
<tr>
<th>Method</th>
<th>Single-centre UK study Randomised controlled trial Recruitment dates not specified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>15 participants All male Mean age: 61 years Inclusion criteria: yes: age &lt; 70 years, Luck involutional stage, ≥ 2 rays on hand affected Exclusion criteria: not specified</td>
</tr>
<tr>
<td>Interventions</td>
<td>Intraoperative wound bath in 5-FU vs Wound bath in normal saline</td>
</tr>
</tbody>
</table>
| Outcomes | Time to wound healing
  - No differences between groups
  - MCPJ, PIPJ and total active motion: preoperative, 3 months, 18 months
    - No differences between groups
  - Loss of extension per ray: preoperative, 3 months, 18 months
    - No differences between groups
    - Measurements for all 3 outcomes performed by the same blinded therapist
  - Complications reported? yes
  - Details: “no intraoperative complications” |
| Notes | Length of follow-up: 18 months Low-quality evidence due to risk of bias and imprecision Funded by the RAFT Institute of Plastic Surgery; no conflicts of interest declared |
### Risk of bias

<table>
<thead>
<tr>
<th>Bias</th>
<th>Authors’ judgement</th>
<th>Support for judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random sequence generation (selection bias)</td>
<td>Low risk</td>
<td>Envelopes containing randomisation</td>
</tr>
<tr>
<td>Allocation concealment (selection bias)</td>
<td>Unclear risk</td>
<td>Unmarked envelopes; unclear whether sealed or opaque</td>
</tr>
<tr>
<td>Incomplete outcome data (attrition bias)</td>
<td>Low risk</td>
<td>No loss to follow-up</td>
</tr>
<tr>
<td>Selective reporting (reporting bias)</td>
<td>Low risk</td>
<td>All outcomes reported</td>
</tr>
<tr>
<td>Other bias</td>
<td>Low risk</td>
<td>No blocked randomisation in an unblinded study</td>
</tr>
<tr>
<td>Blinding of participants and personnel (performance bias)</td>
<td>High risk</td>
<td>Surgeon administering treatment not blinded; study described as double-blinded: participant and assessor</td>
</tr>
<tr>
<td>Blinding of outcome assessment (detection bias)</td>
<td>Low risk</td>
<td>Measurements performed by blinded therapist</td>
</tr>
</tbody>
</table>

### Chignon-Sicard 2012

#### Methods

- Single-centre French study
- Randomised controlled clinical trial
- Recruitment between 2007 and 2010

#### Participants

- 68 participants
- 54 male:10 female; 4 excluded after randomisation not described
- Mean age: 61.4 (SD 8.8) years for intervention group; 66.0 (SD 7.7) years for control group
- Inclusion criteria: yes: “healthy individuals older than 18 years without any comorbidity who had been scheduled for elective McCash (open palm) surgery for Dupuytren disease”
- Exclusion criteria: yes: “Patients allergic to one of the dressing’s components, with diabetes mellitus type 1, who were undergoing cancer treatment, who were pregnant, or who were unable to participate in follow-up visits were excluded”

#### Interventions

- Leucocyte- and platelet-rich fibrin platelet concentrate applied to wound vs Petroleum jelly mesh applied to wound
Outcomes

- Healing delay
  - Statistically significantly shorter healing delay in intervention group compared with control group (median 24 days vs median 29 days)
- Pain (numerical visual analogue scale)
  - No significant differences between groups at day 1, 7, 14, 21 or 28
- Bleeding (absent/slight/moderate/abundant)
  - No significant differences between groups at day 7, 14 or 21
- Wound exudate (absent/slight/moderate/abundant)
  - No significant differences at days 7 and 21; significantly more exudate in control group at day 14
- Complications reported: yes
  - Details: 1 wound infection in control group; 1 pulmonary infection in intervention group

Notes

Length of follow-up: 60 days
Low-quality evidence due to risk of bias and imprecision
Funding source: academic grant from the French Ministry of Health

Risk of bias

<table>
<thead>
<tr>
<th>Bias</th>
<th>Authors' judgement</th>
<th>Support for judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random sequence generation (selection bias)</td>
<td>Low risk</td>
<td>Envelopes containing randomisation from a “predefined randomisation list, constructed through random permuted blocks”</td>
</tr>
<tr>
<td>Allocation concealment (selection bias)</td>
<td>Low risk</td>
<td>“sealed, sequentially numbered, opaque envelopes containing treatment allocation”</td>
</tr>
<tr>
<td>Incomplete outcome data (attrition bias)</td>
<td>Low risk</td>
<td>5% loss to follow-up; split between groups</td>
</tr>
<tr>
<td>Selective reporting (reporting bias)</td>
<td>Low risk</td>
<td>All outcomes reported</td>
</tr>
<tr>
<td>Other bias</td>
<td>Unclear risk</td>
<td>Blocked randomisation employed in single-blinded study (blinding of outcome assessment only)</td>
</tr>
<tr>
<td>Blinding of participants and personnel (performance bias)</td>
<td>High risk</td>
<td>Randomisation performed before procedure; surgeon probably unblinded throughout operative procedure, including fasciectomy component of procedure</td>
</tr>
<tr>
<td>Blinding of outcome assessment (detection bias)</td>
<td>Low risk</td>
<td>All assessors blinded</td>
</tr>
</tbody>
</table>
### Citron 2003

#### Methods
- Single-centre UK study
- Pseudorandomised controlled clinical trial
- Recruitment between 1996 and 2000

#### Participants
- 30 participants
  - 24 male:6 female
- Mean age (at diagnosis): 67 years for treatment group; 66 years for control group
- Inclusion criteria: yes: “Dupuytren’s contracture of a single ray confined to the palm and affecting only the MCPJ, a single cord of Dupuytren’s tissue, no previous surgery for Dupuytren’s disease in that ray, agreement to surgery”
- Exclusion criteria: not specified

#### Interventions
- Longitudinal incision closed with z-plasty
  - vs
  - Transverse incision

#### Outcomes
- ● Recurrence (reappearance of palpable disease)
  - ○ Lower recurrence in z-plasty group than in direct closure group (P value < 0.1)
- ● MCPJ flexion deformity: preoperative, postoperative
  - ○ No statistical analysis presented
  - ○ Both outcomes measured by 5 different unblinded assessors over the course of the study; outcomes assessed at 2 years postop
- ● Complications reported? yes
- ● Details: “no complications”

#### Notes
- Mean length of follow-up: 2 years (range 2.0 to 3.5)
- Low-quality evidence, as pseudorandomised and at high risk of bias and imprecision
- No funding sources acknowledged; no conflicts of interest declared

#### Risk of bias

<table>
<thead>
<tr>
<th>Bias</th>
<th>Authors’ judgement</th>
<th>Support for judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random sequence generation (selection bias)</td>
<td>High risk</td>
<td>Alternation rather than randomisation</td>
</tr>
<tr>
<td>Allocation concealment (selection bias)</td>
<td>High risk</td>
<td>Alternation rather than randomisation</td>
</tr>
<tr>
<td>Incomplete outcome data (attrition bias) All outcomes</td>
<td>Low risk</td>
<td>10% loss to follow-up but balanced between groups</td>
</tr>
<tr>
<td>Selective reporting (reporting bias)</td>
<td>Low risk</td>
<td>Primary outcomes reported</td>
</tr>
<tr>
<td>Other bias</td>
<td>Unclear risk</td>
<td>Unblinded study with alternation rather than randomisation.</td>
</tr>
</tbody>
</table>
### Citron 2003 (Continued)

<table>
<thead>
<tr>
<th>Blinding of participants and personnel (performance bias)</th>
<th>High risk</th>
<th>Surgeon unblinded</th>
</tr>
</thead>
<tbody>
<tr>
<td>All outcomes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Blinding of outcome assessment (detection bias)</th>
<th>High risk</th>
<th>Multiple unblinded assessors throughout study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All outcomes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Citron 2005

| Methods | Single-centre UK study  
|---------|------------------------|
|         | Randomised controlled trial  
|         | Recruitment between February 1998 and August 2002  

| Participants | 100 participants  
|--------------|------------------|
|              | 63 male:16 female (21 incomplete)  
|              | Mean age: 65 (SD 10) years  
|              | Inclusion criteria: yes: Dupuytren's disease in 1 ray only and any degree of resultant contracture  
|              | Exclusion criteria: yes: bleeding diathesis, recurrent disease  

| Interventions | Bruner incision closed with Y-V plasties  
|---------------|----------------------------------------|
|               | vs  
|               | Longitudinal incision closed with z-plasties  

| Outcomes | • Recurrence (reappearance of palpable disease)  
|----------|------------------------------------------------|
|          | o No differences between groups  
|          | • Deformity: preoperative, postoperative  
|          | o No differences between groups  
|          | • Extension  
|          | o No differences between groups  
|          | o Outcomes measured “in a special review clinic mostly by a registrar who had not operated” at 1 year and 2 years after healing  
|          | • Complications reported: yes  
|          | • Details: total complications not different between groups; algodystrophy not different between groups; digital nerve injury not different between groups  

| Notes | Length of follow-up: 2 years  
|-------|-------------------------------|
|       | Low-quality evidence, as high risk of performance bias, which may have influenced outcomes and imprecision  
|       | No funding sources acknowledged; no conflicts of interest declared  

### Risk of bias

<table>
<thead>
<tr>
<th>Bias</th>
<th>Authors’ judgement</th>
<th>Support for judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Random sequence generation (selection bias) | Low risk | Random numbers in envelopes  

---

Surgery for Dupuytren’s contracture of the fingers (Review)  
Copyright © 2015 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.
Citron 2005  (Continued)

<table>
<thead>
<tr>
<th>Source of bias</th>
<th>Risk</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allocation concealment (selection bias)</td>
<td>Low</td>
<td>Sealed sequentially numbered envelopes</td>
</tr>
<tr>
<td>Incomplete outcome data (attrition bias)</td>
<td>Low</td>
<td>Attrition unlikely to be related to true outcome</td>
</tr>
<tr>
<td>All outcomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selective reporting (reporting bias)</td>
<td>Low</td>
<td>All outcomes reported</td>
</tr>
<tr>
<td>Other bias</td>
<td>Low</td>
<td>No blocked randomisation in an unblinded study</td>
</tr>
<tr>
<td>Blinding of participants and personnel (performance bias)</td>
<td>High</td>
<td>Surgeon unblinded; participant possibly unblinded</td>
</tr>
<tr>
<td>All outcomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blinding of outcome assessment (detection bias)</td>
<td>Unclear</td>
<td>Independent observer, but unclear whether blinded</td>
</tr>
<tr>
<td>All outcomes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Collis 2013

| Methods | Single-centre New Zealand study  
|         | Randomised controlled clinical trial  
|         | Study period: 2010 to 2011 |
| Participants | 56 participants  
|            | 45 male:11 female  
|            | Mean age: 68 (SD 8) years in intervention group; 67 (SD 9) years in control group  
|            | Inclusion criteria: yes: “Patients of all ages and surgery types were included, provided they attended their first postoperative hand therapy appointment within 14 days after surgery”  
|            | Exclusion criteria: yes: “K-wiring of the proximal interphalangeal joint during surgery or inability to comply with hand therapy” |
| Interventions | Night extension orthosis plus standard hand therapy  
|             | vs  
|             | Hand therapy alone (apart from participants in this group who had a net loss of ≥ 20 degrees at the PIPJ and/or a net loss of ≥ 30 degrees at the MCPJ of the operated fingers, in which case a splint was given) |
| Outcomes | ● Total active extension  
|          | o No significant differences at 3 months for little/ring/middle fingers  
|          | ● Total active flexion  
|          | o No significant differences at 3 months for little/ring/middle fingers  
|          | ● Composite finger flexion  
|          | o No significant differences at 3 months for little/ring/middle fingers  
|          | ● Grip strength  
|          | o No significant differences in mixed-effect model averaged across postoperative visits |
Hand function (DASH)
   ○ No significant differences in mixed-effect model averaged across postoperative visits

Notes
Length of follow-up: 3 months
Low-quality evidence, as inadequate detail provided on study design and high risk of performance bias and imprecision
Funding source: A grant was received through the Clinical Centre for Research and Effective Practice (CCREP) Innovation Fund

**Risk of bias**

<table>
<thead>
<tr>
<th>Bias</th>
<th>Authors’ judgement</th>
<th>Support for judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random sequence generation (selection bias)</td>
<td>Unclear risk</td>
<td>Inadequate detail: “participant selecting a tag from an envelope with group allocation concealed”</td>
</tr>
<tr>
<td>Allocation concealment (selection bias)</td>
<td>Unclear risk</td>
<td>Inadequate detail: “participant selecting a tag from an envelope with group allocation concealed”</td>
</tr>
<tr>
<td>Incomplete outcome data (attrition bias)</td>
<td>Low risk</td>
<td>Attrition described: split between groups; attrition unlikely to be related to true outcome</td>
</tr>
<tr>
<td>Selective reporting (reporting bias)</td>
<td>Low risk</td>
<td>All outcomes reported</td>
</tr>
<tr>
<td>Other bias</td>
<td>Unclear risk</td>
<td>Inadequate details of randomisation in paper</td>
</tr>
<tr>
<td>Blinding of participants and personnel (performance bias)</td>
<td>High risk</td>
<td>No blinding</td>
</tr>
<tr>
<td>Blinding of outcome assessment (detection bias)</td>
<td>High risk</td>
<td>No blinding</td>
</tr>
</tbody>
</table>

**Degreef 2014**

Methods
- Single-centre Belgian study
- Randomised controlled clinical trial
- Study period not stated

Participants
- 30 participants
- 26 male: 4 female
- Mean age: 63.5 (SD 8) years
- Inclusion criteria: Adult patients scheduled for subtotal fasciectomy to treat Dupuytren's
disease were eligible for inclusion if they had a D score > 4
Exclusion criteria: patients undergoing a reintervention for recurrent contractures; patients with a need for skin grafts or flaps; premenopausal women; patients using anti-inflammatory drugs; patients with a history of malignancy; patients with a known allergy to tamoxifen

Interventions

|                            | Segmental fasciectomy with 80 mg oral tamoxifen daily for 6 weeks before surgery continuing until 12 weeks after surgery vs Segmental fasciectomy with 80 mg oral placebo daily for 6 weeks before surgery continuing until 12 weeks after surgery |

Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Improvement in extension deficit by joint</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• No differences at MCPJ at 3 months, 12 months or 24 months; significantly greater differences for tamoxifen group at PIPJ at 3 months and 12 months; not significantly different at 24 months</td>
</tr>
<tr>
<td></td>
<td>• Tubiana index</td>
</tr>
<tr>
<td></td>
<td>• Significantly greater differences in tamoxifen group at 3 months; not significantly different at 12 months nor 24 months</td>
</tr>
<tr>
<td></td>
<td>• Satisfaction visual analogue scale</td>
</tr>
<tr>
<td></td>
<td>• Significantly higher in tamoxifen group at 3 months; no significant differences at 12 months or 24 months</td>
</tr>
<tr>
<td></td>
<td>• Hand function (DASH)</td>
</tr>
<tr>
<td></td>
<td>• No significant differences at 12 months nor 24 months</td>
</tr>
</tbody>
</table>

Notes

|                                | Length of follow-up: 24 months           |
|                                | Low-quality evidence, as inadequate details on study design and imprecision |
|                                | Funding source: Belgian Orthopaedic Society |

Risk of bias

<table>
<thead>
<tr>
<th>Bias</th>
<th>Authors’ judgement</th>
<th>Support for judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random sequence generation (selection bias)</td>
<td>Unclear risk</td>
<td>Inadequate detail: not described</td>
</tr>
<tr>
<td>Allocation concealment (selection bias)</td>
<td>Unclear risk</td>
<td>Inadequate detail: boxes used to store allocation, but opacity not described; second copies of allocations stored in envelopes with inadequate details provided</td>
</tr>
<tr>
<td>Incomplete outcome data (attrition bias)</td>
<td>Low risk</td>
<td>Attrition described; systematic differences between groups unlikely</td>
</tr>
<tr>
<td>Selective reporting (reporting bias)</td>
<td>Unclear risk</td>
<td>No data presented for hand function (DASH) at 3 months</td>
</tr>
<tr>
<td>Other bias</td>
<td>Low risk</td>
<td>Blinded study; hence blocked randomisation not problematic</td>
</tr>
<tr>
<td>Blinding of participants and personnel (performance bias)</td>
<td>Low risk</td>
<td>Double-blind</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>----------</td>
<td>--------------</td>
</tr>
<tr>
<td>Blinding of outcome assessment (detection bias)</td>
<td>Low risk</td>
<td>Blinded outcome measurements</td>
</tr>
</tbody>
</table>

**Howard 2009**

| Methods | Single-centre UK study  
Randomised controlled trial  
Recruitment dates not specified |
|---------|-------------------------------------------------------------------|
| Participants | 62 participants  
Gender ratio not presented  
Age data not presented  
Inclusion criteria: not specified  
Exclusion criteria: not specified |
| Interventions | Absorbable polyglactin suture closure  
vs  
Non-absorbable polypropylene suture closure |
| Outcomes |  
- Time spent managing wound at first postop visit  
  - Less time spent in wound management for absorbable group once outliers excluded (P value = 0.003) (measured by the nurse reviewing the wound)  
- Pain VAS at first postop visit (patient-reported)  
- No difference between groups  
- Complications described?: yes  
- Details: group A - 1 x delayed wound healing, 1 x swollen hand; group B - 1 x wound infection, 2 x delayed healing, 2 x retained suture material |
| Notes | Length of follow-up: primary outcome assessed at 10 to 14 days  
Low-quality evidence, as review group was concerned that exclusion of outliers despite use of non-parametric statistics in analysis of primary outcome created significant differences and imprecision  
No funding sources acknowledged; no conflicts of interest declared |

**Risk of bias**

<table>
<thead>
<tr>
<th>Bias</th>
<th>Authors’ judgement</th>
<th>Support for judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random sequence generation (selection bias)</td>
<td>Low risk</td>
<td>Computer generated</td>
</tr>
<tr>
<td>Allocation concealment (selection bias)</td>
<td>Unclear risk</td>
<td>Unclear from paper</td>
</tr>
</tbody>
</table>
### Howard 2009  (Continued)

<table>
<thead>
<tr>
<th>Bias Category</th>
<th>Risk Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incomplete outcome data (attrition bias)</td>
<td>Low risk</td>
<td>3 of 62 missing</td>
</tr>
<tr>
<td>Selective reporting (reporting bias)</td>
<td>High risk</td>
<td>Protocol for exclusion of outliers not given; non-parametric statistics used after test of normality described; unclear why outliers excluded; outlier exclusion may have influenced outcome of study</td>
</tr>
<tr>
<td>Other bias</td>
<td>Low risk</td>
<td>No blocked randomisation in an unblinded study</td>
</tr>
<tr>
<td>Blinding of participants and personnel (performance bias)</td>
<td>Low risk</td>
<td>Blinded until start of procedure</td>
</tr>
<tr>
<td>Blinding of outcome assessment (detection bias)</td>
<td>High risk</td>
<td>Assessor unblinded</td>
</tr>
</tbody>
</table>

### Jerosch-Herold 2011

**Methods**
- Multi-centre (5-centre) UK study
- Randomised controlled trial
- Recruitment between October 2007 and January 2009

**Participants**
- 154 participants
  - 120 male: 34 female
- Mean age: 67.2 years in splint group; 67.5 years in no splint group
- Inclusion criteria: yes: Patients with Dupuytren's disease affecting ≥ 1 digit of either hand and requiring fasciectomy or dermofasciectomy were invited to participate. Patients had to be over 18 years of age and competent to give fully informed written consent
- Exclusion criteria: yes: contracture of the thumb or first webspace

**Interventions**
- Static splint for 3 months postop vs
  - No splint (apart from participants in this group who had a net loss ≥ 15 degrees at the PIPJ and/or a net loss ≥ 20 degrees at the MCPJ of the operated fingers, in which case a splint was given)

**Outcomes**
- DASH PROM: 3 months, 6 months, 12 months
  - No differences between groups
- Total active extension: 3 months, 6 months, 12 months
  - No differences between groups
- Total active flexion: 3 months, 6 months, 12 months
  - No differences between groups
- Patient satisfaction: 3 months, 6 months, 12 months
  - No differences between groups
Jerosch-Herold 2011  (Continued)

<table>
<thead>
<tr>
<th>Risk of bias</th>
<th>Authors’ judgement</th>
<th>Support for judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random sequence generation (selection bias)</td>
<td>Unclear risk</td>
<td>Randomisation process at central site not explained</td>
</tr>
<tr>
<td>Allocation concealment (selection bias)</td>
<td>Low risk</td>
<td>Central telephone cluster randomisation</td>
</tr>
<tr>
<td>Incomplete outcome data (attrition bias) All outcomes</td>
<td>Low risk</td>
<td>Attrition recorded and explained</td>
</tr>
<tr>
<td>Selective reporting (reporting bias)</td>
<td>Low risk</td>
<td>All outcomes reported</td>
</tr>
<tr>
<td>Other bias</td>
<td>Unclear risk</td>
<td>Cluster randomisation used in an un-blinded study, but unclear if would have introduced bias</td>
</tr>
<tr>
<td>Blinding of participants and personnel (performance bias) All outcomes</td>
<td>High risk</td>
<td>Not blinded</td>
</tr>
<tr>
<td>Blinding of outcome assessment (detection bias) All outcomes</td>
<td>Unclear risk</td>
<td>Patient-reported outcome measure un-blinded but unclear whether likely to be biased; independent observer measured range of motion but unclear whether blinded</td>
</tr>
</tbody>
</table>

Kemler 2012

Methods
- 2-Centre Dutch study
- Randomised controlled clinical trial
- Recruitment between 2007 and 2008

Participants
- 54 participants
- 46 male: 8 female
- Mean age: 63 (SD 9) years in intervention group; 64 (SD 11) years in control group
- Inclusion criteria: yes: “DD (Dupuytren's disease) and a proximal inter-phalangeal (PIP) joint flexion contracture of at least 30°”
- Exclusion criteria: yes: “below 18 years of age, had undergone partial amputation or arthrodesis of a digit or were patients with insufficient knowledge of the Dutch language”
### Interventions

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>3-Month splinting protocol together with hand therapy vs Hand therapy alone</th>
</tr>
</thead>
</table>

* • Extension deficit at PIPJ  
  ○ No significant differences  
* • Participant perceived change  
  ○ No significant differences  
* • Pain (numerical visual analogue scale)  
  ○ No significant differences  
* • Haematoma  
  ○ No significant differences  
* • Residual flexion deficit  
  ○ No significant differences  

### Notes

- Length of follow-up: 1 year
- Low-quality evidence due to risk of bias and imprecision
- No specific funding sources declared

### Risk of bias

<table>
<thead>
<tr>
<th>Bias</th>
<th>Authors' judgement</th>
<th>Support for judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random sequence generation (selection bias)</td>
<td>Low risk</td>
<td>Random numbers table</td>
</tr>
<tr>
<td>Allocation concealment (selection bias)</td>
<td>Unclear risk</td>
<td>Not specified; allocation concealed from outcome assessor but allocation concealment not clear</td>
</tr>
<tr>
<td>Incomplete outcome data (attrition bias) All outcomes</td>
<td>Low risk</td>
<td>No attrition</td>
</tr>
<tr>
<td>Selective reporting (reporting bias)</td>
<td>Low risk</td>
<td>All outcomes reported</td>
</tr>
<tr>
<td>Other bias</td>
<td>Low risk</td>
<td>No blocked randomisation in an unblinded study</td>
</tr>
<tr>
<td>Blinding of participants and personnel (performance bias) All outcomes</td>
<td>High risk</td>
<td>Surgeon blinded but therapist and participant not blinded</td>
</tr>
<tr>
<td>Blinding of outcome assessment (detection bias) All outcomes</td>
<td>Unclear risk</td>
<td>All assessments by “same independent third party, a resident who had no part in the operative procedure or postoperative treatment”, although blinding status not specified</td>
</tr>
</tbody>
</table>
McMillan 2012

| Methods          | Single-centre Canadian study  
|                 | Randomised controlled trial  
|                 | Recruitment dates not specified  

| Participants     | 47 participants  
|                 | 41 male:6 female  
|                 | Mean age: 61.2 years  
|                 | Inclusion criteria: yes: “at least one joint contracture of at least 20°”  
|                 | Exclusion criteria: yes: “diabetes mellitus and those who had previously had hand surgery, including PNA, on the affected hand for any reason”  

| Interventions    | Steroid injection at end of percutaneous needle fasciotomy, repeated at 6 weeks and 3 months, vs no steroid injection  

| Outcomes         | Change and % change in total active extension deficit, described per joint: 6 weeks, 3 months, 6 months  
|                 | Significantly greater % improvement in TAED for all joints at all time points, and for MCPJs and PIPJs at 6 months, for steroid group (unclear who performed outcome measurements)  
|                 | Complications described? yes  
|                 | Details: no infections; reported alterations in sensation or other side effects or complications  

| Notes            | Length of follow-up: 6 months  
|                 | Low-quality evidence due to risk of bias and imprecision  
|                 | Funded by the Canadian Society of Plastic Surgeons; no conflicts of interest declared  

### Risk of bias

<table>
<thead>
<tr>
<th>Bias</th>
<th>Authors' judgement</th>
<th>Support for judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random sequence generation (selection bias)</td>
<td>Low risk</td>
<td>Electronic random number generator</td>
</tr>
<tr>
<td>Allocation concealment (selection bias)</td>
<td>Unclear risk</td>
<td>Not described</td>
</tr>
<tr>
<td>Incomplete outcome data (attrition bias) All outcomes</td>
<td>Low risk</td>
<td>No exclusions after randomisation</td>
</tr>
<tr>
<td>Selective reporting (reporting bias)</td>
<td>Low risk</td>
<td>Outcomes reported</td>
</tr>
<tr>
<td>Other bias</td>
<td>Low risk</td>
<td>No blocked randomisation in an unblinded study</td>
</tr>
<tr>
<td>Blinding of participants and personnel (performance bias) All outcomes</td>
<td>High risk</td>
<td>No blinding; no sham injection for control group</td>
</tr>
</tbody>
</table>
### Ullah 2009

**Methods**
- Single-centre UK study
- Randomised controlled trial
- Recruitment dates not specified

**Participants**
- 79 participants
- 65 male:14 female
- Mean age: 62.9 (range 27 to 85) years
- Inclusion criteria: yes: “primary Dupuytren's contracture greater than 30° of the PIP joint of a finger”
- Exclusion criteria: yes: “receiving anticoagulation treatment or were unable to complete questionnaires, give consent or attend for follow-up”

**Interventions**
- Firebreak full-thickness skin graft closure
  vs
- Z-plasty closure

**Outcomes**
- Degree of contracture: preoperative, 2 weeks, 3 months, 6 months, 12 months, 24 months, 36 months
  - No differences in recurrence between groups
- Time to recurrence
  - No differences between groups
- Range of motion
  - No statistical analysis presented
- Time for surgery
  - Significantly longer for skin graft group (P value = 0.01)
- Grip strength
  - No differences between groups
- PEM PROM
  - No statistical analysis presented
  - Outcome measurements performed by a single surgeon; PEM reported by participants
- Complications described? yes
- Details: infection, wound necrosis, wound dehiscence, altered sensation, algodystrophy, haematoma

**Notes**
- Length of follow-up: 36 months
- Low-quality evidence due to risk of bias and imprecision
- No sources of funding acknowledged; no conflicts of interest declared

**Risk of bias**

<table>
<thead>
<tr>
<th>Bias</th>
<th>Authors’ judgement</th>
<th>Support for judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

*Copyright © 2015 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.*
Random sequence generation (selection bias) | Low risk | Randomisation via sequential envelopes |
---|---|---|
Allocation concealment (selection bias) | Unclear risk | Sealed sequential envelopes but unclear whether opaque |
Incomplete outcome data (attrition bias) | Unclear risk | Loss to follow-up not described |
Selective reporting (reporting bias) | Unclear risk | 2-Week postoperative data not presented; some data presented only graphically |
Other bias | Low risk | No blocked randomisation in an unblinded study |
Blinding of participants and personnel (performance bias) | Low risk | Randomisation not performed until after contracture excised |
Blinding of outcome assessment (detection bias) | High risk | Independent observer unlikely to be blinded |

**van Rijssen 2006**

**Methods**
Single-centre Dutch study
Randomised controlled trial
Recruitment between August 2002 and January 2005

**Participants**
125 hands in 121 participants
94 male:19 female; 8 incomplete
Mean age: 63 years
Inclusion criteria: yes: (1) a flexion contracture of at least 30° in the MCP, PIP, or DIP joints; (2) a clearly defined pathologic cord in the palmar fascia; and (3) willingness to participate in this trial
Exclusion criteria: yes: (1) patients with postsurgical recurrence or extension of the disease, (2) patients who were not allowed to stop taking their anticoagulants, (3) patients generally unfit to have surgery, and (4) patients who were not willing to participate in this study or had a specific treatment wish

**Interventions**
Percutaneous needle fasciotomy vs Limited fasciectomy

**Outcomes**
- Total passive extension deficit at MCPJ, PIPJ and DIPJ (presented as % change and converted in Tubiana stage): preoperative, 1 week, 6 weeks
  - No differences between procedures for Tubiana I and II contractures by 6 weeks; fasciectomy superior for Tubiana III and IV contractures by 6 weeks
van Rijssen 2006  (Continued)

- Flexion deficit (distal palmar crease - fingertip pulp): preoperative, 1 week, 6 weeks
  - Data described but no comparative statistical analysis presented
- DASH PROM: preoperative, 1 week, 2 weeks, 3 weeks, 4 weeks, 5 weeks
  - No significant differences between procedures before surgery; significantly lower DASH scores for needle fasciotomy at all time points after surgery
- Patient satisfaction: 6 weeks
  - Angles measured by the surgeon; DASH and satisfaction reported by participants
  - Significantly better after needle fasciotomy
- Complications described? yes
- Details: infection, haematoma, wound slough, skin fissure, sympathetic dystrophy, paraesthesia (defined as subjective tingling sensation without objective evidence of altered sensation), altered sensation, digital nerve injury, tendon injury, revision surgery

<table>
<thead>
<tr>
<th>Bias</th>
<th>Authors' judgement</th>
<th>Support for judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random sequence generation (selection bias)</td>
<td>Low risk</td>
<td>Randomisation via sealed sequential envelopes</td>
</tr>
<tr>
<td>Allocation concealment (selection bias)</td>
<td>Unclear risk</td>
<td>Sealed sequential envelopes but unclear whether opaque</td>
</tr>
<tr>
<td>Incomplete outcome data (attrition bias)</td>
<td>Unclear risk</td>
<td>Loss to follow-up not different between groups</td>
</tr>
<tr>
<td>All outcomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selective reporting (reporting bias)</td>
<td>Low risk</td>
<td>All data reported</td>
</tr>
<tr>
<td>Other bias</td>
<td>Low risk</td>
<td>No blocked randomisation in an unblinded study</td>
</tr>
<tr>
<td>Blinding of participants and personnel (performance bias)</td>
<td>High risk</td>
<td>No blinding</td>
</tr>
<tr>
<td>All outcomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blinding of outcome assessment (detection bias)</td>
<td>High risk</td>
<td>No blinding</td>
</tr>
<tr>
<td>All outcomes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes
- Length of follow-up: 6 weeks
- Low-quality evidence due to risk of bias and imprecision
- No sources of funding acknowledged; no conflicts of interest declared

Risk of bias
### van Rijssen 2012a

**Methods**
- Single-centre Dutch study
- Randomised controlled trial
- Recruitment between August 2002 and January 2005

**Participants**
- 93 participants (out of 113 patients studied in van Rijssen 2006)
  - 76 male:17 female
  - Mean age 62.8 years for needle fasciotomy; 63.1 years for limited fasciectomy
  - Inclusion criteria: yes: “(1) a flexion contracture of at least 30° in the MCP, PIP, or DIP joints; (2) a clearly defined pathologic cord in the palmar fascia; and (3) willingness to participate in this trial”
  - Exclusion criteria: yes: “(1) patients with postsurgical recurrence or extension of the disease, (2) patients who were not allowed to stop taking their anticoagulants, (3) patients generally unfit to have surgery, and (4) patients who were not willing to participate in this study or had a specific treatment wish”

**Interventions**
- Percutaneous needle fasciotomy vs Limited fasciectomy

**Outcomes**
- **Recurrence** (defined as recurrent deformity of 20 degrees in a joint initially corrected to 0 to 5 degrees)
  - Significantly higher recurrence after needle fasciotomy by 5 years (P value < 0.001)
- **Passive extension deficit** (per joint)
  - No comparative analysis presented
- **Patient satisfaction**
  - Significantly higher after fasciectomy (P value < 0.001)
- **Likelihood of selecting treatment again**
  - Significantly higher after fasciectomy (P value = 0.008)
  - Satisfaction and likelihood of selecting again were patient reported; unclear who performed other measurements
- **Complications described?** no: described previously in van Rijssen 2006

**Notes**
- Length of follow-up: 5 years
- Low-quality evidence due to risk of bias and imprecision
- No sources of funding acknowledged; no conflicts of interest declared

### Risk of bias

<table>
<thead>
<tr>
<th>Bias</th>
<th>Authors' judgement</th>
<th>Support for judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random sequence generation (selection bias)</td>
<td>Low risk</td>
<td>Sealed envelopes</td>
</tr>
<tr>
<td>Allocation concealment (selection bias)</td>
<td>Unclear risk</td>
<td>Unclear whether envelopes were numbered but were numbered in van Rijssen 2006, in which early outcomes of same study were reported; unclear whether opaque</td>
</tr>
</tbody>
</table>
van Rijssen 2012a *(Continued)*

<table>
<thead>
<tr>
<th>Bias type</th>
<th>Risk</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incomplete outcome data (attrition bias)</td>
<td>High risk</td>
<td>Significantly different attrition between cohorts possibly because of differences in true outcomes</td>
</tr>
<tr>
<td>Selective reporting (reporting bias)</td>
<td>Low risk</td>
<td>All outcomes presented</td>
</tr>
<tr>
<td>Other bias</td>
<td>Low risk</td>
<td>No blocked randomisation in an unblinded study</td>
</tr>
<tr>
<td>Blinding of participants and personnel (performance bias)</td>
<td>High risk</td>
<td>Unblinded</td>
</tr>
<tr>
<td>Blinding of outcome assessment (detection bias)</td>
<td>High risk</td>
<td>Unblinded</td>
</tr>
</tbody>
</table>

Abbreviations:
- 5-FU: 5-Fluorouracil.
- DASH: Disabilities of the Arm, Shoulder and Hand Scale.
- DIPJ: Distal interphalangeal joint.
- MCPJ: Metacarpophalangeal joint.
- PIPJ: Proximal interphalangeal joint.
- PROM: Patient-reported outcome measure.
- TAED: Total active extension deficit.
- VAS: Visual analogue scale.

**Characteristics of excluded studies** *(ordered by study ID)*

<table>
<thead>
<tr>
<th>Study</th>
<th>Reason for exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atroshi 2014</td>
<td>Excluded on the basis of question 5 of Appendix 3; not a randomised or pseudorandomised trial</td>
</tr>
<tr>
<td>Barros 1997</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Bendon 2012</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Braga Silva 1999</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Braga Silva 2002</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Study</td>
<td>Exclusion Reason</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Castro 1981</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Cervero 2013</td>
<td>Excluded on the basis of question 5 of Appendix 3; not a randomised or pseudorandomised trial</td>
</tr>
<tr>
<td>Craft 2011</td>
<td>Excluded on the basis of question 5 of Appendix 3; no concurrent control and intervention groups</td>
</tr>
<tr>
<td>Dias 2013</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Dib 2008</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Dickie 1967</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Erne 2014</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Evans 2002</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Ferry 2013</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Galbiatti 1995</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Glassey 2001</td>
<td>Excluded on the basis of question 5 of Appendix 3; retrospective service evaluation of participants treated with a splint and those treated without a splint based on clinical grounds rather than randomisation/pseudo-randomisation</td>
</tr>
<tr>
<td>Gomes 1984</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Halliday 1966</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Herrera 2013</td>
<td>Excluded on the basis of question 5 of Appendix 3; not a randomised or pseudorandomised trial</td>
</tr>
<tr>
<td>Hovius 2011</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Jerosch-Herold 2008</td>
<td>Excluded on the basis of question 3 of Appendix 3; publication reports the protocol of a study; final study is described in Jerosch-Herold 2011, which is among the Included studies</td>
</tr>
<tr>
<td>Study</td>
<td>Exclusion Reason</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Larson 2012</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Malta 1984</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Malta 2013</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Moraes Neto 1996</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Nancoo 2007</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Nydick 2013</td>
<td>Excluded on the basis of question 5 of Appendix 3; not a randomised or pseudorandomised trial</td>
</tr>
<tr>
<td>Orbezo 1999</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Ould-Slimane 2013</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Pereira 2012</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Pesco 2008</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Pess 2012</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Reuben 2006</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Rives 1992</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Skoff 2004</td>
<td>Excluded on the basis of question 5 of Appendix 3; no concurrent control and intervention groups</td>
</tr>
<tr>
<td>van Rijssen 2012b</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
<tr>
<td>Vollbach 2013</td>
<td>Excluded on the basis of question 5 of Appendix 3; not a randomised or pseudorandomised trial</td>
</tr>
<tr>
<td>von Campe 2012</td>
<td>Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions</td>
</tr>
</tbody>
</table>
White 2012  Excluded on the basis of question 4 of Appendix 3; no comparison of an intervention vs control and no comparison of 2 interventions

**Characteristics of studies awaiting assessment**  [ordered by study ID]

### Gazdzik 1997

<table>
<thead>
<tr>
<th>Methods</th>
<th>Unclear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td></td>
</tr>
<tr>
<td>Interventions</td>
<td></td>
</tr>
<tr>
<td>Outcomes</td>
<td></td>
</tr>
<tr>
<td>Notes</td>
<td></td>
</tr>
</tbody>
</table>

### Hazarika 1979

| Methods   | Single-centre UK study  
Unclear study design  
Recruitment dates not specified |
|-----------|-------------------------|
| Participants | 39 participants  
17 male:4 female; 18 incomplete  
Mean age: not presented, range 46 to 76 years  
Inclusion criteria: not specified  
Exclusion criteria: not specified |
| Interventions | Intermittent pneumatic postoperative compression  
vs Boxing glove dressing and roller towel elevation |
| Outcomes |  
- Hand volume: preoperative, postoperative (unclear when), differences  
  - Significantly less swelling for pneumatic compression group (P value < 0.001)  
- Wound discharge/dressing saturation  
  - No statistical analysis  
- Pain and analgesia use  
  - No statistical analysis  
- Haematoma formation  
  - No statistical analysis  
  - Outcome measurements performed during “at least one follow-up appointment”, and from physiotherapy notes; unclear who performed measurements  
- Complications reported? yes  
- Details: haematoma formation as above; “no infections” |

---

Copyright © 2015 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.
<table>
<thead>
<tr>
<th>Slullitel 1987</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Methods</strong></td>
</tr>
<tr>
<td><strong>Participants</strong></td>
</tr>
<tr>
<td><strong>Interventions</strong></td>
</tr>
</tbody>
</table>
| **Outcomes** | - Ratio of 28-day postop hand volume/preop hand volume  
  - Ratio significantly lower with elevated hand table than with tourniquet (P value < 0.001)  
  - Unclear who performed outcome measurements  
  - Complications described? yes  
  - Details: 1 infected hand excluded; otherwise described as “no complications” |
| **Notes** | Length of follow-up: 28 days  
  Low-quality evidence  
  No funding sources acknowledged; no conflicts of interest declared |

<table>
<thead>
<tr>
<th>Ward 1976</th>
</tr>
</thead>
</table>
| **Methods** | Single-centre UK study  
  Unclear study design  
  Recruitment dates not specified |
| **Participants** | 20 participants  
  13 male:7 female  
  Mean age: not reported (range 42 to 81 years)  
  Inclusion criteria: yes: “previously untreated simple Dupuytren's disease”  
  Exclusion criteria: yes: “any illness or medication that might influence fluid retention” |
| **Interventions** |  |
| **Outcomes** | • Ratio of 28-day postop hand volume/preop hand volume  
  - Ratio significantly lower with elevated hand table than with tourniquet (P value < 0.001)  
  - Unclear who performed outcome measurements  
  - Complications described? yes  
  - Details: 1 infected hand excluded; otherwise described as “no complications” |
| **Notes** | Length of follow-up: 28 days  
  Low-quality evidence  
  No funding sources acknowledged; no conflicts of interest declared |
### Yoshida 1998

<table>
<thead>
<tr>
<th>Methods</th>
<th>Unclear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td></td>
</tr>
<tr>
<td>Interventions</td>
<td></td>
</tr>
<tr>
<td>Outcomes</td>
<td></td>
</tr>
<tr>
<td>Notes</td>
<td></td>
</tr>
</tbody>
</table>
### Comparison 1. Preoperative measurements

<table>
<thead>
<tr>
<th>Outcome or subgroup title</th>
<th>No. of studies</th>
<th>No. of participants</th>
<th>Statistical method</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 DASH</td>
<td>2</td>
<td>210</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>1.00 [-2.74, 4.74]</td>
</tr>
<tr>
<td>2 Total active extension</td>
<td>2</td>
<td>240</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>-1.89 [-7.72, 3.94]</td>
</tr>
<tr>
<td>2.1 Middle finger</td>
<td>1</td>
<td>13</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>-12.0 [-33.20, 9.20]</td>
</tr>
<tr>
<td>2.2 Ring finger</td>
<td>1</td>
<td>22</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>9.0 [-21.50, 39.50]</td>
</tr>
<tr>
<td>2.3 Little finger</td>
<td>1</td>
<td>51</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>-12.0 [-32.31, 8.31]</td>
</tr>
<tr>
<td>2.4 No subgroup by digit</td>
<td>1</td>
<td>154</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>-0.40 [-6.90, 6.10]</td>
</tr>
<tr>
<td>3 Total active flexion</td>
<td>2</td>
<td>232</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>2.42 [-4.98, 9.83]</td>
</tr>
<tr>
<td>3.1 Middle finger</td>
<td>1</td>
<td>13</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>6.0 [-11.52, 23.52]</td>
</tr>
<tr>
<td>3.2 Ring finger</td>
<td>1</td>
<td>22</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>11.00 [-0.47, 22.47]</td>
</tr>
<tr>
<td>3.3 Little finger</td>
<td>1</td>
<td>43</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>-9.0 [-21.26, 3.26]</td>
</tr>
<tr>
<td>3.4 No subgroup by digit</td>
<td>1</td>
<td>154</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>2.40 [-3.35, 8.15]</td>
</tr>
</tbody>
</table>

### Comparison 2. Effects of 3 months of postoperative night splinting (intention-to-treat)

<table>
<thead>
<tr>
<th>Outcome or subgroup title</th>
<th>No. of studies</th>
<th>No. of participants</th>
<th>Statistical method</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 DASH score at 3 months</td>
<td>2</td>
<td>205</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>1.15 [-2.32, 4.62]</td>
</tr>
<tr>
<td>2 Total active extension at 3 months</td>
<td>2</td>
<td>225</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>-2.21 [-8.01, 3.59]</td>
</tr>
<tr>
<td>2.1 Middle finger</td>
<td>1</td>
<td>12</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>4.0 [-30.26, 38.26]</td>
</tr>
<tr>
<td>2.2 Ring finger</td>
<td>1</td>
<td>22</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>-4.0 [-23.24, 15.24]</td>
</tr>
<tr>
<td>2.3 Little finger</td>
<td>1</td>
<td>40</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>-5.0 [-27.35, 17.35]</td>
</tr>
<tr>
<td>2.4 No subgroup by digit</td>
<td>1</td>
<td>151</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>-2.0 [-8.43, 4.43]</td>
</tr>
<tr>
<td>3 Total active flexion at 3 months</td>
<td>2</td>
<td>225</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>12.36 [1.21, 23.50]</td>
</tr>
<tr>
<td>3.1 Middle finger</td>
<td>1</td>
<td>12</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>29.00 [3.96, 54.04]</td>
</tr>
<tr>
<td>3.2 Ring finger</td>
<td>1</td>
<td>22</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>24.0 [0.21, 47.79]</td>
</tr>
<tr>
<td>3.3 Little finger</td>
<td>1</td>
<td>40</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>9.0 [-9.12, 27.12]</td>
</tr>
<tr>
<td>3.4 No subgroup by digit</td>
<td>1</td>
<td>151</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>4.60 [-3.25, 12.45]</td>
</tr>
</tbody>
</table>
Comparison 3. Effects of 3 months of postoperative night splinting (per-protocol)

<table>
<thead>
<tr>
<th>Outcome or subgroup title</th>
<th>No. of studies</th>
<th>No. of participants</th>
<th>Statistical method</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 DASH score at 3 months</td>
<td>2</td>
<td>184</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>1.01 [-2.85, 4.86]</td>
</tr>
<tr>
<td>2 Total active extension at 3 months [degrees]</td>
<td>2</td>
<td>206</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>-9.50 [-21.14, 2.15]</td>
</tr>
<tr>
<td>2.1 Middle finger</td>
<td>1</td>
<td>12</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>3.90 [-29.81, 37.61]</td>
</tr>
<tr>
<td>2.2 Ring finger</td>
<td>1</td>
<td>22</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>-16.9 [-33.79, -0.01]</td>
</tr>
<tr>
<td>2.3 Little finger</td>
<td>1</td>
<td>39</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>-22.20 [-41.05, -3.35]</td>
</tr>
<tr>
<td>2.4 No subgroup by digit</td>
<td>1</td>
<td>133</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>-1.90 [-8.77, 4.97]</td>
</tr>
<tr>
<td>3 Total active flexion at 3 months [degrees]</td>
<td>2</td>
<td>206</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>12.64 [3.68, 21.60]</td>
</tr>
<tr>
<td>3.1 Middle finger</td>
<td>1</td>
<td>12</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>28.60 [3.79, 53.41]</td>
</tr>
<tr>
<td>3.2 Ring finger</td>
<td>1</td>
<td>22</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>21.70 [-0.80, 44.20]</td>
</tr>
<tr>
<td>3.3 Little finger</td>
<td>1</td>
<td>39</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>13.10 [-4.61, 30.81]</td>
</tr>
<tr>
<td>3.4 No subgroup by digit</td>
<td>1</td>
<td>133</td>
<td>Mean Difference (IV, Random, 95% CI)</td>
<td>6.80 [-1.42, 15.02]</td>
</tr>
</tbody>
</table>

Analysis 1.1. Comparison 1 Preoperative measurements, Outcome 1 DASH.

Review: Surgery for Dupuytren’s contracture of the fingers

Comparison: 1 Preoperative measurements

Outcome: 1 DASH

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Splint</th>
<th>No Splint</th>
<th>Mean Difference (IV, Random, 95% CI)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N Mean(SD)</td>
<td>N Mean(SD)</td>
<td>IV, Random, 95% CI</td>
<td>IV, Random, 95% CI</td>
</tr>
<tr>
<td>Collis 2013</td>
<td>26 14 (12)</td>
<td>30 13 (14)</td>
<td>30.2 %</td>
<td>1.00 [-5.81, 7.81]</td>
</tr>
<tr>
<td>Jerosch-Herold 2011</td>
<td>77 16.4 (15.1)</td>
<td>77 15.4 (13.2)</td>
<td>69.8 %</td>
<td>1.00 [-3.48, 5.48]</td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>103</strong></td>
<td><strong>107</strong></td>
<td><strong>100.0 %</strong></td>
<td><strong>1.00 [-2.74, 4.74]</strong></td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.0; Chi² = 0.00, df = 1 (P = 1.00); I² =0.0%

Test for overall effect: Z = 0.52 (P = 0.60)

Test for subgroup differences: Not applicable
### Analysis 1.2. Comparison 1 Preoperative measurements, Outcome 2 Total active extension.

Review: Surgery for Dupuytren’s contracture of the fingers

Comparison: 1 Preoperative measurements

Outcome: 2 Total active extension

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Splint</th>
<th>No Splint</th>
<th>Mean Difference</th>
<th>Weight</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean(SD)</td>
<td>N</td>
<td>Mean(SD)</td>
<td></td>
</tr>
<tr>
<td><strong>N</strong></td>
<td></td>
<td></td>
<td><strong>N</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td></td>
<td></td>
<td><strong>Mean</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Difference</strong></td>
<td></td>
<td></td>
<td><strong>Difference</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>95% CI</strong></td>
<td></td>
<td></td>
<td><strong>95% CI</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IV, Random</strong></td>
<td></td>
<td></td>
<td><strong>IV, Random</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>95% CI</strong></td>
<td></td>
<td></td>
<td><strong>95% CI</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Heterogeneity</strong></td>
<td></td>
<td></td>
<td><strong>Heterogeneity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Test for overall effect:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. **Middle finger**
   - Collis 2013
     - N: 8, Mean: 59 (24), SD: 71 (15)
     - Mean difference: 7.6% [−12.00, 9.20]

2. **Ring finger**
   - Collis 2013
     - N: 11, Mean: 73 (42), SD: 64 (30)
     - Mean difference: 3.7% [−21.50, 39.50]

3. **Little finger**
   - Collis 2013
     - N: 21, Mean: 80 (30), SD: 92 (44)
     - Mean difference: 8.2% [−32.31, 8.31]

4. **No subgroup by digit**
   - Jerosch-Herold 2011
     - N: 77, Mean: 50.7 (22.2), SD: 51.1 (18.8)
     - Mean difference: 80.5% [−0.40, 6.10]

**Total (95% CI)**
- N: 117, Mean: 100.0% [−1.89, 3.94]

Heterogeneity: Tau² = 0.0; Chi² = 3 (P = 0.47); I² = 0.0%

Test for overall effect: Z = 1.16 (P = 0.25)

Test for subgroup differences: Chi² = 2.52, df = 3 (P = 0.47), I² = 0.0%\n
---

Favours splint Favours no splint
## Analysis 1.3.  Comparison 1 Preoperative measurements, Outcome 3 Total active flexion.

Review: Surgery for Dupuytren’s contracture of the fingers

Comparison: 1 Preoperative measurements

Outcome: 3 Total active flexion

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>No Splint</th>
<th>Splint</th>
<th>Mean Difference (IV/Ran)</th>
<th>Weight</th>
<th>Mean Difference (IV/Ran)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle finger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collis 2013</td>
<td>5 248 (18)</td>
<td>8 242 (11)</td>
<td></td>
<td>13.5 %</td>
<td>6.00 [-11.52, 23.52]</td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td>5 8</td>
<td></td>
<td></td>
<td>13.5 %</td>
<td>6.00 [-11.52, 23.52]</td>
</tr>
<tr>
<td>Homogeneity: not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 0.67 (P = 0.50)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ring finger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collis 2013</td>
<td>11 241 (16)</td>
<td>11 230 (11)</td>
<td></td>
<td>23.6 %</td>
<td>11.00 [-0.47, 22.47]</td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td>11 11</td>
<td></td>
<td></td>
<td>23.6 %</td>
<td>11.00 [-0.47, 22.47]</td>
</tr>
<tr>
<td>Homogeneity: not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 1.88 (P = 0.060)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little finger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td>22 21</td>
<td></td>
<td></td>
<td>21.9 %</td>
<td>-9.00 [-21.26, 3.26]</td>
</tr>
<tr>
<td>Homogeneity: not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 1.44 (P = 0.15)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No subgroup by digit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jerosch-Herold 2011</td>
<td>77 226.2 (15)</td>
<td>77 223.8 (20.9)</td>
<td></td>
<td>41.1 %</td>
<td>2.40 [-3.35, 8.15]</td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td>77 77</td>
<td></td>
<td></td>
<td>41.1 %</td>
<td>2.40 [-3.35, 8.15]</td>
</tr>
<tr>
<td>Homogeneity: not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 0.82 (P = 0.41)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td>115 100.0 % 2.42 [-4.98, 9.83]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homogeneity: Tau² = 26.20; Chi² = 5.64, df = 3 (P = 0.13); I² = 47%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 0.64 (P = 0.52)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for subgroup differences: Chi² = 5.64, df = 3 (P = 0.13), I² = 47%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Analysis 2.1. Comparison 2 Effects of 3 months of postoperative night splinting (intention-to-treat), Outcome 1 DASH score at 3 months.

**Review:** Surgery for Dupuytren's contracture of the fingers

**Comparison:** 2 Effects of 3 months of postoperative night splinting (intention-to-treat)

**Outcome:** 1 DASH score at 3 months

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>No Splint</th>
<th>Splint</th>
<th>Mean Difference</th>
<th>Weight</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N Mean(SD)</td>
<td>N Mean(SD)</td>
<td>IV,Random,95% CI</td>
<td></td>
<td>IV,Random,95% CI</td>
</tr>
<tr>
<td>Collis 2013</td>
<td>29 11 (16)</td>
<td>24 10 (9)</td>
<td>25.7 % 1.00 [ -5.85, 7.85 ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jerosch-Herold 2011</td>
<td>76 10.8 (12.5)</td>
<td>76 9.6 (12.8)</td>
<td>74.3 % 1.20 [ -2.82, 5.22 ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>105</td>
<td>100</td>
<td>100.0 % 1.15 [ -2.32, 4.62 ]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: $\tau^2 = 0.0; \chi^2 = 0.00, df = 1 (p = 0.96); I^2 =0.0$

Test for overall effect: $Z = 0.65 (p = 0.52)$

Test for subgroup differences: Not applicable
### Analysis 2.2. Comparison 2 Effects of 3 months of postoperative night splinting (intention-to-treat), Outcome 2 Total active extension at 3 months.

Review: Surgery for Dupuytren’s contracture of the fingers

Comparison: 2 Effects of 3 months of postoperative night splinting (intention-to-treat)

Outcome: 2 Total active extension at 3 months

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>No Splint</th>
<th>Splint</th>
<th>Mean Difference</th>
<th>Weight</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean(SD)[degrees]</td>
<td>N</td>
<td>Mean(SD)[degrees]</td>
<td>IV, Random, 95% CI</td>
</tr>
<tr>
<td>1 Middle finger</td>
<td>5</td>
<td>30 (36)</td>
<td>7</td>
<td>26 (18)</td>
<td>2.9 %</td>
</tr>
<tr>
<td></td>
<td><strong>Subtotal (95% CI)</strong></td>
<td></td>
<td><strong>5</strong></td>
<td><strong>7</strong></td>
<td><strong>2.9 %</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Ring finger</td>
<td>11</td>
<td>24 (24)</td>
<td>11</td>
<td>28 (22)</td>
<td>9.1 %</td>
</tr>
<tr>
<td></td>
<td><strong>Subtotal (95% CI)</strong></td>
<td></td>
<td><strong>11</strong></td>
<td><strong>11</strong></td>
<td><strong>9.1 %</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Little finger</td>
<td>20</td>
<td>33 (34)</td>
<td>20</td>
<td>38 (38)</td>
<td>6.7 %</td>
</tr>
<tr>
<td></td>
<td><strong>Subtotal (95% CI)</strong></td>
<td></td>
<td><strong>20</strong></td>
<td><strong>20</strong></td>
<td><strong>6.7 %</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 No subgroup by digit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jerosch-Herold 2011</td>
<td>76</td>
<td>30.9 (20.7)</td>
<td>75</td>
<td>32.9 (19.6)</td>
<td>81.3 %</td>
</tr>
<tr>
<td></td>
<td><strong>Subtotal (95% CI)</strong></td>
<td></td>
<td><strong>76</strong></td>
<td><strong>75</strong></td>
<td><strong>81.3 %</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td>112</td>
<td>113</td>
<td>100.0 %</td>
<td>-2.21 [-8.01, 3.59]</td>
<td></td>
</tr>
</tbody>
</table>

-50 -25 0 25 50
Favours no splint Favours splint

Heterogeneity: not applicable

Test for overall effect: Z = 0.23 (P = 0.82)
Test for overall effect: Z = 0.41 (P = 0.68)
Test for overall effect: Z = 0.44 (P = 0.66)
Test for overall effect: Z = 0.75 (P = 0.45)
Test for subgroup differences: Chi^2 = 0.02, df = 3 (P = 0.97), I^2 = 0.0%
Test for subgroup differences: Chi^2 = 0.02, df = 3 (P = 0.97), I^2 = 0.0%
Test for subgroup differences: Chi^2 = 0.02, df = 3 (P = 0.97), I^2 = 0.0%
### Analysis 2.3. Comparison 2 Effects of 3 months of postoperative night splinting (intention-to-treat),
Outcome 3 Total active flexion at 3 months.

**Review:** Surgery for Dupuytren’s contracture of the fingers

**Comparison:** 2 Effects of 3 months of postoperative night splinting (intention-to-treat)

**Outcome:** 3 Total active flexion at 3 months

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>No Splint</th>
<th>Splint</th>
<th>Mean Difference</th>
<th>Weight</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (Mean(SD))</td>
<td>N (Mean(SD))</td>
<td>IV,Random,95% CI</td>
<td>IV,Random,95% CI</td>
<td></td>
</tr>
<tr>
<td>1 Middle finger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collis 2013</td>
<td>5 (245 (16))</td>
<td>7 (216 (28))</td>
<td>14.9 %</td>
<td>29.00 [3.96, 54.04]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td>5</td>
<td>7</td>
<td>14.9 %</td>
<td>29.00 [3.96, 54.04]</td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 2.27 (P = 0.023)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Ring finger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collis 2013</td>
<td>11 (232 (18))</td>
<td>11 (208 (36))</td>
<td>16.0 %</td>
<td>24.00 [0.21, 47.79]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td>11</td>
<td>11</td>
<td>16.0 %</td>
<td>24.00 [0.21, 47.79]</td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 1.98 (P = 0.048)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Little finger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collis 2013</td>
<td>20 (229 (22))</td>
<td>20 (220 (35))</td>
<td>23.1 %</td>
<td>9.00 [-9.12, 27.12]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td>20</td>
<td>20</td>
<td>23.1 %</td>
<td>9.00 [-9.12, 27.12]</td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 0.97 (P = 0.33)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 No subgroup by digit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jerosch-Herold 2011</td>
<td>76 (217.6 (22.5))</td>
<td>75 (213 (26.5))</td>
<td>46.0 %</td>
<td>4.60 [-3.25, 12.45]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td>76</td>
<td>75</td>
<td>46.0 %</td>
<td>4.60 [-3.25, 12.45]</td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 1.15 (P = 0.25)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td>112</td>
<td>113</td>
<td>100.0 %</td>
<td>12.36 [1.21, 23.50]</td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: Tau^2 = 54.30; Chi^2 = 5.16, df = 3 (P = 0.16); I^2 = 42%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 2.17 (P = 0.030)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for subgroup differences: Chi^2 = 5.16, df = 3 (P = 0.16), I^2 = 42%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Analysis 3.1. Comparison 3 Effects of 3 months of postoperative night splinting (per-protocol), Outcome 1 DASH score at 3 months.

Review: Surgery for Dupuytren’s contracture of the fingers

Comparison: 3 Effects of 3 months of postoperative night splinting (per-protocol)

Outcome: 1 DASH score at 3 months

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>No splint</th>
<th>Splint</th>
<th>Mean Difference</th>
<th>Weight</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Mean(SD)</td>
<td>N</td>
<td>Mean(SD)</td>
<td></td>
<td>IV(Random,95% CI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IV(Random,95% CI)</td>
</tr>
<tr>
<td>Collis 2013</td>
<td>24</td>
<td>27</td>
<td>11 (16.5)</td>
<td>26.9 %</td>
<td>1.30 [-6.12, 8.72 ]</td>
</tr>
<tr>
<td>Jerosch-Herold 2011</td>
<td>68</td>
<td>65</td>
<td>10.7 (13)</td>
<td>73.1 %</td>
<td>0.90 [-3.61, 5.41 ]</td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td>92</td>
<td>92</td>
<td><strong>100.0 %</strong></td>
<td>1.01</td>
<td><strong>[-2.85, 4.86]</strong></td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.0; Chi² = 1 (df = 1; P = 0.38); I² =0.0%

Test for overall effect: Z = 0.51 (P = 0.61)

Test for subgroup differences: Not applicable
### Analysis 3.2. Comparison 3 Effects of 3 months of postoperative night splinting (per-protocol), Outcome 2

Total active extension at 3 months [degrees].

#### Review: Surgery for Dupuytren's contracture of the fingers

#### Comparison: 3 Effects of 3 months of postoperative night splinting (per-protocol)

#### Outcome: 2 Total active extension at 3 months [degrees]

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>No splint</th>
<th></th>
<th>Splint</th>
<th></th>
<th>Mean Difference</th>
<th>Weight</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean(SD)</td>
<td>N</td>
<td>Mean(SD)</td>
<td>IV, Random, 95% CI</td>
<td></td>
<td>IV, Random, 95% CI</td>
</tr>
<tr>
<td>1 Middle finger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collis 2013</td>
<td>5</td>
<td>29.6 (35.5)</td>
<td>7</td>
<td>25.7 (17.5)</td>
<td>9.7 %</td>
<td>3.90 [-29.81, 37.61]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td>5</td>
<td></td>
<td>7</td>
<td></td>
<td>9.7 %</td>
<td>3.90 [-29.81, 37.61]</td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 0.23 (P = 0.82)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Ring finger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collis 2013</td>
<td>9</td>
<td>15.9 (16.1)</td>
<td>13</td>
<td>32.8 (24.3)</td>
<td>24.7 %</td>
<td>-16.90 [-33.79, -0.01]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td>9</td>
<td></td>
<td>13</td>
<td></td>
<td>24.7 %</td>
<td>-16.90 [-33.79, -0.01]</td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 1.96 (P = 0.050)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Little finger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collis 2013</td>
<td>16</td>
<td>21.4 (15.7)</td>
<td>23</td>
<td>43.6 (42.1)</td>
<td>21.9 %</td>
<td>-22.20 [-41.05, -3.35]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td>16</td>
<td></td>
<td>23</td>
<td></td>
<td>21.9 %</td>
<td>-22.20 [-41.05, -3.35]</td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 2.31 (P = 0.021)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 No subgroup by digit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jerosch-Herold 2011</td>
<td>68</td>
<td>31.1 (21)</td>
<td>65</td>
<td>33 (19.4)</td>
<td>43.7 %</td>
<td>-1.90 [-8.77, 4.97]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td>68</td>
<td></td>
<td>65</td>
<td></td>
<td>43.7 %</td>
<td>-1.90 [-8.77, 4.97]</td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 0.54 (P = 0.59)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td>98</td>
<td></td>
<td>108</td>
<td></td>
<td>100.0 %</td>
<td>-9.50 [-21.14, 2.15]</td>
<td></td>
</tr>
</tbody>
</table>

Pooled heterogeneity: Tau² = 68.62; Chi² = 6.12, df = 3 (P = 0.11); I² = 51%

Test for overall effect: Z = 1.60 (P = 0.11)

Test for subgroup differences: Chi² = 6.12, df = 3 (P = 0.11), I² = 51%
Analysis 3.3. Comparison 3 Effects of 3 months of postoperative night splinting (per-protocol), Outcome 3 Total active flexion at 3 months [degrees].

Review: Surgery for Dupuytren’s contracture of the fingers
Comparison: 3 Effects of 3 months of postoperative night splinting (per-protocol)
Outcome: 3 Total active flexion at 3 months [degrees]

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>No splint</th>
<th>Splint</th>
<th>Mean Difference</th>
<th>Weight</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N Mean(SD)</td>
<td>N Mean(SD)</td>
<td>IV Random,95% CI</td>
<td></td>
<td>IV Random,95% CI</td>
</tr>
<tr>
<td>1 Middle finger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collis 2013</td>
<td>5 245 (15.9)</td>
<td>7 216.4 (27.7)</td>
<td>11.5 %</td>
<td>28.60 [ 3.79, 53.41 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td>5</td>
<td>7</td>
<td><strong>11.5 %</strong></td>
<td><strong>28.60 [ 3.79, 53.41 ]</strong></td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 2.26 (P = 0.024)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Ring finger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collis 2013</td>
<td>9 232.9 (20)</td>
<td>13 211.2 (33.7)</td>
<td>13.7 %</td>
<td>21.70 [-0.80, 44.20 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td>9</td>
<td>13</td>
<td><strong>13.7 %</strong></td>
<td><strong>21.70 [-0.80, 44.20 ]</strong></td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 1.89 (P = 0.059)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Little finger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collis 2013</td>
<td>16 231.4 (22.3)</td>
<td>23 218.3 (34.1)</td>
<td>20.4 %</td>
<td>13.10 [-4.61, 30.81 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td>16</td>
<td>23</td>
<td><strong>20.4 %</strong></td>
<td><strong>13.10 [-4.61, 30.81 ]</strong></td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 1.45 (P = 0.15)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 No subgroup by digit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jerosch-Herold 2011</td>
<td>68 218.7 (21.5)</td>
<td>65 211.9 (26.5)</td>
<td>54.4 %</td>
<td>6.80 [-1.42, 15.02 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td>68</td>
<td>65</td>
<td><strong>54.4 %</strong></td>
<td><strong>6.80 [-1.42, 15.02 ]</strong></td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 1.62 (P = 0.11)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td>98</td>
<td>108</td>
<td>100.0 %</td>
<td>12.64 [ 3.68, 21.60 ]</td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: Tau² = 20.81; Chi² = 3.85, df = 3 (P = 0.28); I² =22%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 2.77 (P = 0.0057)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for subgroup differences: Chi² = 3.85, df = 3 (P = 0.28), I² =22%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Additional Tables

Table 1. Outcomes measured and length of study follow-up

<table>
<thead>
<tr>
<th>Article</th>
<th>Aspect of care studied</th>
<th>Length of follow-up, months</th>
<th>Outcomes measured</th>
<th>Recurrence</th>
<th>Extension deficit</th>
<th>Flexion deficit</th>
<th>Total motion</th>
<th>PROM</th>
<th>Time</th>
<th>Complications as an outcome measure</th>
<th>Hand volume</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhatia 2002</td>
<td>Technical refinement</td>
<td>0.5</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>Wound appearance</td>
</tr>
<tr>
<td>Bulstrode 2004</td>
<td>Technical refinement</td>
<td>18</td>
<td></td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Chignon-Sicard 2012</td>
<td>Rehabilitation adjunct</td>
<td>2</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Citron 2003</td>
<td>Technical refinement</td>
<td>24</td>
<td></td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Citron 2005</td>
<td>Technical refinement</td>
<td>24</td>
<td></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Collis 2013</td>
<td>Rehabilitation adjunct</td>
<td>3</td>
<td></td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Grip strength, composite flexion</td>
</tr>
<tr>
<td>Degreef 2014</td>
<td>Technical refinement</td>
<td>24</td>
<td></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Howard 2009</td>
<td>Technical refinement</td>
<td>0.5</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
### Table 1. Outcomes measured and length of study follow-up (Continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Procedure type</th>
<th>Fine-moment</th>
<th>Rehabilitation adjunct</th>
<th>12</th>
<th>+</th>
<th>+</th>
<th>+</th>
<th>-</th>
<th>-</th>
<th>-</th>
<th>-</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jerosch-Herold 2011</td>
<td>Rehabilitation adjunct</td>
<td>12</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Kemler 2012</td>
<td>Rehabilitation adjunct</td>
<td>12</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>McMillan 2012</td>
<td>Technical refinement</td>
<td>6</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Ullah 2009</td>
<td>Procedure type</td>
<td>36</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>van Rijssen 2006</td>
<td>Procedure type</td>
<td>1.5</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>van Rijssen 2012a</td>
<td>Procedure type</td>
<td>60</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

### Table 2. Six-week outcomes described in van Rijssen 2006

<table>
<thead>
<tr>
<th>Tubiana stage preop</th>
<th>% improvement in TPED for needle fasciotomy</th>
<th>% improvement in TPED for fasciectomy</th>
<th>Significance of differences between procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>71</td>
<td>82</td>
<td>0.329</td>
</tr>
<tr>
<td>II</td>
<td>67</td>
<td>78</td>
<td>0.071</td>
</tr>
<tr>
<td>III</td>
<td>46</td>
<td>75</td>
<td>0.000</td>
</tr>
<tr>
<td>IV</td>
<td>47</td>
<td>79</td>
<td>0.004</td>
</tr>
</tbody>
</table>
APPENDICES

Appendix 1. CENTRAL search strategy

#1 MeSH descriptor: [Dupuytren Contracture] explode all trees 36
#2 MeSH descriptor: [Fibroma] explode all trees 4
#3 Dupuytren*:ti,ab,kw (Word variations have been searched) 49
#4 Fibromatosis 12
#5 MeSH descriptor: [Fascia] explode all trees 142
#6 palmar fibromatosis 1
#7 viking disease 1
#8 palmar fascia 7
#9 MeSH descriptor: [Fibroblasts] explode all trees 161
#10 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 357

Appendix 2. MEDLINE search strategy: Ovid (numbers of results from original search in 2012)

Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) <1948 to Present> Search Strategy:

1 exp Dupuytren Contracture/ (2121)
2 exp Fibroma/ (11134)
3 Fibromatosis,tw. (2482)
4 exp Fascia/ (7945)
5 Fibroblasts/ (93904)
6 (palmar adj3 fascia),tw. (212)
7 Dupuytren*.tw. (2087)
8 (palmar adj3 fibromatosis),tw. (65)
9 (viking adj3 disease),tw. (1)
10 or/1-9 (115275)
11 randomized controlled trial,pt. (336898)
12 controlled clinical trial,pt. (85168)
13 randomized.ab. (252166)
14 placebo.ab. (139534)
15 clinical trials as topic.sh. (162410)
16 randomly.ab. (184567)
17 trial.ti. (108505)
18 or/11-17 (807835)
19 exp animals/ not humans.sh. (3780560)
20 18 not 19 (746667)
21 10 and 20 (767)

Appendix 3. EMBASE search strategy

EMBASE Classic+EMBASE <1947 to 2012 September 17>

1 Dupuytren contracture/ (3303)
2 fibroma/ (12928)
3 Fibromatosis,tw. (3239)
4 fascia/ (9898)
5 *fibroblast/ (30576)
6 (palmar adj3 fascia),tw. (309)
7 Dupuytren*.tw. (3062)
Appendix 4. CINAHL search strategy

CINAHL via Ebscohost - 1985-2012

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>S18</td>
<td>S5 and S17</td>
</tr>
<tr>
<td>S17</td>
<td>S6 or S7 or S8 or S9 or S10 or S11 or S12 or S13 or S14 or S15 or S16</td>
</tr>
<tr>
<td>S16</td>
<td>TX allocat* random*</td>
</tr>
<tr>
<td>S15</td>
<td>(MH &quot;Quantitative Studies&quot;)</td>
</tr>
<tr>
<td>S14</td>
<td>(MH &quot;Placebos&quot;)</td>
</tr>
<tr>
<td>S13</td>
<td>TX placebo*</td>
</tr>
<tr>
<td>S12</td>
<td>TX random* allocat*</td>
</tr>
<tr>
<td>S11</td>
<td>(MH &quot;Random Assignment&quot;)</td>
</tr>
<tr>
<td>S10</td>
<td>TX random* control* trial*</td>
</tr>
<tr>
<td>S9</td>
<td>TX ( (singl* n1 blind*) or (singl* n1 mask*) ) or TX ( (doubl* n1 blind*) or (doubl* n1 mask*) ) or TX ( (tripl* n1 blind*) or (tripl* n1 mask*) ) or TX ( (trebl* n1 blind*) or (trebl* n1 mask*) )</td>
</tr>
<tr>
<td>S8</td>
<td>TX clinic* n1 trial*</td>
</tr>
<tr>
<td>S7</td>
<td>PT Clinical trial</td>
</tr>
</tbody>
</table>
(Continued)

<table>
<thead>
<tr>
<th>Set#</th>
<th>Searched for</th>
<th>Databases</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>dupuytren's contracture</td>
<td>ProQuest Dissertations &amp; Theses (PQDT)</td>
<td>18</td>
</tr>
<tr>
<td>S2</td>
<td>Fibroma</td>
<td>ProQuest Dissertations &amp; Theses (PQDT)</td>
<td>256</td>
</tr>
<tr>
<td>S3</td>
<td>Fibromatosis</td>
<td>ProQuest Dissertations &amp; Theses (PQDT)</td>
<td>118</td>
</tr>
<tr>
<td>S4</td>
<td>palmar fibromatosis</td>
<td>ProQuest Dissertations &amp; Theses (PQDT)</td>
<td>2</td>
</tr>
<tr>
<td>S6</td>
<td>palmar fascia</td>
<td>ProQuest Dissertations &amp; Theses (PQDT)</td>
<td>86</td>
</tr>
<tr>
<td>S7</td>
<td>&quot;viking disease&quot;</td>
<td>ProQuest Dissertations &amp; Theses (PQDT)</td>
<td>0</td>
</tr>
<tr>
<td>S8</td>
<td>ab(viking disease)</td>
<td>ProQuest Dissertations &amp; Theses (PQDT)</td>
<td>1</td>
</tr>
</tbody>
</table>

Appendix 5. LILACS search strategy

LILACS (Latin American and Caribbean Health Sciences) - 1982 to current date
Search terms: dupuytren's contracture

Appendix 6. ProQuest Dissertations & Theses search strategy

ProQuest Dissertations & Theses (PQDT) (all years)
Appendix 7. ISI Web of Science search strategy

ISI Web of Science via Thomson Web of Knowledge Conference Proceedings Citation Index - Science (CPCI-S) -- 1990-present
Topic=(dupuytren contracture)
Refined by: Web of Science Categories=(SURGERY ) AND Document Types=( PROCEEDINGS PAPER OR MEETING ABSTRACT )
Databases=CPCI-S Timespan=All Years
Lemmatization=On

Appendix 8. Clinicaltrials.gov search strategy

(advanced search screen)

Conditions: Dupuytren's contracture

Appendix 9. Study eligibility form

<table>
<thead>
<tr>
<th>Study eligibility form - Surgery for Dupuytren's disease</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authors</strong></td>
</tr>
<tr>
<td><strong>Title</strong></td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>Q1. Does the paper report the outcome of a clinical study? (i.e. not a review article or just a paper describing an operative technique description)?</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>Next question</td>
</tr>
<tr>
<td>Q2. Participant. Have participants had a surgical intervention for Dupuytren's contracture of a finger?</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>Next question</td>
</tr>
</tbody>
</table>
### Q3. Outcomes
Did the study report short-term or long-term outcomes (recurrence) of surgery?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Unclear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Next question</td>
<td>Exclude</td>
<td>Refer</td>
<td></td>
</tr>
</tbody>
</table>

### Q4. Intervention
Did participants receive an intervention compared with a control group, or were at least 2 interventions compared?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Unclear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Next question</td>
<td>Exclude</td>
<td>Refer</td>
<td></td>
</tr>
</tbody>
</table>

### Q5. Type of study
Was the study randomised or quasi-randomised?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Unclear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Include</td>
<td>Exclude</td>
<td>Refer</td>
<td></td>
</tr>
</tbody>
</table>

### Appendix 10. Assessment of potential for bias in report (tool of The Cochrane Collaboration for assessing risk of bias)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Support for judgement</th>
<th>Review authors’ judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection bias</td>
<td>Insert description, preferably a direct quote from report or correspondence, and add comment</td>
<td>One of: “Low risk”, “High risk”, “Unclear risk”</td>
</tr>
<tr>
<td>Random sequence generation</td>
<td>Describe the method used to generate the allocation sequence in sufficient detail to allow an assessment of whether it should produce comparable groups</td>
<td>Selection bias (biased allocation to interventions) due to inadequate generation of a randomised sequence</td>
</tr>
<tr>
<td>Allocation concealment</td>
<td>Describe the method used to conceal the allocation sequence in sufficient detail to determine whether intervention allocations could have been foreseen in advance of, or during, enrolment</td>
<td>Selection bias (biased allocation to interventions) due to inadequate concealment of allocations before assignment</td>
</tr>
</tbody>
</table>
### Performance bias

**Blinding of participants and personnel**  
Assessments should be made for each main outcome (or class of outcomes)  
Describe all measures used, if any, to blind study participants and personnel from knowledge of which intervention a participant received. Provide any information related to whether intended blinding was effective  
Performance bias due to knowledge of allocated interventions by participants and personnel during the study

### Detection bias

**Blinding of outcome assessment**  
Assessments should be made for each main outcome (or class of outcomes)  
Describe all measures used, if any, to blind outcome assessors from knowledge of which intervention a participant received. Provide any information related to whether intended blinding was effective  
Detection bias due to knowledge of allocated interventions by outcome assessors

### Attrition bias

**Incomplete outcome data**  
Assessments should be made for each main outcome (or class of outcomes)  
Describe completeness of outcome data for each main outcome, including attrition and exclusions from analysis. State whether attrition and exclusions were reported, numbers in each intervention group (compared with total randomised participants), reasons for attrition/exclusions when reported and any re-inclusions in analyses performed by review authors  
Attrition bias due to amount, nature or handling of incomplete outcome data

### Reporting bias

**Selective reporting**  
State how the possibility of selective outcome reporting was examined by the review authors, and what they found  
Reporting bias due to selective outcome reporting

### Other bias

**Other sources of bias**  
State any important concerns about bias not addressed in other domains of the tool if particular questions/entries were pre-specified in the review protocol, responses should be provided for each question/entry  
Bias due to problems not covered elsewhere in the table
## Appendix 11. Paper assessment form

### Surgery for Dupuytren's disease - Study checklist

<table>
<thead>
<tr>
<th>Authors and year</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td></td>
</tr>
<tr>
<td>Journal/Source if not published</td>
<td></td>
</tr>
<tr>
<td>Study ID (Revman)</td>
<td>Date of extraction</td>
</tr>
<tr>
<td>Study design</td>
<td></td>
</tr>
<tr>
<td>Single/Multi-centre</td>
<td>Study setting (country)</td>
</tr>
<tr>
<td>Number of participants</td>
<td>Mean (SD:range) age</td>
</tr>
<tr>
<td>Male:Female</td>
<td></td>
</tr>
<tr>
<td>Inclusion criteria</td>
<td>Exclusion criteria</td>
</tr>
<tr>
<td>Randomisation technique</td>
<td>Concealment of allocation sequence?</td>
</tr>
<tr>
<td></td>
<td>• Rand numbers</td>
</tr>
<tr>
<td></td>
<td>• Quasi-random</td>
</tr>
<tr>
<td></td>
<td>• Not stated</td>
</tr>
<tr>
<td>Blinding of participant</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Unclear</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Interventions</td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>Control intervention</td>
</tr>
<tr>
<td>Length of follow-up (mean, SD, median, min, max)</td>
<td>Withdrawals (and why)</td>
</tr>
</tbody>
</table>
### Outcomes assessed

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Recurrence</th>
<th>No. Rec.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control treatment</td>
<td>Treatment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pre-op contracture (mean/SD)</th>
<th>MCP</th>
<th>PIP</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imm post-op contracture</td>
<td>MCP</td>
<td>PIP</td>
<td>Combined</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Final contracture</th>
<th>MCP</th>
<th>PIP</th>
<th>Combined</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Complications of surgery</th>
<th>Infection (definition)</th>
<th>Digital nerve injury</th>
<th>Tendon injury</th>
<th>Other</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Other outcomes</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Quality of evidence</th>
</tr>
</thead>
</table>
HISTORY

Review first published: Issue 12, 2015

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 November 2008</td>
<td>Amended</td>
<td>Converted to new review format</td>
</tr>
</tbody>
</table>

CONTRIBUTIONS OF AUTHORS

Jeremy Rodrigues

Giles Becker
Contributed to the design of the review. Contributed to the design of the statistical analysis. Screened abstracts. Read and approved the final version.

Cathy Ball
Contributed to the design of the protocol. Contributed to the search strategy. Assessed risks of bias. Extracted data. Read and approved the final version.

Weiya Zhang
Re-designed the methodology and statistics components of the protocol, following review. Read and approved the final version.

Henk Giele
Contributed to the design of the review. Tested different search strategies to compare effectiveness and appropriateness. Read and approved the final version.

Jonathan Hobby
Contributed to the design of the protocol. In particular, contributed to the design of the statistical analysis. Read and approved the final version.

Anna L. Pratt
Contributed to the interpretation of results, particularly of the meta-analysis. Read and approved the final version.

Tim Davis
Conceived of the review. Acted as guarantor of the review. Served as primary author of the protocol. Resolved conflicts in study selection, risk of bias assessment and data extraction. Contributed to the authorship of the review. Read and approved the final version.
DECLARATIONS OF INTEREST

None to declare.

SOURCES OF SUPPORT

Internal sources

- No sources of support supplied

External sources

- British Society for Surgery of the Hand (BSSH), UK.
  Contributed to funding Mr Rodrigues’ Research Fellowship
- Nottingham Hospitals Charity, UK.
  Contributed to funding Mr Rodrigues’ Research Fellowship
- Nottingham Orthopaedic Walk, UK.
  Contributed to funding Mr Rodrigues’ Research Fellowship
- National Institute for Health and Care Excellence (NICE) Fellows & Scholars Programme, UK.
  A scholarship has provided analytical and educational support during Mr Rodrigues’ period of full-time research, and a fellowship has provided further support since.
- Kennedy Institute Trust for Rheumatology Research and Health Innovation Challenge Fund (Wellcome Trust + Department of Health), UK.
  Contributed to funding Catherine Ball

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

As the result of difficulty gaining access, the following resources were not searched.

- Cochrane Wounds Group Specialised Register BNI (British Nursing Index and Archive).
- Sciverse.
- Zetoc.

As the journals listed for handsearching are currently indexed in databases searched electronically, we deemed handsearching to be redundant and we did not perform a handsearch.

Two additional resources were searched: ISI Web of Science was chosen as a source of conference abstracts, and clinicaltrials.gov was searched.

Given the comprehensive and inclusive nature of the search strategies listed in Appendix 1 and Appendix 2, and the large number of references retrieved (2464), we believe that this search was comprehensive.

The primary outcomes studied have been reordered to reflect the increasing importance of patient-reported outcomes among clinical studies since the time the protocol was first written.