REVIEW ARTICLE

Effectiveness of Interventions of Specific Complaints of the Arm, Neck, and/or Shoulder: 3 Musculoskeletal Disorders of the Hand. An Update

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ABSTRACT. Huisstede BM, van Middelkoop M, Randsdorp MS, Glerum S, Koes BW. Effectiveness of interventions of specific complaints of the arm, neck, and/or shoulder: 3 musculoskeletal disorders of the hand. An update. Arch Phys Med Rehabil 2010;91:298-314.

Objectives: To provide an evidence-based overview of the effectiveness of conservative and surgical interventions for trigger finger, Dupuytren's, and De Quervain's diseases.

Data Sources: The Cochrane Library, PEDro, PubMed, Embase, and CINAHL were searched to identify relevant studies.

Study Selection: Two reviewers independently applied the inclusion criteria to select potential relevant studies from the title and abstracts of the references retrieved by the literature search. Relevant (Cochrane) reviews and randomized controlled trials (RCTs) were included.

Data Extraction: Two reviewers independently extracted the data and performed a methodologic quality assessment.

Data Synthesis: A best-evidence synthesis was performed to summarize the results of the included trials. One Cochrane review (trigger finger) and 13 RCTs (trigger finger [6], Dupuytren's [4], De Quervain's [3]) were included. The trials reported on physiotherapy (De Quervain's), steroid injections (trigger finger, De Quervain's), surgical treatment (trigger finger, De Quervain's), and a postsurgical treatment (Dupuytren's). For trigger finger, moderate evidence was found for the effectiveness of steroid injections in the short-term (1–4wk) but not for long-term outcomes. Limited evidence was found for the effectiveness of staples compared with sutures in skin closure and for intermittent compression after surgery to treat Dupuytren's disease. For other interventions, no evidence was found.

Conclusions: Indications for effectiveness of some interventions for trigger finger, Dupuytren's, and De Quervain's diseases were found. Because only a few RCTs were identified, it is difficult to draw firm conclusions. High-quality RCTs are clearly needed in this field.

Key Words: Dupuytren's Contracture; Rehabilitation; Review [Publication Type]; Tenosynovitis; Treatment outcome; Trigger finger disorder.

DISORDERS AND INJURIES of the upper extremity have a considerable impact on patients and society because of their high frequency, associated disability, and economic consequences. In the United States, injuries affecting the upper extremity are the most common cause of injury, comprising about 30% of all injuries[1] and resulting in around 18 million patients visiting a physician because of this injury.[2] Using a flow chart called the CANS model, patients with nontraumatic upper-extremity disorders can be classified.[3] CANS is defined as musculoskeletal complaints of the arm, neck, and/or shoulder not caused by acute trauma or by any systemic disease. In a questionnaire survey on musculoskeletal conditions (age >25y, n=3664) in the general Dutch population, 36.8% of the participants reported CANS during the past year[4]; of the 19% of those with chronic CANS (ie, those with pain lasting for more than 3 months in the past year), 58% reported the use of health care.[4] Of those with chronic CANS, 28.7% reported complaints in the hand and wrist region. Pain, loss of motor function, and discomfort caused by either traumatic or nontraumatic disorders of the hand can result in a nonfunctional hand. Hand disorders are treated in both primary and secondary care by general practitioners, physiotherapists, plastic and orthopedic surgeons, and other paramedical and medical specialists. Moreover, to treat these disorders with the specialized care needed, increasing numbers of hand units within hospitals and practitioner-led hand clinics are being introduced. For example, in The Netherlands, the number of specialized units focusing on hand disorders doubled between 2005 and 2009. In these clinics, medical specialist and paramedical staff (eg, hand surgeons/therapists) work closely together. Improved continuity of care by experienced hand surgeons and therapists in cases of hand disorders can contribute to improved outcomes in the treatment of hand disorders.[5,6]

Frequently treated nontraumatic hand disorders are the trigger finger, Dupuytren's disease, and De Quervain's disease (table 1). Different clinical interventions are used to treat these specific hand disorders ranging from conservative therapy (such as immobilization or physiotherapy) to surgery. To further optimize the quality of care for patients with hand disorders, evidence-based information is needed to develop evidence-based protocols and guidelines for interventions. Therefore, an overview is needed of the current state-of-the-art regarding the evidence for the effectiveness of therapeutic interventions used to treat the trigger finger, Dupuytren's disease, and De Quervain's disease.

Our earlier systematic review[7] (with a search performed in PubMed up to May 2006) examined the evidence for the

List of Abbreviations

CANS	complaints of the arm, neck, and/or shoulder
CI	confidence interval
RCT	randomized controlled trial

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Table 1: Manifestations of 3 Specific Disorders of the Hand

Hand Disorder	Description
Trigger finger	A snapping phenomenon that occurs as the flexor digitorum superficialis and profundus tendons pull suddenly through a tight A1 pulley portion of the flexor sheath.
Dupuytren's disease	A condition of the palmar fascia initially presenting as fibromatous nodule formations that can lead to the development of a thickened cord. Over time, the cord contracts resulting in digital flexion contracture and reduced hand function.
De Quervain's disease	A painful stenosing condition of the first dorsal compartment of the hand that contains the abductor pollicis longus and the extensor pollicis brevis tendons. Patients report pain with thumb movements radiating to the radial side of the forearm.

effectiveness of interventions to treat the 4 specific disorders of the hand[3] (ie, the 3 specific hand disorders mentioned earlier and primary Raynaud phenomenon).

In this updated systematic review, we provide a comprehensive evidence-based overview of the effectiveness of conservative and surgical interventions to treat the trigger finger, Dupuytren's disease, and De Quervain's disease.

METHODS

Search Strategy

A search of relevant systematic reviews on the 3 hand disorders was performed in the Cochrane Library up to February 2009. In addition, we searched for relevant review publications and RCTs in PubMed, Embase, CINAHL, and PEDro up to February 2009. Key words related to the disorders such as trigger finger, Dupuytren's disease, De Quervain's, and interventions were included in the literature search. The complete search strategy is described in appendix 1.

Inclusion Criteria

Systematic reviews and/or RCTs were considered eligible for inclusion if they fulfilled all of the following criteria: (1) the study included patients with trigger finger, Dupuytren's disease, or De Quervain's disease; (2) the disorder was not caused by an acute trauma or any systemic disease as described in the definition of CANS; (3) an intervention for treating the disorder was evaluated; (4) results for pain, function, or recovery were reported; and (5) all languages were included.

If a subset of the total patients included in a study met our inclusion criteria, the study was only included if the outcomes of the subset were assessed and reported separately.

Selection of Studies

Two reviewers (BH and MR) independently applied the inclusion criteria to select potential relevant studies from the title and abstracts of the references retrieved by the literature search. A consensus method was used to solve any disagreements concerning inclusion of studies, and a third reviewer (BK) was consulted if disagreement persisted.

RCTs published after the search data mentioned in the (Cochrane) review and RCTs investigating interventions not summarized in a (Cochrane) review were included in this study.

Categorization of the Relevant Literature

The relevant literature was categorized under 3 headers: systematic reviews, recent RCTs, and additional RCTs. The header systematic reviews describes all Cochrane and Cochrane-based systematic reviews. The header recent RCTs contains all RCTs published from the final date of the search strategy that the systematic review covered. Finally, the header additional RCTs describes all RCTs concerning an intervention that has not yet been described in a systematic review.

Data Extraction

Two authors (MR, BH) independently extracted the data. Information was collected on the study population, interventions used, outcome measures, and outcome. A consensus procedure was used to solve any disagreement between the authors.

The follow-up time was categorized into short-term (0–3mo), midterm (4–6mo), and long-term (>6mo). Data are reported as closely as possible for short-term to 3 months, for midterm to 6 months, and for long-term to 1 year.

Methodologic Quality Assessment

To identify potential risks of bias of the included RCTs, 2 reviewers (BH, MR) independently assessed the methodologic quality of each additional or recent RCT. The 12 quality criteria and operationalization of these criteria (appendix 2) were adapted from Furlan et al.[8] Each item was scored as "yes," "no," or "don't know." High quality was defined as a score of 50% or more (ie, a "yes" score on 50% or more of the criteria) on the methodologic quality assessment. A consensus procedure was used to solve any disagreement between the reviewers.

In a Cochrane or a Cochrane-based review, the use of a methodologic quality assessment is a standard procedure. We describe the methodologic quality scale or criteria that were used in the review and use their definitions of high and low quality of the included studies.

Data Synthesis

A quantitative analysis of the studies was not possible because of the use of diverse outcome measures and other clinical heterogeneity. Therefore, we decided not to perform a meta-analysis but instead to summarize the results using a rating system that consisted of 5 levels of scientific evidence, taking into account the methodologic quality and the outcome of the original studies (best-evidence synthesis).[9] The number of RCTs found in the reviews summarized together with the recent RCTs or the number of additional RCTs determined the number of RCTs for a certain intervention. The article was included in the best-evidence synthesis only if a comparison was made between the groups (treatment vs placebo, treatment vs control, treatment vs treatment) and the level of significance was reported. The results of a study were labeled significant if 1 of the 3 outcome measures reported significant results. The level of evidence presented depends on the number of studies that found significant differences between the intervention groups.

Table 2: Data Extraction: Systematic Reviews

Study	Patients (n)	Treatment	Placebo	Control/Comparison	Outcome Measures	Effect Size
Trigger finger		Local corticosteroid injection				
Peters-Veluthamaningal et al,[11] (2 RCTs)	63	Corticosteroid + lidocaine injection		Lidocaine injection	Treatment success	4 wk: RR, 3.15 (95% CI, 1.34–7.40) In favor of corticosteroid injection 4mo: RR, 3.21 (95% CI, .88–11.79)
Dupuytren's disease No systematic reviews						
De Quervain's disease No systematic reviews						

NOTE. Gray shading indicates a group of treatment.
Abbreviation: RR, relative risk.

The level of evidence was ranked and divided into the following levels: (1) strong evidence for effectiveness: consistent (when ≥75% of the trials report the same findings) positive (significant) findings within multiple higher-quality RCTs; (2) moderate evidence for effectiveness: consistent positive (significant) findings within multiple lower-quality RCTs and/or 1 high-quality RCT; (3) limited evidence for effectiveness: positive (significant) findings within 1 low-quality RCT; (4) conflicting evidence for effectiveness: provided by conflicting (significant) findings in the RCTs (<75% of the studies reported consistent findings); (5) no evidence found for effectiveness of the inventions: RCT(s) available, but no (significant) differences between intervention and control groups were reported; and (6) no systematic review or RCT found.

RESULTS

Characteristics of the Included Studies

The literature search resulted in the identification of 1 review from the Cochrane Library for trigger finger and 50 reviews (17 from PubMed, 31 from Embase, 2 from CINAHL, 0 from PEDro). Furthermore, we found 605 RCTs (293 from PubMed, 304 from Embase, 5 from CINAHL, 3 from PEDro). Finally, after selection based on the content of the titles, abstracts, and full text, 1 Cochrane review (for trigger finger) and 13 RCTs (6 from PubMed for trigger finger, 4 from PubMed for Dupuytren's disease, 2 from PubMed, 1 from CINAHL for De Quervain's disease) met our inclusion criteria. Of these, 1 Cochrane review and another 8 RCTs were found extra in comparison to the studies included in our earlier systematic review.

The initial search revealed a systematic review by Fleisch et al[10] reporting on corticosteroid injections in the treatment of trigger finger; this review only included RCTs (search up to January 2006) written in English and found in PubMed or the Cochrane database. We also found a Cochrane review reporting on corticosteroid injections (search up to November 2007). Therefore, we decided to include the Cochrane review and to exclude the review of Fleisch et al.[10] The characteristics of the included articles are listed in table 2 (systematic reviews), table 3 (recent RCTs), and table 4 (additional RCTs).

Methodologic Quality of the Included Studies

The results of the methodologic quality assessment of the 12 included recent and additional RCTs are presented in table 5. The Cochrane review of Peters-Veluthamaningal et al[11] reporting on corticosteroid with lidocaine injection compared with lidocaine injection alone used a combination of 2 methodologic quality assessment tools from Jadad et al[12] and the Delphi list.[13] Ten quality items were described, and no definition of high- or low-quality studies was given. Therefore, for the 2 included RCTs, we defined a high-quality study as a score of more than 5 quality items (table 6).

In total, 5 of the 14 RCTs included in our review were of high quality (2 on trigger finger, 2 on Dupuytren's disease, 1 on De Quervain's disease). Another 5 RCTs scored 40% to 50% of the total score. The most prevalent methodologic limitations were care provider not blinded (100%), treatment allocation not concealed (86%), and cointerventions not avoided or similar (83%).

Effectiveness of Interventions

Table 7 gives an overview of the therapeutic interventions fields for which evidence for trigger finger, Dupuytren's disease, and De Quervain's disease was found. Table 8 presents results on the evidence for effectiveness of all included interventions for the treatment of the 3 hand disorders. For trigger finger, we found studies evaluating steroid injection and surgery; for Dupuytren's disease, we found studies evaluating surgery and postoperative treatment; and for De Quervain's disease, we found studies evaluating conservative treatment and injection therapy.

Effectiveness of Interventions of the Trigger Finger–Corticosteroid Injections

Corticosteroid with lidocaine injection versus lidocaine injection: a systematic review. The Cochrane review of Peters-Veluthamaningal[11] included studies regarding corticosteroid injection compared with placebo injection, injection with local anesthetic, injection with a different type of steroid, splinting, nonsteroidal anti-inflammatory drugs, systemic steroids, surgery, combination treatments, and no intervention. The 2 included low-quality RCTs (n=63) compared the short-term and midterm effects of local corticosteroid injection with lidocaine injection with lidocaine injection alone.

The low-quality study of Murphy et al[14] used 1mL betamethasone and 3mL 1% lidocaine for the treatment group and 4mL 1% lidocaine for the control group. The low-quality study of Lambert et al[15] used 0.5mL (20mg) methylprednisolone and 0.5mL 1% lidocaine for the treatment group and 1mL 1% lidocaine for the control group. The meta-analysis of the pooled estimates on treatment success showed significant dif-

Table 3: Data Extraction: Recent RCTs

Study	Treatment (numbers)	Placebo (numbers)	Control/Comparison (numbers)	Outcome Measures (total follow-up time)	Results: *P*	Results: Outcome Measures
Trigger finger	Steroid injection					
Peters-Veluthamaningal, et al[16]	One or 2 injections with 1 mL triamcinolone-acetonide around the affected flexor tendon (n=25)	(n=25)		Direct treatment response (1wk)	<.001	Complete resolution of symptoms: Treatment group, 9 (36%) vs placebo group, 0 (0%) No response: treatment group, 2 (8%) vs placebo, 15 (60%)
				Functional improvement (Dutch-AIMS-2) (12mo)	.770	At 3-mo follow-up (mean [range]): treatment group, 1.0 (1.0–1.9) vs placebo, 1.0 (1.0–1.9)
					.598	At 6-mo follow-up (mean [range]): treatment group, 1.0 (1.0–1.9) vs placebo, 1.1 (1.9–2.6)
					.531	At 12-mo follow-up (mean [range]): treatment group, 1.0 (1.0–1.4) vs placebo, 1.2 (1.0–1.5)
				Frequency of triggering (12mo)	.486	At 3-mo follow-up (%): treatment group, 66.7 vs placebo, 50.0
					.767	At 6-mo follow-up: treatment group, 55.6 vs placebo, 69.2
					1.000	At 12-mo follow-up: treatment group, 60.0 vs placebo, 52.9
				Median severity of local pain (12mo)	.872	At 3-mo follow-up (mean [range]): treatment group, 0.0 (0.0–1.0) vs placebo, 0.0 (0.0–2.5)
					.612	At 6-mo follow-up (mean [range]): treatment group, 1.0 (0.0–3.5) vs placebo, 0.0 (0.0–3.5)
					.610	At 12-mo follow-up (mean [range]): treatment group, 0.0 (0.0–1.0) vs placebo, 0.0 (0.0–2.0)
Ring, et al[17]	Injection with triamcinolone (10mg/mL) around the flexor tendon at the level of the A1 pulley (n=44)		Injection with dexamethasone (4mg/mL) around the flexor tendon at the level of the A1 pulley (n=40)	DASH Questionaire (3mo)	.61	Triamcinolone (mean ± SD): from 24±19.9; range, 0–90; 95% CI, 18.1–29.8 at baseline to 13±19.7; range, 0–77; 95% CI, 5.2–20.6 at 3mo vs dexamethasone: from 24±19.9; range, 0–90; 95% CI, 18.1–29.8 at baseline to 11±14.6; range, 0–42; 95% CI, 5.5–20.5 at 3 mo
				Absence of triggering (3mo)	<.05	Triamcinolone: 22/35 patients vs dexamethasone 12/35 at 6-wk follow-up
					.87	Triamcinolone: 27/41 patients vs dexamethasone: 22/31 at 3-mo follow-up
Dupuytren's disease No recent RCTs						
De Quervain's disease No recent RCTs						

NOTE. Gray shading indicates a group of treatment.
Abbreviation: DASH, Disability of the Arm, Shoulder, and Hand.

Table 4: Data Extraction: Additional RCTs

Study	Treatment (numbers)	Placebo (numbers)	Control/Comparison (numbers)	Outcome Measures (total follow-up time)	Results: *P*	Results: Outcome Measures
Trigger finger	Steroid injection					
Taras, et al[18]	Subcutaneous injection with 1.0 mL Celestone, 0.5 mL 1.0% lidocaine, and 0.5 mL Omnipaque-300 at the A1 pulley level (n=55 digits)		Injection with 1.0 mL Celestone, 0.5 mL 1.0% lidocaine, and 0.5 mL Omnipaque-300 at a 45° angle into the tendon sheath (n=52 digits)	Relief of symptoms (average, 27mo; range, 10–60 mo)	Data not listed	Attempted intrasheath group: good results 52%, fair results 19%, poor results vs attempted subcutaneous group: good results 71%, fair results 7%, poor results 22%*
			Regrouping after injection: mix group: portions of injection solution received into the sheath and the subcutaneous tissue (n=24)		Data not listed	After regrouping intrasheath group: good results 47%, fair results 16%, poor results 37% vs mix group: good results 50%, fair results 17%, poor results 33% vs subcutaneous group: good results: 70%, fair results 11%, poor results: 19%*
	Surgery:					
Gilberts, et al[19]	percutaneous surgical technique for trigger finger release (n=54)		Open surgical technique for trigger finger release (n=46)	Duration of postoperative pain (12wk)	.039	Percutaneous surgery (mean [range]): 3.1d (0–21) vs open surgery: 5.7d (3–60)
				Recovery of motor function (d) (12wk)	.002	Percutaneous surgery, 7d vs open surgery, 18d
				Success rate (%) (12wk)	Non significant, *P* value not listed	Percutaneous surgery, 100% vs open surgery, 98%
Dierks, et al[20]	Surgery: percutaneous technique (n=16 digits)		Surgery: open technique (n=20 digits)	Grip strength (kg) (12wk)	>.05	Percutaneous surgery: (mean ± SD) from 25±7 preoperatively to 31±8 after 12wk vs open surgery: from 27±11 preoperatively to 31±10 after 12 wk
				Pain (12wk)	>.05	Percutaneous surgery: (mean ± SD) from 4.3±0.9 preoperatively to 1.8±0.9 after 12wk vs open: from 4.3±0.7 preoperatively to 1.8±0.7 after 12wk
				Active range of motion of the PIP joint (12wk)	<.05	Percutaneous surgery: (mean ± SD) from 105±0 preoperatively to 95±17.5 after 1wk vs open surgery: from 107±7.2 preoperatively to 81±18.5 after 1wk
					>.05	Percutaneous surgery: from 105 (0) (mean (sd)) pre-operativeley to 105 (6.3) vs open surgery from 107 (7.2) to 104 (7.4) after 12wk
Topper, et al[21]	Trigger finger release: A: dividing of the proximal third of the A-1 pulley (n=7)		B: dividing of the middle third of the A-1 pulley (n=7) C: dividing of the distal third of the A-1 pulley (n=5)	Absence of clinical triggering (during procedure)		All 19 participants had clinical triggering after partial release*

Table 4: Data Extraction: Additional RCTs (Cont'd)

Study	Treatment (numbers)	Placebo (numbers)	Control/Comparison (numbers)	Outcome Measures (total follow-up time)	Results: *P*	Results: Outcome Measures
Dupuytren's disease						
	Sutures in surgery					
Bhatia, et al[22]	Staples (n=13)		Sutures (n=18)	Pain on removal (VAS) (1wk)	.008	Mean pain score suture removal (range) 2 (1–9) and staple removal 5 (2–9)
				Appearance of the wound scale 1 to 10 (1wk)	NS	Mean: 7.9 suture group vs 7.0 staple group
				Appearance of the wound scale 1 to 10 (2wk)	NS	Mean: 9.8 suture group vs 9.5 staple group
				Mean skin closure time in seconds (1wk)	<.001	499s (202–1135) sutures group vs 246s (105–437) in the staples group
	Surgery:					
Citron, et al[23]	Longitudinal incision closed with Z-plasty (n=46)		Modified Bruner incision (n=33)	Recurrence rate (2y)	>.05	33% Bruner vs 18% Z-plasty
				Extension rate (2y)	>.05	7% Bruner vs 12% Z-plasty
				Complications (2y)	>.05	10/47 Bruner vs 12/33 Z-plasty
Bulstrode, et al[24]	Intraoperative 5-fluorouracil treatment (n=15)	(n=15)		Range of motion: total active (18mo)	NS	3mo: increase of 28° treatment vs increase of 12° control
				MTP joint movement (18mo)	NS	68° to 85° for control and 69° to 79° for the treatment group
				Loss of extension MTP or interphalangeal joints (18mo)	NS	Loss of 19° and improved to 15° in control group Loss of 21° and improved to 12° in treatment group
	Postoperative					
Hazarika, et al[25]	intermittent pneumatic compression of the hand after fasciectomy compression garment (n=11)		Boxing glove dressing and roller towel elevation (n=11)	Mean postoperative hand volume (7d)	<.001	453.15 mL (mean difference, 5.82) treated group vs 478.81 mL (mean difference, 33.18) control group
				Physiotherapists reports	Data not listed	Treated group had earlier resumption of normal hand movements compared with the control group (no further data given)
De Quervain's disease						
	Injection					
Jirarattanapho-chai, et al[26]	Triamcinolone injection with supplement oral nimesulide (n=80)	(n=80)		Recovery (3wk)	.699	67% treated group vs 68% placebo group
				Pain score (VAS) (3wk)	.0116	−98.30±3.79 treated group vs −97.0±4.67 control group
Avci, et al[27]	Cortisone injection in pregnant women or in lactation period (n=10) (in 9 patients)		Thumb spica splints (n=9)	Pain relief (12mo)	Data not listed	9/9 complete pain relief in injection vs 0/9 pain relief when not wearing the splint*

Table 4: Data Extraction: Additional RCTs (Cont'd)

Study	Treatment (numbers)	Placebo (numbers)	Control/ Comparison (numbers)	Outcome Measures (total follow-up time)	Results: *P*	Results: Outcome Measures
Sharma, et al[28]	Laser (low level) (n=15)	(n=15)		Pain (Ritchie's tenderness scale) (after treatment, no exact follow-up time given)	<.01	Laser: no exact data given*
					Data not listed	Placebo: no exact data given*
				Grip strength (after treatment, no exact follow-up time given)	.007	Placebo: less grip strength than before treatment, no exact data given*
					.001	Laser: no exact data given*
				Pinch strength (after treatment, no exact follow-up time given)	.005	Placebo: less pinch grip than before treatment, no exact data given*
					.024	Laser, no exact data given*
				Ultrasonographic parameters:		
				Anteroposterior diameter (no exact follow-up time given)	.001	Placebo: increased diameter than before treatment, no exact data given*
					.011	Laser, no exact data given*
				Mediolateral diameter (no exact follow-up time given)	.004	Placebo: increased diameter than before treatment, no exact data given*
					.001	Laser: no exact data given*

NOTE. Gray shading indicates a group of treatment.
Abbreviations: MTP, metatarsophalangeal; NS, nonsignificant; PIP, proximal interphalangeal; VAS, visual analog scale.
*No statistical comparison between groups was made (ie, within groups compared).

Table 5: Methodologic Quality Scores of the Included RCTs

Reference	Adequate randomization?	Allocation concealment?	Blinding? Patients?	Blinding? Caregiver?	Blinding? Outcome assessors?	Incomplete outcome data addressed? Drop outs?	Incomplete outcome data? ITT analysis?	Free of suggestions of selective outcome reporting?	Similarity of baseline characteristics?	Co-interventions avoided or similar?	Compliance acceptable in all groups?	Timing of the outcome assessment similar?	Score max	Score study	%
Jirarattanaphocha[26]	+	?	+	−	+	+	+	+	+	+	?	−	12	8	67
Peters-Veluthamaningal[16]	+	+	+	?	+	+	−	+	−	?	NA	+	11	7	64
Bulstrode[24]	+	?	+	?	+	+	+	+	?	?	NA	+	11	7	64
Taras[18]	−	?	?	−	?	+	+	+	+	+	NA	+	11	6	55
Citron[23]	+	+	?	−	−	+	+	+	+	?	NA	−	11	6	55
Gilberts[19]	+	?	−	−	−	+	+	+	?	?	NA	+	11	5	45
Bhatia[22]	+	?	−	−	−	+	+	+	?	?	NA	+	11	5	45
Sharma[28]	−	?	+	?	+	+	+	+	?	?	?	?	12	5	42
Ring[17]	+	?	-	−	−	−	+	+	+	-	NA	−	11	4	36
Topper[21]	?	?	?	−	−	+	+	+	?	?	NA	+	11	4	36
Hazarika[25]	?	?	?	?	?	−	+	+	?	?	+	+	12	4	33
Dierks[20]	−	?	−	−	?	?	?	+	+	?	NA	+	11	3	27
Avci[27]	−	?	−	−	?	+	+	−	?	?	NA	−	11	2	18

Abbreviations: +, yes; −, no; ?, unsure; NA, not applicable (in a one-time intervention, such as surgery, compliance is not an issue).

Table 6: Methodologic Quality Scores of the Included RCTs of the Cochrane Review of Peters-Veluthamaningal, et al*

Reference	Adequate randomization?	Allocation concealment?	Blinding? Patients?	Blinding? Caregiver?	Blinding? Outcome assessors?	Incomplete outcome data addressed? Dropouts?	Incomplete outcome data? ITT analysis?	Similarity of baseline characteristics?	Specification of eligibility criteria?	Availability of point estimates and measures of variability of primary outcome measures?	Score max	Score study	%
Murphy[14]	−	−	+	−	+	+	+	?	−	?	10	4	40
Lambert[15]	−	−	?	?	+	+	−	?	+	+	10	4	40

Abbreviations: +, yes; −, no; ?, unsure; NA, not applicable (in a one-time intervention, such as surgery; compliance is not an issue).
*Adapted by Jadad et al[12] and Verhagen et al.[13]

Table 7: Evidence for Effectiveness of Interventions for Disorders of the Hand

	Trigger Finger	Dupuytren's Disease	De Quervain's Disease
Conservative			
Physiotherapy	ND	ND	ND
Oral	ND	ND	ND
Injection	✓*†	ND	0
Other	ND	ND	ND
Surgical	0	0	0
Postsurgical	ND	0	ND

Abbreviations: ND, no data; 0, RCT(s) found, but only limited, conflicting, or no evidence for effectiveness of interventions was found.
✓strong or moderate evidence found.
*Moderate evidence: steroid injection plus lidocaine in short-term.
†Moderate evidence: corticosteroid injection in short-term.

ferences in favor of local corticosteroid injections (relative risk = 3.15; 95% CI, 1.34–7.40) at the 4-week follow-up. These results on treatment success were not sustained at the 4-month follow-up in the RCT of Murphy et al[14] (relative risk = 3.21; 95% CI, .88–11.79). Therefore, there is moderate evidence that a local corticosteroid plus lidocaine injection is more effective than lidocaine injection in the very short-term, but there is no evidence for the midterm.

Corticosteroid injection versus placebo around the affected flexor tendon: a recent RCT. The high-quality study of Peters-Veluthamaningal et al[16] (n=50) found no significant differences between 1 or 2 injections with 1mL triamcinolone acetonide around the affected flexor tendon and placebo (0.9% natrium chloride) on functional improvement (Dutch-Arthritis Impact Measurement scale-2) at the 3-, 6-, and 12-month follow-up. Additionally, no significant differences were found on the frequency of triggering at the 3- and 12-month follow-up. Furthermore, no significant different effects were found on the median severity of local pain at the 3-, 6-, and 12-month follow-up. The only significant differences were found on direct treatment response (ie, complete resolutions of symptoms) at the 1-week follow-up; complete resolution of symptoms was found in 36% in those treated with the triamcinolone acetonide injection and in 0% of those treated with placebo ($P<.001$). Furthermore, 8% in the treated group and 60% in the placebo group did not respond to the treatment.

We conclude that there is moderate evidence for the effectiveness of corticosteroid injection compared with placebo (0.9% natrium chloride) around the affected tendon in the treatment of trigger finger at the 1-week follow-up and no evidence on the short-, mid-, and long-term.

Different types of corticosteroid injections around the affected flexor tendon: a recent RCT. In the low-quality RCT of Ring et al[17] (n=84), an injection with 10mg/mL triamcinolone was compared with an injection of 4mg/mL dexamethasone around the flexor tendon at the level of the A1 pulley. No significant differences were found on the Disability of the Arm, Shoulder and Hand Questionnaire at the 3-month follow-up: (mean ± SD) triamcinolone (from 24±19.9, range 0–90; 95% CI, 18.1–29.8 at baseline to 13±19.7; range, 0–77; 95% CI, 5.2–20.6 at 3 months) versus dexamethasone (from 24±19.9; range, 0–90; 95% CI, 18.1–29.8 at baseline to 11±14.6; range, 0–42; 95% CI, 5.5–20.5 at 3 months); $P=.61$.

Significant differences on the absence of triggering were found in favor of triamcinolone at the 6-week follow-up (triamcinolone: 22/35 patients vs dexamethasone 12/35, $P<.05$). However, the significant results were not sustained at the 3-month follow-up (triamcinolone: 27/41 patients vs dexamethasone: 22/31, $P=.87$). In conclusion, there is no clear evidence for the effectiveness of dexamethasone compared with triamcinolone for the treatment of trigger finger in the short-term.

Intrasheath steroid injection versus subcutaneous steroid injection: an additional RCT. The high-quality RCT of Taras et al[18] (n=96 patients and 107 digits) compared subcutaneous corticosteroid injection (1.0mL Celestone, 0.5mL 1.0% lidocaine, 0.5mL Omnipaque-300) with an injection with the same solution at a 45° angle into the tendon sheath. An x-ray was made to identify whether the injection solution had reached the true delivery location. If a participant in the intrasheath group received the corticosteroid solution into the sheath but also into the subcutaneous tissue, this participant was placed in a subgroup (ie, the mix group [n=24]). At the 27-month follow-up (range, 10–60mo), in the attempted intrasheath group 52% had good, 47% fair, and 19% had poor results and in the intrasheath group 71% had good, 7% fair, and 22% poor results. Regrouping after the x-ray resulted in 47% good, 16% fair, and 37% poor results in the intrasheath group. In the mix group, 50% had good, 17% fair, and 33% poor results. In the subcutaneous group, 70% had good, 11% fair, and 19% had poor results. No comparison was made between the groups. Thus, there is no clear evidence for intrasheath corticosteroid injection compared with subcutaneous corticosteroid injection to treat the trigger finger in the long-term.

Effectiveness of Interventions of the Trigger Finger Surgery

Additional RCTs. There were 2 additional low-quality RCTs reporting on the effectiveness of an open surgical technique compared with a percutaneous surgical technique for trigger finger release. One low-quality RCT by Gilberts et al[19] (n=100) found significant differences in favor of the percutaneous technique regarding the duration of postoperative pain (percutaneous surgery: mean, 3.1d [range, 0–21] vs open surgery: mean, 5.7d [range, 3–60], $P=.039$), and recovery of motor function in days (percutaneous surgery: 7d vs open surgery: 18d) at the 12-week follow-up. No significant differences were reported for success rate (%) (percutaneous surgery: 100% vs open surgery: 98%, no P value given) at the 12-week follow-up.

Another low-quality RCT of Diercks et al[20] (n=36) compared the same 2 interventions and found no significant differences on grip strength (percutaneous: mean ± SD, from 25±7 preoperatively to 31±8 after 12 weeks vs open: from 27±11 preoperatively to 31±10 after 12 weeks, $P>.05$) and pain (percutaneous: mean ± SD, from 4.3±0.9 preoperatively to 1.8±0.9 after 12 weeks vs open: from 4.3±0.7 preoperatively to 1.8±0.7 after 12 weeks, $P>.05$). The only significant differences found were for active range of motion of the proximal interphalangeal joint in favor of the percutaneous technique 1 week after surgery (percutaneous: mean ± SD, from 105±0 preoperatively to 95±17.5 after 1 week vs open: from 107±7.2 preoperatively to 81±18.5 after 1 week, $P<.05$). However, 12 weeks after surgery, these significant differences between the 2 interventions were not sustained (percutaneous: mean ± SD, from 105±0 preoperatively to 105±6.3 vs open: from 107±7.2 to 104±7.4, $P>.05$).

Topper et al[21] (n=19) studied partial trigger finger release and compared dividing the proximal third of the A-1 pulley with dividing the middle third and the distal third of the A-1 pulley. After partial release, in all 19 patients, the clinical triggering persisted, and all patients received total release of the A-1 pulley with complete relief of symptoms. No comparisons were made between the groups.

Table 8: Evidence for Effectiveness of Interventions for the 3 Specific Disorders of the Hand

Hand Disorder	Conservative Treatment					Surgical	
	Physiotherapy	Oral Treatment	Injection		Other Conservative		
Trigger finger	X	X	⇒ Steroid injection* plus lidocaine vs lidocaine injection		X	Various techniques: ⇒ Open vs percutaneous technique	
			Short-term (4wk):	++		Short-term:	±
			Midterm:	NE			
			⇒ Corticosteroid injection vs placebo			⇒ Partial dividing of the A1-pulley	
			Short-term:			Short-term:	NC
			1wk:	++			
			Short-term:	NE			
			Midterm:	NE			
			Long-term:	NE			
			⇒ Dexamethasone vs triamcinolone				
			Short-term:	NE			
			⇒ Intrasheath corticosteroid injection vs subcutaneous corticosteroid injection				
			Long-term:	NC			
Dupuytren's disease	X	X	X		X	Various techniques: ⇒ Staples* vs sutures in skin closure	
						Short-term:	+
						⇒ Bruner vs *Z*-plasty technique	
						Long-term:	NE
						⇒ 5-fluorouracil after excision	
						Short-term:	NE
						Midterm:	NE
						Long-term:	NE
						Postsurgery: ⇒ Intermittent vs constant compression after surgery	
						Short-term:	+
De Quervain's disease	⇒ Low-level laser therapy vs placebo	X	⇒ Triamcinolone vs triamcinolone plus oral nimesulide		X	X	
	Short-term: NC		Short-term:	NE			
			⇒ Cortisone vs splinting in pregnant women or during breast-feeding:				
			Short-term:	NC			

Abbreviations: X, No systematic review or RCT found; +, limited evidence found; ++, moderate evidence found; +++, strong evidence found; ±, conflicting evidence for effectiveness; NC, RCT found, but no comparison between the intervention and control groups were made, so no evidence was found; NE, no evidence found for effectiveness of the treatment: RCT(s) available, but no differences between intervention and control groups were found.
*In favor of.

We conclude that there is conflicting evidence for the effectiveness of percutaneous compared with open surgery for the treatment of trigger finger in the short-term. Moreover, there is no evidence for the effectiveness of partial release of the A-1 pulley in the treatment of trigger finger in the short-term.

Effectiveness of Interventions for Dupuytren's Disease

We found no systematic reviews and 4 additional RCTs reporting on sutures, surgery techniques, and postoperative treatment for the treatment of Dupuytren's disease.

Sutures in surgery: an additional RCT. One low-quality RCT was identified for the effectiveness of surgery for Dupuytren's disease. The study[22] (n=31) compared staples versus sutures in skin closure after Dupuytren's surgery. After 1 week, the mean skin closure time (in seconds) was significantly higher in the sutures group (mean, 499s [range, 202–1135s] than in the staples group (mean, 246 [range, 105–437]). At the same time, the pain score on removal was significantly lower in the sutures group (mean, 2 [range, 1–9] on a 0–10 scale) than in the staples group (mean, 5 [range, 2–9], $P=.008$). Because

staples can be inserted in about half the time of conventional sutures, the authors recommend their use for closure of extensive palmar wounds after long operative procedures. We conclude that there is limited evidence for the use of staples versus sutures in skin closure in Dupuytren's surgery in the short-term.

Surgery: an additional RCT. Two additional RCTs were found for the effectiveness of surgery for Dupuytren's disease. The high-quality study of Citron and Nunez[23] (n=100) compared 2 different skin incisions, modified Bruner and a longitudinal incision closed with Z-plasty, for Dupuytren's contracture and compared the recurrence of the disease minimally 2 years after surgery or until a recurrence or extension of the disease was noted. The recurrence rate was 33% in the modified Bruner group compared with 18% in the Z-plasty group ($P>.05$). Extension rates in the same digit were low and similar in the 2 groups (ie, 7% and 12%, respectively). Complication rates were slightly higher in the Z-plasty group, but the difference was not significant. Therefore, we conclude that there is no clear evidence for the use of the modified Bruner technique in Dupuytren's surgery compared with the Z-plasty technique in the long-term.

The high-quality study of Bulstrode et al[24] (n=30) assessed the effect of intraoperative topical treatment with 5-fluorouracil after limited excision in Dupuytren's disease in 30 patients at the 3-, 6-, 12-, and 18-month follow-up. At follow-up, there were no significant differences between the treated and control groups with regard to the range of motion in total or in the metacarpophalangeal or interphalangeal joints separately. Thus, there is no evidence for the use of 5-fluorouracil after excision in Dupuytren's disease in the short-, mid-, and long-term.

Postoperative treatment: an additional RCT. A low-quality study by Hazarika et al[25] (n=22) evaluated the effect of intermittent compression on the postoperative hand compared with constant compression by wearing a boxing glove dressing and roller towel elevation after surgery for Dupuytren's contracture 7 days after surgery. The most important finding was a distinct increase in edema (mean difference [mL] [pre- postoperative] of hand volume in the group treated with intermittent compression of 5.82 vs 33.18 in the control group, $P<.001$) with an almost immediate return to normal hand function in the group treated by compression. Therefore, we conclude that there is limited evidence for the effectiveness of intermittent compression compared with constant compression after Dupuytren's surgery in the short-term.

Effectiveness of Interventions for De Quervain's Disease

No systematic reviews and 3 additional RCTs on injection therapy and physiotherapy were identified for the treatment of De Quervain's disease.

Injection therapy: an additional RCT. One high-quality study[26] (n=160) reported on triamcinolone injection with or without the nonsteroidal anti-inflammatory drug nimesulide. Three weeks after the first injection, 67% in the treatment group recovered versus 68% in the placebo group. The overall recovery at the final follow-up examination after a single injection or multiple (2, 3, 4) injections was 95% in both groups. No significant difference between the 2 groups was found with respect to recovery ($P=.699$) and pain intensity after treatment ($P=.116$). The authors concluded that supplemental oral administration of nimesulide does not improve the effectiveness of a single injection with triamicinolone. Therefore, we conclude that there is no evidence that nimesulide plus triamcinolone injection is more effective than triamcinolone injection alone in the treatment of De Quervain's disease in the short-term.

Another low-quality study[27] (n=19 wrists [out of 18 patients]) was conducted among pregnant women and women who were breastfeeding. Treatment success was defined as total pain relief and a negative Finkelstein test. Cortisone injection was found to be effective, whereas splinting did not provide satisfactory pain relief. A fixed follow-up time was not applied. All 9 patients who had injections reported complete pain relief and had a negative Finkelstein test 1 to 6 days after injection. All 9 patients in the splint group reported pain relief while wearing the splint but had pain otherwise. Pain did not resolve completely during the lactation period in those patients but resolved spontaneously 2 to 6 weeks after the cessation of breastfeeding. No statistical analyses were applied. No comparisons were made between the groups. Thus, there is no evidence that a cortisone injection reduces the symptoms of De Quervain's disease compared with splinting during the period of breastfeeding.

Physiotherapy: an additional RCT. The low-quality study of Sharma et al[28] (n=30) compared low-level laser therapy with placebo and found significantly better results on grip strength (no exact data given, $P=.001$), pinch grip (no exact data given, $P=.024$), and ultrasonographic parameters (anteroposterior diameter [no exact data given, $P=.011$]) and mediolateral diameter (no exact data given, $P=.001$) in the low-laser therapy group after therapy. No significant improvement in any outcome measure was found in the placebo group (no exact data given). Comparisons between the groups were not made. In conclusion, there is no evidence for low-level laser therapy for the treatment of De Quervain's disease compared with placebo in the short-term.

DISCUSSION

Because the hand is the primary interface between humans and the environment,[29] traumatic as well as nontraumatic disorders may have considerable impact on the functioning of patients. Hand disorders are frequently seen in primary care. In addition, specialized care for hand disorders is nowadays given in hand clinics and hand units. Optimizing this care can be provided by developing evidence-based protocols and guidelines. To contribute to this need, this systematic review provides an overview of the current state-of-the-art regarding evidence-based effectiveness of conservative and surgical interventions to treat the most frequently seen nontraumatic hand disorders in hand clinics including trigger finger, Dupuytren's disease, and De Quervain's disease.

Trigger Finger

Moderate evidence was found for the effectiveness of steroid injections in the short-term (1–4wk) to treat trigger finger. In the present systematic review, we found moderate evidence for corticosteroid injection for treating trigger finger at the 1-week follow-up and in favor of corticosteroid injections plus lidocaine compared with lidocaine alone at the 4-week follow-up. However, these results were not sustained in the mid- and long-term.

It is reported that a lower success rate after steroid injections is associated with a prolonged period (4–6mo) of symptoms and an increasing number of injections.[30,31] In the prospective cohort study of Rozental et al,[32] prognostic indicators of recurrence of triggering after corticosteroid injections were evaluated. After 5.6 months (range, 0.5–13.1mo), 56% of the 119 participants had recurrence of triggering. Prognostic indicators of treatment failure were younger age ($P<.01$), insulin-dependent diabetes mellitus ($P<.01$), involvement of multiple digits ($P<.01$), and a history of other tendinopathies of the upper extremity ($P=.02$). Rhoades et al[31] suggested that the development of fibrocartilaginous metaplasia of the stenotic A-1

pulley hampers the effect of corticosteroids. Similarly, for treatment of other disorders, it is known that the positive effect of steroid injections fades away over time.[33,34] It seems that in patients with trigger finger the effects of corticosteroids do not persist because the cause of the trigger finger is not resolved. To relieve the symptoms of trigger finger permanently, surgery is suggested to be an effective treatment option. Turowski et al[35] recommended surgery in patients with trigger finger when conservative treatment was not successful and in patients with longstanding and severe cases of trigger finger. The success rate of surgery to release the trigger finger was shown to be successful in the short-term in retrospective studies.[35-38] Also, the observational study of Lange-Riess et al[39] showed positive results for surgery; complete relief of symptoms after open surgical treatment for the release of the trigger finger was reported in all patients after an average of 14.3 years (range, 10–20y). In conclusion, local steroid injection can be used for a quick decrease of symptoms, and surgical treatment may be considered as a definitive treatment option. However, more RCTs should be performed to investigate the efficacy of these treatment strategies.

Dupuytren's Disease

Limited evidence was found for the effectiveness of staples compared with sutures in skin closure in surgery and for the effectiveness of intermittent compression after surgery to treat Dupuytren's disease.

De Quervain's Disease

No evidence regarding the effectiveness of treatment for De Quervain's disease was found. Thus, currently, only moderate and limited evidence for some treatment options for trigger finger and Dupuytren's disease could be shown. For other interventions regarding trigger finger and Dupuytren's disease and for interventions to treat De Quervain's disease, no clear evidence for effectiveness was found.

In our previous systematic review,[40] a small number of RCTs evaluating interventions to treat the specific hand disorders (1 RCT for trigger finger, 4 RCTs for Dupuytren's disease, 2 RCTs for De Quervain's disease) were included. Additionally, in the present review, we found a Cochrane review including 2 RCTs reporting on corticosteroid injections for trigger finger, 3 recent RCTs reporting on steroid injection therapy for trigger finger, 3 RCTs evaluating different techniques of surgery for trigger finger, and 1 RCT examining laser therapy for De Quervain's disease. Fortunately, interest in studying the effectiveness of interventions for treating hand disorders seems to be growing. In particular, more RCTs for trigger finger were found.

In primary care and in hand clinics/units, all kinds of conservative treatments are currently used for the management of patients suffering from nontraumatic hand disorders. The intended beneficial effects of conservative treatments (eg, immobilization and physical therapy) for the treatment of trigger finger,[31,41] Dupuytren's,[42] and De Quervain's[43-45] diseases have been described. However, high-quality RCTs examining the effectiveness of these treatments are still lacking. Therefore, future research should also concentrate on conservative treatment options.

Study Limitations

Some limitations of this review and its conclusions need to be addressed. First, we refrained from statistical pooling of the results of the individual trials; this was done because of the heterogeneity of the trials. A single-point estimate of the effect of the interventions included for a single specific hand disorder would probably not do justice to the differences between the trials regarding patient characteristics, interventions, and outcome measures. The use of a best-evidence synthesis is a next best solution and is a transparent method commonly applied in the field of musculoskeletal disorders when statistical pooling is not feasible or clinically viable.[9] Second, only one third of the included studies had a methodologic quality score of high quality. Thus, more high-quality RCTs in this area are needed. In this systematic review, we decided to define a score of 50% or more as a high-quality study; this cut-off point of 50% is an arbitrary choice. Had we decided to define a high-quality study with a score of 60% or more, no more than 3 RCTs would be classified as high quality. However, the evidence for the effectiveness of the interventions should have remained similar.

Furthermore, the Cochrane review of Peters-Veluthamaningal et al[11] on corticosteroids for trigger finger included in this review found 2 low-quality RCTs. We wanted to use the methodologic quality criteria of this Cochrane review adapted by Jadad et al[12] and the Delphi list.[13] Because no definitions of high- or low-quality studies were given, in the present review we defined a high-quality study as 50% or more positive criteria. Comparing the methodologic quality criteria applied by Furlan et al[46] with those that we used to assess the methodologic quality of the recent and additional RCTs, 2 quality criteria were missing: (1) Are cointerventions avoided or similar? and (2) Is the compliance acceptable? If we assess these 2 missing items with regard to the 2 included RCTs[14,15] in the review of Peters-Veluthamaningal,[11] (1) the compliance for both studies is not applicable and (2) for both studies it is unsure if cointerventions were avoided or similar. Therefore, according to the methodologic quality criteria of Furlan,[46] Murphy et al[14] scored 4 out of 12 items positively (33%), and Lambert et al[15] also scored 4 out of 12 items positively (33%). Consequently, the methodologic quality of the 2 studies remains low, and our conclusion remains unchanged.

CONCLUSIONS

In conclusion, the current review provides indications for the effectiveness of some interventions for trigger finger, Dupuytren's disease, and De Quervain's disease. The number of published RCTs for the specific hand disorders is still disappointingly low. Therefore, it remains difficult to draw firm conclusions about the evidence regarding the effectiveness of treatment.

At present, for trigger finger, there is moderate evidence that a local corticosteroid injection is effective in the very short-term (1–4wk), but injections do not tend to alter the long-term outcomes. For the effectiveness of surgery, no evidence is yet available. Furthermore, for Dupuytren's disease, there is limited evidence that staples are more effective than sutures in skin closure in the short-term and that intermittent compression is effective after surgical treatment. For other treatment options to treat trigger finger, Dupuytren's disease, and De Quervain's disease, no clear evidence is available.

Our conclusions can be used for policymaking and for the development of clinical guidelines. Although it is encouraging that in the last 3 years more RCTs were conducted to study the effectiveness of 2 of these disorders, more high-quality RCTs are still urgently needed in this field in order to stimulate evidence-based practice.

APPENDIX 1: SEARCH STRINGS

1. Search strategy for disorders

Trigger finger	
PubMed	((tendinopathy[mesh] OR tendinit*[tw] OR tendonit*[tw] OR tendinopath*[tw] OR tendonopath*[tw] OR tenosynovitis[mesh] OR tenosynovit*[tw]) AND (stenosis[tw] OR stenot*[tw] OR fibrot*[tw] OR fibrosis[mesh] OR fibrosis[tw]) AND (hand[mesh:noexp] OR hand[tw] OR hands[tw] OR finger[tw] OR fingers[mesh] OR fingers[tw]) OR "trigger finger disorder"[mesh] OR "trigger finger"[tw] OR "trigger fingers"[tw] OR "snapping finger"[tw] OR "snapping fingers"[tw] OR "A1 pulley"[tw] OR "A1-pulley"[tw])
EMBASE	((tendinitis/exp OR tendinit* OR tendinopath* OR tendonit* OR tendonopath* OR tenosynovitis/exp OR tenosynovit*) AND (stenos* OR stenot* OR fibrot* OR fibros*) AND (hand/exp OR finger* OR thumb* OR metacarp*) OR 'trigger finger' OR 'trigger fingers' OR 'snapping finger' OR 'snapping fingers')
CINAHL	"trigger finger*" or (stenos* and ((MH"tenosynovitis") or tenosynovitis or (MH "tendinitis") or tendin* or tendon*))
PEDro	"trigger finger"
Dupuytren's disease	
PubMed	Dupuytren* OR "Dupuytren's Contracture"[mh]
EMBASE	'Dupuytren contracture'/ OR Dupuytren*
CINAHL	(MH "Dupuytren's Contracture") or dupuytren*
PEDro	Dupuytren Contracture OR Dupuytren disease OR Dupuytren
De Quervain's disease	
PubMed	(tendinopathy[mh:noexp] OR tenovaginitis OR tendovaginitis OR tendinit* OR tendonitis OR tenosynovitis OR tendinos* OR bursitis[mh:noexp]) OR Quervain* OR DeQuervain* OR "De Quervain Disease"[mh] OR ((abductor AND pollicis) AND (long OR longus)) OR (extensor AND pollicis AND brevis)
EMBASE	tendinopathy OR tenovaginitis OR tendovaginitis/ OR tendinit* OR tendonitis OR tendinitis/ OR tenosynovitis/ OR tendinos* OR bursitis/ OR 'De Quervain tenosynovitis'/ OR Quervain* OR DeQuervain* OR ((abductor AND pollicis) AND (long OR longus)) OR (extensor AND pollicis AND brevis)
CINAHL	Quervain* or DeQuervain* or ((abductor and pollicis) and (long or longus)) or (extensor and pollicis and brevis)
PEDro	De Quervain disease

2. Search strategy for therapy

Therapy	
PubMed	(randomized controlled trial[Publication Type] OR (randomized[Title/Abstract] AND controlled[Title/Abstract] AND trial[Title/Abstract]))
EMBASE	'randomized controlled trial':it OR (randomized:ti,ab AND controlled:ti,ab AND trial:ti,ab)
CINAHL	—
PEDro	—

3. Search strategy for systematic reviews

Systematic reviews	
PubMed	((meta-analysis [pt] OR meta-analysis [tw] OR metanalysis [tw]) OR ((review [pt] OR guideline [pt] OR consensus [ti] OR guideline* [ti] OR literature [ti] OR overview [ti] OR review [ti]) AND ((Cochrane [tw] OR Medline [tw] OR CINAHL [tw] OR (National [tw] AND Library [tw])) OR (handsearch* [tw] OR search* [tw] OR searching [tw]) AND (hand [tw] OR manual [tw] OR electronic [tw] OR bibliographi* [tw] OR database* OR (Cochrane [tw] OR Medline [tw] OR CINAHL [tw] OR (National [tw] AND Library [tw])))))) OR ((synthesis [ti] OR overview [ti] OR review [ti] OR survey [ti]) AND (systematic [ti] OR critical [ti] OR methodologic [ti] OR quantitative [ti] OR qualitative [ti] OR literature [ti] OR evidence [ti] OR evidence-based [ti])))) BUTNOT (case* [ti] OR report [ti] OR editorial [pt] OR comment [pt] OR letter [pt])

APPENDIX 1: SEARCH STRINGS (Cont'd)

EMBASE	('review'/exp AND (medline:ti,ab OR medlars:ti,ab OR embase:ti,ab OR pubmed:ti,ab) OR scisearch:ti,ab OR psychlit:ti,ab OR psyclit:ti,ab OR psycinfo:ti,ab OR pyschinfo:ti,ab OR cinahl:ti,ab OR 'hand search':ti,ab OR 'manual search':ti,ab OR 'electric database':ti,ab OR 'bibliographic database':ti,ab OR 'pooled analysis':ti,ab OR 'pooled analyses':ti,ab OR pooling:ti,ab OR peto:ti,ab OR dersimonian:ti,ab OR 'fixed effect':ti,ab OR 'mantel haenszel':ti,ab OR 'retracted article':ti,ab) OR ('meta analysis'/exp OR 'meta analysis' OR 'meta-analysis' OR 'meta-analyses':ti,ab OR 'meta analyses':ti,ab OR 'systematic review':ti,ab OR 'systematic overview':ti,ab OR 'quantitative review':ti,ab OR 'quantitativ overview': ti,ab OR 'methodologic review':ti,ab OR 'methodologic overview':ti,ab OR 'integrative research review':ti,ab OR 'research integration':ti,ab OR 'quantitative synthesis':ti,ab)
CINAHL	(MH "Systematic Review")
PEDro	—

4. Search strategy for RCTs

RCT	
PubMed	(randomized controlled trial[pt] OR controlled clinical trial[pt] OR randomized controlled trials [mh] OR random allocation [mh] OR double-blind method [mh] OR single-blind method [mh] OR clinical trial [pt] OR clinical trials [mh] OR ("clinical trial" [tw]) OR ((singl* [tw] OR doubl* [tw] OR tripl* [tw]) AND (mask* [tw] OR blind* [tw])) OR ("latin square" [tw]) OR placebos [mh] OR placebo* [tw] OR random* [tw] OR research design [mh:noexp] OR comparative study [pt] OR evaluation studies [pt] OR follow-up studies [mh] OR prospective studies [mh] OR cross-over studies [mh] OR control[tw] OR controls[tw] OR controlled[tw] OR controled[tw] OR control*[tw] OR prospectiv* [tw] OR volunteer* [tw]) NOT (animals [mh] NOT humans [mh])
EMBASE	('controlled clinical trial'/exp OR 'randomized controlled trial':ti OR 'controlled clinical trial':it OR 'randomization'/ OR 'double blind procedure'/ OR 'single blind procedure'/ OR 'crossover procedure'/ OR 'clinical trial':it OR (('clinical trial' OR (singl* OR doubl* OR tripl*)) AND (mask* OR blind*)) OR ('Latin square design'/ OR 'latin square' OR 'latin-square') OR 'placebo'/ OR placebo* OR 'random sample'/ OR 'comparative study':it OR 'evaluation study':it OR evaluation/ exp OR 'follow up'/exp OR 'prospective study'/ OR control* OR prospectiv* OR volunteer*) NOT (animals/exp NOT humans/exp)
CINAHL	(MH "Clinical Trials+")
PEDro	—

NOTE. For the review search, 1, 2, and 3 were combined. For the RCT search, 1, 2, and 4 were combined.

APPENDIX 2: METHODOLOGIC QUALITY ASSESSMENT

Sources of risk of bias

	Item	Judgment
A	1. Was the method of randomization adequate?	1. Yes/No/Unsure
B	2. Was the treatment allocation concealed?	2. Yes/No/Unsure
C	Was knowledge of the allocated interventions adequately prevented during the study?	
	3. Was the patient blinded to the intervention?	3. Yes/No/Unsure
	4. Was the care provider blinded to the intervention?	4. Yes/No/Unsure
	5. Was the outcome assessor blinded to the intervention?	5. Yes/No/Unsure
D	Were incomplete outcome data adequately addressed?	
	6. Was the dropout rate described and acceptable?	6. Yes/No/Unsure
	7. Were all randomized participants analyzed in the group to which they were allocated?	7. Yes/No/Unsure
E	8. Are reports of the study free of suggestion of selective outcome reporting?	8. Yes/No/Unsure
F	Other sources of potential bias:	
	9. Were the groups similar at baseline regarding the most important prognostic indicators?	9. Yes/No/Unsure
	10. Were cointerventions avoided or similar?	10. Yes/No/Unsure
	11. Was the compliance acceptable in all groups?	11. Yes/No/Unsure
	12. Was the timing of the outcome assessment similar in all groups?	12. Yes/No/Unsure

Operationalization

Criteria for a judgment of "yes" for the sources of risk of bias

1. Was the method of randomization adequate?
   A random (unpredictable) assignment sequence. Examples of adequate methods are coin toss (for studies with 2 groups), rolling a dice (for studies with 2 or more groups), drawing of balls of different colors, drawing of ballots with the study group

labels from a dark bag, computer-generated random sequence, preordered sealed envelopes, sequentially-ordered vials, telephone call to a central office, and preordered list of treatment assignments.
Examples of inadequate methods are alternation, birth date, social insurance/security number, date in which they are invited to participate in the study, and hospital registration number.

2. Was the treatment allocation concealed?
Assignment generated by an independent person not responsible for determining the eligibility of the patients. This person has no information about the persons included in the trial and has no influence on the assignment sequence or on the decision about eligibility of the patient.
Was knowledge of the allocated interventions adequately prevented during the study?
3. Was the patient blinded to the intervention?
This item should be scored "yes" if the index and control groups are indistinguishable for the patients or if the success of blinding was tested among the patients and it was successful.
4. Was the care provider blinded to the intervention?
This item should be scored "yes" if the index and control groups are indistinguishable for the care providers or if the success of blinding was tested among the care providers and it was successful.
5. Was the outcome assessor blinded to the intervention?
Adequacy of blinding should be assessed for the primary outcomes. This item should be scored "yes" if the success of blinding was tested among the outcome assessors and it was successful or:
   - for patient-reported outcomes in which the patient is the outcome assessor (eg, pain, disability): the blinding procedure is adequate for outcome assessors if participant blinding is scored "yes"
   - for outcome criteria assessed during scheduled visit and that supposes a contact between participants and outcome assessors (eg, clinical examination): the blinding procedure is adequate if patients are blinded and the treatment or adverse effects of the treatment cannot be noticed during clinical examination
   - for outcome criteria that do not suppose a contact with participants (eg, radiography, magnetic resonance imaging): the blinding procedure is adequate if the treatment or adverse effects of the treatment cannot be noticed when assessing the main outcome
   - for outcome criteria that are clinical or therapeutic events that will be determined by the interaction between patients and care providers (eg, cointerventions, hospitalization length, treatment failure) in which the care provider is the outcome assessor: the blinding procedure is adequate for outcome assessors if item "E" is scored "yes"
   - for outcome criteria that are assessed from data of the medical forms: the blinding procedure is adequate if the treatment or adverse effects of the treatment cannot be noticed on the extracted data

Were incomplete outcome data adequately addressed?

6. Was the dropout rate described and acceptable?
The number of participants who were included in the study but did not complete the observation period or were not included in the analysis must be described and reasons given. If the percentage of withdrawals and dropouts does not exceed 20% for short-term follow-up and 30% for long-term follow-up and does not lead to substantial bias a "yes" is scored (these percentages are arbitrary, not supported by literature).
7. Were all randomized participants analyzed in the group to which they were allocated?
All randomized patients are reported/analyzed in the group they were allocated to by randomization for the most important moments of effect measurement (minus missing values) irrespective of noncompliance and cointerventions.
8. Are reports of the study free of suggestion of selective outcome reporting?
In order to receive a "yes," the review author determines if all the results from all prespecified outcomes have been adequately reported in the published report of the trial. This information is either obtained by comparing the protocol and the report or in the absence of the protocol assessing that the published report includes enough information to make this judgment.

Other sources of potential bias:

9. Were the groups similar at baseline regarding the most important prognostic indicators?
In order to receive a "yes," groups have to be similar at baseline regarding demographic factors, duration and severity of complaints, percentage of patients with neurologic symptoms, and value of main outcome measure(s).
10. Were cointerventions avoided or similar?
This item should be scored "yes" if there were no cointerventions or they were similar between the index and control groups.
11. Was the compliance acceptable in all groups?
The reviewer determines if the compliance with the interventions is acceptable based on the reported intensity, duration, number, and frequency of sessions for both the index intervention and control intervention(s). For example, physiotherapy treatment is usually administered over several sessions; therefore, it is necessary to assess how many sessions each patient attended. For single-session interventions (eg, surgery), this item is irrelevant.
12. Was the timing of the outcome assessment similar in all groups?
Timing of outcome assessment should be identical for all intervention groups and for all important outcome assessments.

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