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Corticosteroid injection for trigger finger in adults

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Corticosteroid injection for trigger finger in adults (Review)

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[Intervention Review]

Corticosteroid injection for trigger finger in adults

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ABSTRACT

Background

Trigger finger is a disease of the tendons of the hand leading to triggering (locking) of affected fingers, dysfunction and pain. Available treatments include local injection with corticosteroids, surgery, or splinting.

Objectives

To summarize the evidence on the efficacy and safety of corticosteroid injections for trigger finger in adults using the following endpoints: treatment success, frequency of triggering or locking, functional status of the affected fingers, and severity of pain of the fingers.

Search methods

The databases CENTRAL, DARE, MEDLINE (1966 to November 2007), EMBASE (1956 to November 2007), CINAHL (1982 to November 2007), AMED (1985 to November 2007) and PEDro (a physiotherapy evidence database) were searched.

Selection criteria

We selected randomized and controlled clinical trials evaluating efficacy and safety of corticosteroid injections for trigger finger in adults.

Data collection and analysis

The databases were searched for titles of eligible studies. After screening abstracts of these studies, full text articles of studies which fulfilled the selection criteria were obtained. Data were extracted using a predefined electronic form. The methodological quality of included trials was assessed by using items from the checklist developed by Jadad and the Delphi list. We planned to extract data regarding information on the primary outcome measures: treatment success, frequency of triggering or locking, and functional impairment of fingers, severity of the trigger finger; and the secondary outcome measures: proportion of patients with side effects, types of side effects, and patient satisfaction with injection.

Main results

Two randomized controlled studies were found that involved 63 participants: 34 were allocated to corticosteroids and lidocaine, and 29 were allocated to lidocaine alone. Corticosteroid injection with lidocaine was more effective than lidocaine alone on treatment success at four weeks (relative risk 3.15, 95% CI 1.34 to 7.40). The number needed to treat to benefit was 3. No adverse events or side effects were reported.

Corticosteroid injection for trigger finger in adults (Review)

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Authors' conclusions

The effectiveness of local corticosteroid injections was studied in only two small randomized controlled trials of poor methodological quality. Both studies showed better short-term effects of corticosteroid injection combined with lidocaine compared to lidocaine alone on the treatment success outcome. In one study the effects of corticosteroid injections lasted up to four months. No adverse effects were observed. The available evidence for the effectiveness of intra-tendon sheath corticosteroid injection for trigger finger can be graded as a silver level evidence for superiority of corticosteroid injections combined with lidocaine over injections with lidocaine alone.

PLAIN LANGUAGE SUMMARY

Local corticosteroid injection for trigger finger

This summary of a Cochrane review presents what we know from research about the effect of corticosteroid injection for trigger finger.

Pain and symptoms of people with trigger finger may improve with a corticosteroid injection.

What is trigger finger and corticosteroid injection?

Trigger finger is a disease of the tendons of the finger, which makes the finger difficult to straighten. It causes snapping or locking of the affected finger when flexing or stretching. Sometimes it can cause the hand to become painful.

Corticosteroid injections are shots with a needle into a joint (such as your finger) or a tendon. Corticosteroids work by reducing the inflammation of the finger. The injection itself might also help to relieve the pressure on the tendon.

Best estimate of what happens after a corticosteroid injection:

37 out of 100 people benefited from corticosteroid injection combined with a painkiller; compared to 17 out of 100 people who benefited following injection with a painkiller only.

BACKGROUND

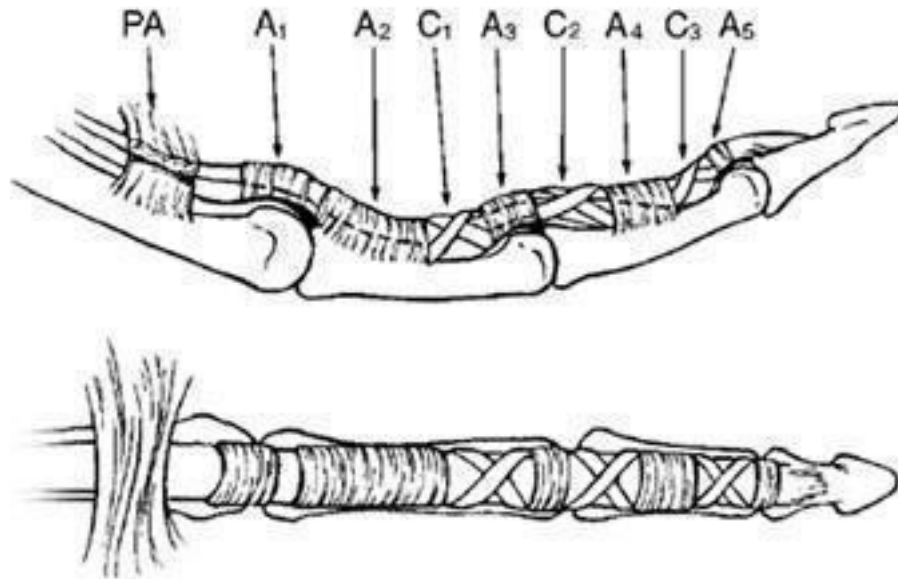
Trigger finger (also known as stenosing tenosynovitis) is a condition that causes triggering, snapping, or locking on flexion of the involved finger. Entrapment of the affected tendon results in difficulty in flexing or extending the finger and is frequently associated with pain in the palm of the hand.

Notta reported the first four cases attended by the physician Nela-ton in 1850, and the first review of the literature on this subject was published by Compere in 1933 (Moore 2000). From the mid-1980s onwards, trigger finger has been suggested to fall under umbrella terms such as 'repetitive strain injury' (RSI) and 'cumulative trauma disorder'. A study of 665 workers at a meat packing plant reported a point prevalence of 14%, suggesting a relation between

occupation and trigger finger (Gorsche 1998), although a study by Trezies 1998 could not confirm this association.

The flexor tendon sheath in the finger is a double-walled, connective tissue cylinder that is held in place by five ring-shaped and three cross-shaped pulleys (Figure 1). The triggering phenomenon is caused by incompatibility between the tendon and its sheath, most probably due to thickening of the first annular pulley. On histologic examination the pulley shows fibrous and cartilaginous tissue changes that include the presence of chondrocytes and glycosaminoglycans (mucopolysaccharide) and degenerative changes. These changes are believed to represent adaptations to shear load. Although trigger finger is also known as tenosynovitis, no inflammatory changes were seen in the histologic studies (Moore 2000).

Figure 1. The flexor tendon sheath in the finger



There is no universally agreed case definition for trigger finger and the diagnosis is made by history and physical examination; there are no specific diagnostic tests. Laboratory tests and radiographic examination techniques are not indicated, unless an underlying cause is suspected (for example infection).

The lifetime prevalence of trigger finger among a group of non-diabetics above the age of 30 years has been estimated at 2.2%. Generally the condition is more common among women than men, and the age distribution is bimodal with one group below six years of age and the other above 40 years of age (most of the affected individuals are in the fifth or sixth decade of their life). Most cases involve a single finger; some have multiple affected fingers and people with multiple affected fingers at presentation are three times more likely to have a subsequent finger affected. Among people without concurrent disease the thumb is the most commonly affected finger, followed by the ring finger and the little finger. The right hand is the most frequently affected. Spontaneous recovery has been reported in 20% to 29% of cases of trigger finger (Moore 2000).

Trigger finger occurs more commonly in patients with diabetes mellitus (probably due to glucose-induced collagen modifications), carpal tunnel syndrome, Dupuytren's disease, rheumatoid arthritis, amyloidosis, hypothyroidism, mucopolysaccharide storage disorders, and congestive heart failure (Blyth 1996; Chammas 1995). A separate entity is formed by trigger finger in children, which is a rare disease (0.3% of newborns) where almost always the thumb is affected and the predominant symptom is limited

extension (Rodgers 1994; van den Borne 2000).

Available treatment modalities for trigger finger are operative (open or percutaneous surgical division of the A1 pulley) and non-operative (corticosteroid injections and splinting). The percentages of participants with trigger finger treated by operation, steroid injection, and splinting are not known. Operative therapy seems to be effective with cure rates of 89% to 97% in non-randomised studies but it is associated with higher cost, longer absence from work, and the possibility of surgical complications (Turowski 1997). An explanation for the presumed efficacy of local corticosteroid injections could be that the anti-inflammatory effect reduces the swelling of the A1 pulley (although in histological studies, as mentioned above, inflammation in the affected tissues could not be demonstrated). Corticosteroid injection has been assumed to be as effective as surgical therapy, with reported cure rates ranging from 60% to 92% (Moore 2000), but there are no studies that compared corticosteroid injections directly to surgical treatment. Splinting appeared to be effective in 70% of cases compared with 82% receiving an injection (Patel 1992). There have been no reports of serious complications of injection therapy, but possible side effects could be steroid flare, tendon ruptures, local infection, allergic reactions to corticosteroids, and atrophy of subcutaneous fat tissue.

Trigger finger appears to be a fairly common disorder leading to marked discomfort and dysfunction of the hand. Injection with corticosteroids has been suggested to be effective and safe; compared with surgical therapy, it also seems more easy to apply and

cost efficient. Therefore, we decided to perform a systematic review on the effectiveness and safety of corticosteroid injections for trigger fingers in adults.

OBJECTIVES

Our objective was to systematically review the evidence from clinical trials on the efficacy and safety of corticosteroid injections for trigger finger in adults.

METHODS

Criteria for considering studies for this review

Types of studies

All randomized controlled trials (RCTs) and controlled clinical trials evaluating local injection with corticosteroids were included in this review.

Types of participants

Only studies of adult populations (older than 18 years) with a clinical diagnosis of trigger finger (triggering with or without locking of a finger or pain at the A1 pulley) and irrespective of the duration of symptoms were included. Studies addressing treatment of trigger finger of infectious origin were excluded.

Types of interventions

All studies using injectable corticosteroids as treatment were included: any volume, type, and concentration of corticosteroid used; whether a local anaesthetic agent was added or not; and regardless of the injection technique. Studies comparing corticosteroid injection to placebo injection, injection with local anaesthetic, injection with a different type of steroid, splinting, systemic analgesics including non-steroidal anti-inflammatory drugs (NSAIDs), systemic steroids, surgery, combination treatments, or no intervention were included.

Types of outcome measures

Primary:

- treatment success, yes or no (definition of treatment success may vary across trials);
- frequency of triggering or locking of the affected fingers;
- functional status of the finger (using validated instruments to measure hand function, e.g. arthritis impact measurement scale);
- severity of pain or tenderness at the base of the digit on the palm of the hand;
- proportion of patients with side effects of steroid injection.

Secondary:

- patient satisfaction (using validated questionnaires).

Search methods for identification of studies

The following electronic databases were searched:

- CENTRAL (*The Cochrane Library*);
- MEDLINE (Ovid platform) (1966 to November 2007);
- EMBASE (Ovid platform) (1956 to November 2007);
- CINAHL (Ovid platform) (1982 to November 2007);
- AMED (Ovid platform) (1985 to November 2007);
- PEDro (the physiotherapy evidence database);
- DARE (The Database of Abstracts of Reviews of Effectiveness);
- Dissertation abstracts.

The search strategy was developed for MEDLINE and modified as necessary for the other databases.

Complete search strategies for each database are provided in [Appendix 1](#); [Appendix 2](#); [Appendix 3](#); [Appendix 4](#); [Appendix 5](#); [Appendix 6](#); [Appendix 7](#); [Appendix 8](#). The references of all relevant publications (RCTs and reviews) were checked to identify additional trials. Content experts were contacted for unpublished data. There were no language restrictions.

Data collection and analysis

Selection of studies

Two review authors independently selected trials for inclusion in this review, based on the content of the title and abstracts obtained through electronic searching of the databases. Each review author's selection was compared. Any discrepancies in opinion about eligibility of a trial were resolved by discussion and consensus by the two review authors.

Quality appraisal

Two review authors independently extracted all data. Each trial was assessed by using a combination of an established quality assessment tool developed by Jadad ([Jadad 1996](#)) and the Delphi list ([Verhagen 1998](#)). The quality items assessed were:

1. randomization;
2. concealment of allocation;
3. blinding of outcome assessor, care provider, and patient;
4. reporting of withdrawals and dropouts;
5. similarity of groups at baseline regarding most important prognostic indicators;
6. specification of eligibility criteria;
7. availability of point estimates and measures of variability of primary outcome measures;

8. use of intention-to-treat analysis.

Each criterion was rated as positive, negative, or inconclusive (if insufficient information was presented).

Data extraction

Details regarding the study population, interventions, treatment periods, length of follow up, complications, baseline demographic data, and baseline and end of study outcome measures were extracted using a pre-defined electronic form, by two review authors. Short-term outcomes were arbitrarily defined as outcomes up to three months after the intervention and long-term outcomes as outcomes one year post-intervention, or later. Referring back to the original article and establishing consensus resolved differences in data extraction. A third review author was consulted to help resolve differences.

Analysis

For continuous data, weighted mean differences (MD) were planned to be calculated for outcomes measured using the same scale; and when the same outcomes were measured using different scales, standardized mean differences (SMD) were to be used. Absolute and relative differences in the change from baseline were to be calculated for continuous outcomes. Absolute benefit was to be calculated as the improvement in the treatment group minus the improvement in the control group, in original units. Relative difference in the change from baseline was to be calculated as the absolute benefit divided by the baseline mean.

For dichotomous data the results for each study were presented as relative risk and the number needed to treat (NNT).

Heterogeneity

To assess heterogeneity of trial results the Cochrane Chi^2 test and I^2 statistic were planned to be used. In case of significant statistical heterogeneity potential sources were planned to be explored by subgroup analysis. Since clinical and methodological diversity always occur in a meta-analysis, statistical heterogeneity is inevitable (Higgins 2003). The test for heterogeneity is irrelevant to the choice of analysis; accordingly the random-effects model was used by default as it is identical to the fixed-effect model if there is no heterogeneity ($I^2 = 0\%$). In order to assess and quantify the possible magnitude of inconsistency (that is heterogeneity) across studies, we used I^2 with a rough guide for interpretation as follows: 0% to 40% might not be important; 30% to 60% may represent moderate heterogeneity; 50% to 90% may represent substantial heterogeneity; 75% to 100% shows considerable heterogeneity.

Subgroup analysis

Subgroup analysis was planned in regard to the following aspects:

- 'idiopathic' or trigger finger secondary to diabetes;

- duration of symptoms at baseline, short if symptoms were present for up to four weeks, intermediate if symptoms were present for one month to one year, and long if symptoms were present for one year or longer.

- trial design, RCT or controlled clinical trial.

Clinical relevance tables

Clinical relevance tables were compiled for primary outcomes under the 'Additional tables' to improve the readability of the review. For dichotomous outcomes, the weighted absolute risk difference was calculated using the risk difference (RD) statistic in RevMan. RR-1 calculates the weighted relative per cent change. The number needed to treat (NNT) was calculated from the control group event rate (unless the population event rate was known), and the relative risk using the Visual Rx NNT calculator (Cates 2004). This was done for the primary outcomes measured.

Continuous outcome tables were also planned to be presented. Weighted absolute change was planned to be calculated from the weighted mean difference (WMD) statistic in RevMan when trials using the same scale were pooled. For outcomes pooled on different scales, the standardized mean difference (SMD) was planned to be multiplied by the baseline standard deviation in the control group to obtain the weighted absolute change. Relative per cent change from baseline was planned to be calculated as the absolute benefit divided by the baseline mean of the control group. NNT was planned to be calculated using the Wells calculator available at the Cochrane Musculoskeletal Group editorial office. The minimal clinically important difference (MCID) for each outcome was planned to be determined for input into the calculator.

Grading of evidence

The evidence obtained in this systematic review was finally graded according to conventions as proposed by the Cochrane Musculoskeletal Group (Tugwell 2004).

Platinum: a published systematic review that has at least two individual controlled trials each satisfying the following.

Sample sizes of at least 50 per group: if these do not find a statistically significant difference, they are adequately powered for a 20% relative difference in the relevant outcome.

Blinding of patients and assessors for outcomes.

Handling of withdrawals > 80% follow up (imputations based on methods such as 'last observation carried forward' (LOCF) are acceptable).

Concealment of treatment allocation.

Gold: at least one RCT meeting all of the following criteria for the major outcome(s) as reported.

Sample sizes of at least 50 per group: if these do not find a statistically significant difference, they are adequately powered for a 20% relative difference in the relevant outcome.

Blinding of patients and assessors for outcomes.

Handling of withdrawals > 80% follow up (imputations based on methods such as LOCF are acceptable).

Concealment of treatment allocation.

Silver: a systematic review or randomized trial that does not meet the above criteria. Silver ranking would also include evidence from at least one study of non-randomised cohorts that did and did not receive the therapy, or evidence from at least one high quality case-control study. A randomized trial with a 'head-to-head' comparison of agents would be considered silver level ranking unless a reference were provided to a comparison of one of the agents to placebo showing at least a 20% relative difference.

Bronze: the bronze ranking is given to evidence if at least one high quality case series without controls (including simple before and after studies in which patients act as their own control) or if the conclusion is derived from expert opinion based on clinical experience without reference to any of the foregoing (for example, argument from physiology, bench research, or first principles).

This review will be updated two years after publication.

RESULTS

Description of studies

See: [Characteristics of included studies](#); [Characteristics of excluded studies](#); [Characteristics of ongoing studies](#).

Our search resulted in 230 titles from a combined search in MEDLINE, EMBASE, AMED and CINAHL. No titles were found in PEDro, CENTRAL, DARE, and Dissertation abstracts. After screening the titles and abstracts, 16 possible studies were selected for further evaluation ([Anderson 1991](#); [Benson 1997](#); [Boyer 2004](#); [Clark 1973](#); [Kraemer 1990](#); [Lambert 1992](#); [Lopez 1991](#); [Maneerit 2000](#); [Maneerit 2003](#); [McGrath 1984](#); [Murphy 1995](#); [Patel 1992](#); [Patel 1997](#); [Povlsen 2004](#); [Stratz 2002](#); [Taras 1998](#)). After retrieving full text articles of these 16 reports, six appeared to be non-randomized ([Anderson 1991](#); [Benson 1997](#); [Clark 1973](#); [Kraemer 1990](#); [Patel 1992](#); [Patel 1997](#)), three did not study trigger finger ([Lopez 1991](#); [Povlsen 2004](#); [Stratz 2002](#)), three did not study one of the comparisons of interest as two compared operative treatment (percutaneous release) preceded by steroid injection to steroid injection alone ([Maneerit 2000](#); [Maneerit 2003](#)) and one compared intra-sheath injection to subcutaneous injection ([Taras 1998](#)). Of the remaining two studies, one was a review article ([McGrath 1984](#)) and one a comment on a reported trial ([Boyer 2004](#)). The 14 excluded trials, and details of why they failed to meet the inclusion criteria for this review, are outlined in the table 'Characteristics of excluded studies'.

We were also aware of an ongoing randomised controlled trial assessing effectiveness of corticosteroid injections in the setting of primary care, but the results of the study were not published yet

when our search was performed (see [Characteristics of ongoing studies](#)).

The two included studies were controlled trials comparing the efficacy of steroid injection with lidocaine injections in the setting of secondary care. One included 41 fingers of 41 participants with a diagnosis of trigger finger (two participants were lost to follow up therefore only 39 participants were included in the analysis) and compared the effectiveness of injection of methylprednisolone (0.5 ml) combined with 1% lidocaine (0.5 ml) to 1% lidocaine alone ([Lambert 1992](#)). Treatment success in this study (defined as complete resolution of symptoms or sufficiently improved that further treatment was not necessary) was assessed one month after injection. The second study included 24 fingers in 24 participants and compared the effectiveness of betamethasone (1ml) combined with lidocaine (3 ml) to injection with 1% lidocaine (4 ml) alone. Treatment success (defined as participants becoming asymptomatic) was assessed immediately after injection, and three weeks and four months after injection ([Murphy 1995](#)). A detailed description of the two included studies can be found in the table 'Characteristics of included studies'.

Risk of bias in included studies

Randomization

Both studies used pseudo-randomization, either allocating patients based on date of birth ([Lambert 1992](#)) or on day of presentation ([Murphy 1995](#)).

Allocation concealment

Both reports did not mention how allocation concealment was realized.

Participant flow and follow up

In the study by [Lambert 1992](#) 41 participants were enrolled and randomized: 20 participants were allocated to steroid injection, 21 participants allocated to lidocaine injection; all participants received the allocated intervention; and two participants in the lidocaine group were lost to follow up and excluded from the analysis. In the study by [Murphy 1995](#) 24 participants were enrolled and randomised: 14 participants were allocated to steroid injection, 10 participants were allocated to lidocaine injection; all participants received the allocated intervention and were analysed since none of the enrolled cases were lost to follow up.

Summary of quality items

In the study by [Lambert 1992](#) the outcome assessor was blinded, there was reporting of withdrawals and dropouts, eligibility criteria

were specified, and point estimates and measures of variability of primary outcome measures were available. However, concealment of allocation, blinding of care provider, blinding of patients, and similarity of groups at baseline regarding most important prognostic indicators were unclear and no intention-to-treat analysis was used.

In the [Murphy 1995](#) study the outcome assessor and patient were blinded, but the care provider was not. Withdrawals and drop-outs were reported, an intention-to treat analysis was used, but no concealment of allocation was used. It was unclear whether the two treatment groups were similar at baseline regarding the most important prognostic indicators, and whether point estimates and measures of variability of primary outcomes were available ([Table 1](#)).

Other shortcomings

Both trials did not specify which specific diagnostic criteria were used for the diagnosis of trigger finger, how many cases were assessed for eligibility prior to enrolment; and insufficient information of baseline demographic and clinical characteristics was provided to make a judgement about comparability of corticosteroid and control groups.

For further details see the table of 'Characteristics of included studies' and 'Additional [Table 1](#)' for methodological quality of included studies.

Effects of interventions

The only primary outcome measure assessed in both studies was the dichotomous outcome of treatment success. In the study by [Lambert 1992](#) this was defined as complete resolution of symptoms or sufficient improvement for further treatment to be unnecessary, and in the study by [Murphy 1995](#) it was defined as being asymptomatic. There were no data available regarding frequency of triggering, severity of pain, and functional status of the hand.

Regarding secondary outcome measures, both studies stated that there were no adverse reactions or complications (it was not clear whether this was systematically assessed). Patient satisfaction with treatment was not assessed in either study.

Because of the small number of studies and included patients, and since the two included studies seemed homogenous, we refrained from subgroup and sensitivity analyses.

In the study by [Lambert 1992](#) treatment success assessed one month after injection was 45% (9/20) in the methylprednisolone + lidocaine group and 16% (3/19) in the lidocaine alone group. Absolute risk reduction was 0.292 (95% CI 0.017 to 0.567), relative risk 2.85 (95% CI 0.91 to 8.96) with a number needed to treat (NNT) of 3 (95% CI 2 to 58).

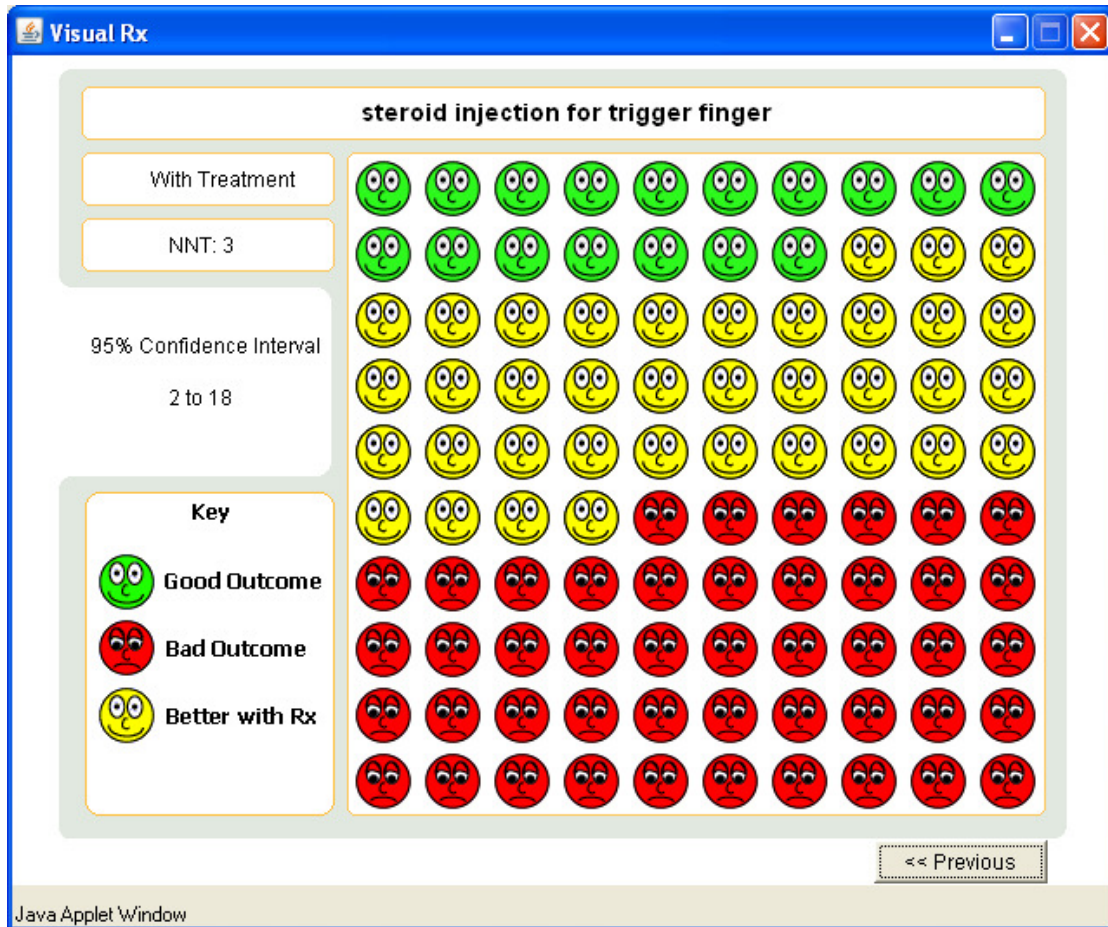
In the study by [Murphy 1995](#) treatment success assessed three weeks after injection therapy was 71% (10/14) in the betamethasone + lidocaine group and 20% (2/10) in the lidocaine alone group. Absolute risk reduction was 0.514 (95% CI 0.165 to 0.864), relative risk 3.57 (95% CI 0.99 to 12.88) with a NNT of 2 (95% CI 1 to 6).

Four months after injection therapy treatment success was 64% (9/14) in the betamethasone + lidocaine group and 20% (2/10) in the lidocaine alone group, absolute risk reduction 0.514 (95% CI 0.165 to 0.864), relative risk 3.21 (95% CI 0.88 to 11.79), and the NNT was 2 (95% CI 1 to 6).

Pooling of the two studies resulted in a total of 63 participants. Corticosteroid injections with lidocaine showed significantly more effectiveness within four weeks than lidocaine injection alone (RR 3.15, 95% CI 1.34 to 7.40). The control event rate was 17.2 % for the pooled group, the weighted absolute risk difference was 38% (95% CI 16 to 59) and the NNT was 3 (95% CI 2 to 18) ([Table 2](#)).

Thus, our data indicated that an expected additional 37 out of 100 participants benefited from the combination of lidocaine and steroid injection; opposed to 17 patients who benefited following (control) therapy with lidocaine only ([Figure 2](#)).

Figure 2.



DISCUSSION

In this review, including two randomized controlled trials (RCTs) with a total of 63 participants (Lambert 1992; Murphy 1995), we found silver level evidence for superiority of intra-tendon sheath corticosteroid injections combined with lidocaine over injections with lidocaine alone. In one of the included studies (Murphy 1995) the effects of corticosteroid injections lasted up to four months. Both studies did not report any adverse effects.

However, there were only two RCTs available which fulfilled the inclusion criteria. The total number of participants included in this review was small, thereby possibly reflecting publication bias. Furthermore, the methodological quality of the two studies was poor and there were some flaws in the quality of reporting.

Effectiveness (using treatment success as the outcome measure) was consistent in the two included studies and the effect size was considerable. We found that for effectiveness within four weeks the relative risk was 3.15, and that the number needed to treat (NNT) was 3; meaning that there is a 3.15 times greater probability of participants treated with local corticosteroid injection to achieve treatment success than for participants treated with lidocaine injection alone, and that three participants have to be treated by local corticosteroid injection to achieve treatment success in one extra participant. For effectiveness at four months (available only for the 24 participants in the study by Murphy 1995) the relative risk was 3.21 and the NNT was 2.

The two trials suggest that corticosteroid injection therapy is effective and safe for the treatment of trigger finger, but these effects need to be confirmed in larger, well-designed randomized trials.

Several other questions remain to be answered. First, it is not

clear whether injection therapy is superior to surgical treatment or splinting, in efficacy or safety. Some retrospective studies have investigated the effectiveness of surgery, reporting treatment success in 67% to 90% of the cases, but this has never been assessed in RCTs and has never been compared directly to injection therapy or splinting. Second, we do not know which diagnostic criteria and outcome measures are valid to use for studies of interventions for trigger finger. At this moment in time there is no universally agreed case definition for trigger finger and there are no validated instruments for measuring symptom severity and functional disability (ideally with known minimal clinically important differences). Third, the two trials analysed in this review were performed in the setting of secondary care and generalizability to other settings (for example primary care) remains to be established. Finally, this review suggests efficacy up to four months, but long-term efficacy still remains to be clarified.

AUTHORS' CONCLUSIONS

Implications for practice

There is silver level evidence that corticosteroid injections are effective for the treatment of trigger finger, but the implications for daily clinical practice may be limited by the fact that the evidence we found is based on two small studies of poor quality, performed in the setting of secondary care, and there were only data available for effectiveness up to four months. However, corticosteroid injection is an easily applicable treatment modality, not expensive, and less invasive than surgery. Therefore, we feel that the initial

treatment for patients should be corticosteroid injection rather than surgery. Other non-invasive interventions such as splinting (which was not evaluated in this review) may also be appropriate first-line interventions.

Implications for research

A case definition for trigger finger should be formulated for research purposes. Validated and relevant outcome measures for trigger finger should be developed. Future RCTs should have adequate sample sizes, better methodological quality (especially adequate randomization procedures and allocation concealment), and the findings should be reported according to the CONSORT statement. More comparison studies are needed, comparing corticosteroid injections to surgery and splinting; comparing different types and dosages of corticosteroids; and effectiveness in different types of healthcare settings (for example primary care). Future studies should also address the natural course of trigger finger.

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Lambert 1992

Methods	Randomized controlled study: allocation of intervention based on date of birth. Method of blinding unclear. Parallel groups.
Participants	Secondary care. Adults. Inclusion criteria: symptoms of trigger finger for at least 3 months. Exclusion criteria: insulin dependent diabetes mellitus, rheumatoid arthritis, eczema, current infection or previous injection in the past 3 months. Mean age 54 years. 25 female, 16 male. Average duration of symptoms 6.5 months. Flow of patients: -41 fingers enrolled -41 fingers randomised -20 fingers allocated to methylprednisolone injection, 21 to lidocaine injection -41 fingers received allocated intervention -lost to follow up: 2 fingers in the lidocaine group -analysed: 20 fingers in steroid injection group, 19 fingers in lidocaine group
Interventions	Group 1: 0.5 ml (20 mg) methylprednisolone + 0.5 ml 1% lidocaine. Group 2: 1 ml 1% lidocaine. Technique: intra-sheath injection. Number of injections: 1.
Outcomes	Assessment 1 month after injection. Definition of treatment success: complete resolution of symptoms or sufficiently improved that further treatment was not necessary. Definition of treatment failure: persistent clicking or locking requiring retreatment
Notes	

Risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	B - Unclear

Murphy 1995

Methods	Randomized controlled study: allocation of intervention based on date of birth. Method of blinding unclear. Parallel groups.
Participants	Secondary care. Adults. Inclusion criteria: primary trigger finger Exclusion criteria: participants with rheumatoid arthritis, diabetes mellitus, prior damage of tendons, prior diagnosis of trigger finger or locked finger. Mean age: betamethasone+lidocaine group 54 years, lidocaine group: 62 years. 15 female, 9 male. Flow of patients: -24 fingers enrolled -24 fingers randomised -14 fingers allocated to methylprednisolone injection, 10 to lidocaine injection -24 fingers received allocated intervention -lost to follow up: 0 -analysed: 14 fingers in steroid injection group, 10 fingers in lidocaine group
Interventions	Group 1: 1 ml betamethasone + 3 ml 1% lidocaine. Group 2: 4ml 1% lidocaine. Technique: intra-sheath injection. Number of injections: 1, re-injection after 3 weeks for unrelieved cases in Celestone+ lidocaine and lidocaine alone group
Outcomes	Assessment directly after injection, 3 weeks after injection and 4 months after injection. Definition of treatment success: asymptomatic. Definition of treatment failure: not asymptomatic.
Notes	

Risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	B - Unclear

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Anderson 1991	not a randomized study: prospective cohort study
Benson 1997	not a randomized study: prospective cohort study
Boyer 2004	not a trial (commentary)

(Continued)

Clark 1973	not a randomized study: retrospective cohort study
Kraemer 1990	not a randomized study: retrospective cohort study
Lopez 1991	not condition of interest: tendinitis of shoulder, elbow and thumb
Maneerit 2000	not comparison of interest: surgery plus steroid injection versus steroid injection alone
Maneerit 2003	not comparison of interest: surgery plus steroid injection versus steroid injection alone
McGrath 1984	not a trial (review article)
Patel 1992	not a randomized study: prospective cohort study
Patel 1997	not a randomized study: prospective cohort study
Povlsen 2004	not condition of interest: basal joint arthritis of the thumb
Stratz 2002	not condition of interest: bicipital of supraspinatus tendinitis, epicondylitis, bursitis trochanterica, pes anserinus tendinitis
Taras 1998	not comparison of interest: intra-sheath versus subcutaneous steroid injection

Characteristics of ongoing studies [ordered by study ID]

Peters 2007

Trial name or title	The Groningen Hand and Wrist Injection Therapy Trial
Methods	Randomized controlled study Blinding of participants and outcome assessors. Parallel groups.
Participants	Primary care. Adults. Inclusion criteria: triggering or locking of a finger with or without pain and tenderness or swelling at the A1-pulley Exclusion criteria: less than 18 years of age, presence of an absolute contraindication for corticosteroid injection, prior treatment in the last six months with steroid injection and/ or surgery at the same anatomical location, possible traumatic or neoplastic origin of symptoms, inability to fill in follow-up forms or absence of self determination in the participant
Interventions	Group 1: one or two injections of 1ml triamcinolonacetionide 10mg/ml Group 2: one or two injections of 1ml 0,9 % NaCl

Peters 2007 (Continued)

Outcomes	<ol style="list-style-type: none">1. direct treatment response (consensus between physician and patient): no response; partial response, but not satisfactory, warranting further treatment; partial response, satisfactory, not warranting further treatment; complete resolution of symptoms and signs2. perceived improvement (by patient): much worse, worse, not better/ not worse, better, much better3. frequency of triggering: never, incidental, weekly, daily, always4. pain and discomfort in the palm of the hand using a numerical rating scale: 0 = no pain to 10 = severe pain5. Functional improvement using the sub items hand and finger function of the Dutch version of the second version of the Arthritis Impact Measurement Scale (DUTCH AIMS-2)
Starting date	2003
Contact information	Cyriac Peters-Veluthamaningal, general practitioner Department of General Practice University Medical Center Groningen Antonius Deusinglaan 1 9713 AV Groningen the Netherlands
Notes	

DATA AND ANALYSES

Comparison 1. Corticosteroid + lidocaine injection versus lidocaine injection < 4 weeks

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 treatment success	2	63	Risk Ratio (M-H, Random, 95% CI)	3.15 [1.34, 7.40]

Comparison 2. Corticosteroid injection versus lidocaine injection at 4 months

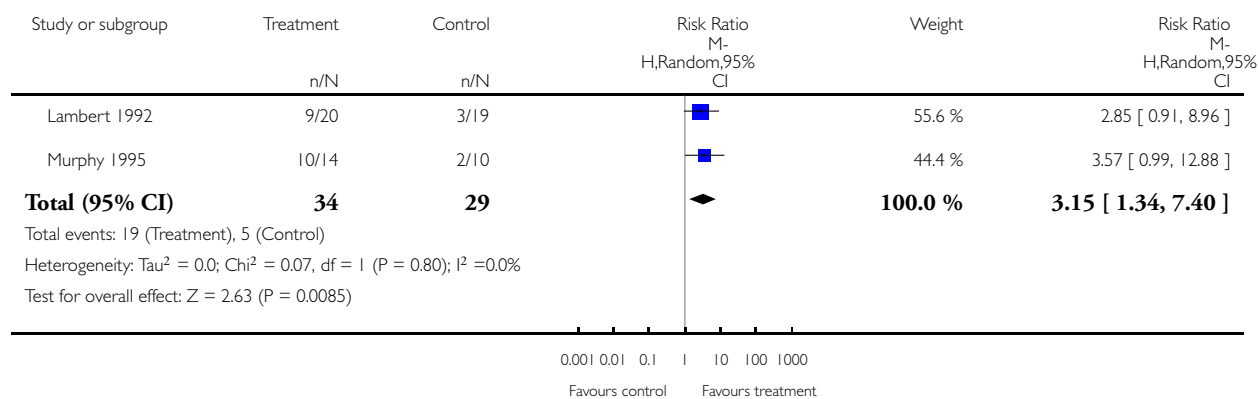
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 treatment success @ 4 months	1	24	Risk Ratio (M-H, Random, 95% CI)	3.21 [0.88, 11.79]

Analysis 1.1. Comparison 1 Corticosteroid + lidocaine injection versus lidocaine injection < 4 weeks, Outcome 1 treatment success.

Review: Corticosteroid injection for trigger finger in adults

Comparison: 1 Corticosteroid + lidocaine injection versus lidocaine injection < 4 weeks

Outcome: 1 treatment success

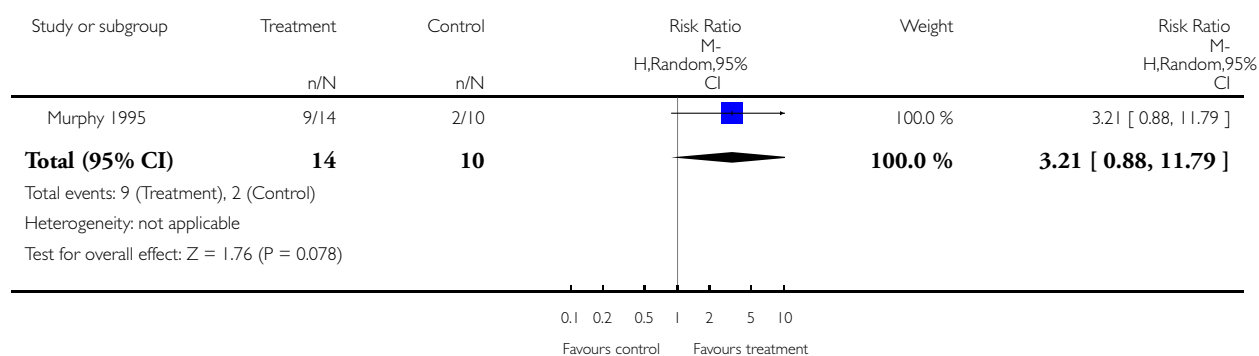


Analysis 2.1. Comparison 2 Corticosteroid injection versus lidocaine injection at 4 months, Outcome 1 treatment success @ 4 months.

Review: Corticosteroid injection for trigger finger in adults

Comparison: 2 Corticosteroid injection versus lidocaine injection at 4 months

Outcome: 1 treatment success @ 4 months



ADDITIONAL TABLES

Table 1. Methodological quality of included studies

Quality Item	Lambert	Murphy
randomization	no	no
concealment of allocation	no	no
blinding of outcome assessor	yes	yes
blinding of care provider	unclear	no
blinding of patient	unclear	yes
reporting of withdrawals and dropouts	yes	yes
similarity of groups at baseline regarding most important prognostic indicators	unclear	unclear
specification of eligibility criteria	yes	no
availability of point estimates and measures of variability of primary outcome measures	yes	unclear

Table 1. Methodological quality of included studies (Continued)

use of intention-to-treat analysis	no	yes
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Table 2. Clinical relevance table: treatment success of steroid injection

Outcome	n patients/ n trials	Control event rate	Wt absolute RD	Wt Rel % change	NNTB	Statistical significance	Quality of evidence
treatment success	63 (2)	17% 17 out of 100	38% 38 more participants out of 100	215% (I)	3	statistically significant	silver
95% confidence interval			(16,59)	(34,640)	(2,18)		
Legend			Wt=weighted, RD= risk difference	Wt Rel= weighted relative percent change, I= improvement	NNTB= Number needed to benefit		

APPENDICES

Appendix I. MEDLINE search strategy

1. exp fingers/
2. exp JOINTS/
3. exp Finger Joint/
4. 1 and 2
5. exp TENOSYNOVITIS/
6. exp Tendons, Para-Articular/
7. exp TENDINITIS/
8. exp Tendon Injuries/
9. exp TENDONS/de [Drug Effects]
10. trigger finger.tw.
11. trigger thumb.tw.
12. trigger digit\$.tw.
13. snapping finger.tw.
14. snapping thumb.tw.
15. locking finger.tw.
16. locking thumb.tw.

17. or/1,3-16
18. exp GLUCOCORTICIDS/
19. glucocorticoid\$.tw.
20. exp Adrenal Cortex Hormones/
21. corticoster\$.tw.
22. exp Methylprednisolone/
23. methylprednisolone.tw.
24. exp BETAMETHASONE/
25. betamethasone.tw.
26. exp TRIAMCINOLONE/
27. triamcinolone.tw.
28. (steroid\$ adj2 inject\$).tw.
29. or/18-29
30. 17 and 29
31. randomized controlled trial.pt.
32. controlled clinical trial.pt.
33. randomized controlled trials.sh.
34. random allocation.sh.
35. double blind method.sh.
36. single-blind method.sh.
37. or/31-36
38. (animal\$ not human).sh.
39. 37 not 38
40. clinical trial.pt.
41. exp clinical trials/
42. (clin\$ adj38 trial\$).ti,ab.
43. ((singl\$ or doubl\$ or trebl\$ or tripl\$) adj38 (blind\$ or mask\$)).tw.
44. placebo\$.sh.
45. placebo\$.ti,ab.
46. random\$.ti,ab.
47. research design.sh.
48. or/41-47
49. 48 not 38
50. 49 not 39
51. comparative study.sh.
52. exp evaluation studies/
53. follow up studies.sh.
54. prospective studies.sh.
55. (control\$ or prospectiv\$ or volunteer\$).ti,ab.
56. or/51-55
57. 56 not 38
58. 57 not (39 or 50)
59. 30 and 58

Appendix 2. EMBASE search strategy

1. exp Finger/
2. exp JOINT/
3. exp Finger Joint/
4. 1 and 2
5. exp TENOSYNOVITIS/
6. exp TENDINITIS/
7. exp Tendon Injury/
8. trigger finger.tw.
9. trigger thumb.tw.
10. trigger digit\$.tw.
11. snapping finger.tw.
12. snapping thumb.tw.
13. locking finger.tw.
14. locking thumb.tw.
15. or/3-14
16. exp Glucocorticoid/
17. glucocorticoid\$.tw.
18. exp Corticosteroid/
19. corticoster\$.tw.
20. exp METHYLPREDNISOLONE/
21. methylprednisolone.tw.
22. exp BETAMETHASONE/
23. betamethasone.tw.
24. TRIAMCINOLONE/
25. triamcinolone.tw.
26. (steroid\$ adj2 inject\$).tw.
27. or/16-26
28. 15 and 27
29. random\$.ti,ab.
30. factorial\$.ti,ab.
31. (crossover\$ or cross over\$ or cross-over\$).ti,ab.
32. placebo\$.ti,ab.
33. (doubl\$ adj blind\$).ti,ab.
34. (singl\$ adj blind\$).ti,ab.
35. assign\$.ti,ab.
36. allocat\$.ti,ab.
37. volunteer\$.ti,ab.
38. crossover procedure.sh.
39. double blind procedure.sh.
40. randomized controlled trial.sh.
41. single blind procedure.sh.
42. or/29-41
43. exp animal/ or nonhuman/ or exp animal experiment/
44. exp human/
45. 43 and 44
46. 43 not 45
47. 42 not 46
48. 28 and 47

Appendix 3. CINAHL search strategy

1. exp fingers/
2. exp JOINTS/
3. exp Finger Joint/
4. 1 and 2
5. exp TENOSYNOVITIS/
6. exp TENDINITIS/
7. exp Tendon Injuries/
8. exp TENDONS/de [Drug Effects]
9. trigger finger.tw.
10. trigger thumb.tw.
11. trigger digit\$.tw.
12. snapping finger.tw.
13. snapping thumb.tw.
14. locking finger.tw.
15. locking thumb.tw.
16. or/3-15
17. exp GLUCOCORTICOIDS/
18. glucocorticoid\$.tw.
19. exp Adrenal Cortex Hormones/
20. corticoster\$.tw.
21. exp Methylprednisolone/
22. methylprednisolone.tw.
23. exp BETAMETHASONE/
24. betamethasone.tw.
25. exp TRIAMCINOLONE/
26. triamcinolone.tw.
27. (steroid\$ adj2 inject\$).tw.
28. or/17-27
29. 16 and 28

Appendix 4. AMED search strategy

1. exp fingers/
2. exp JOINTS/
3. exp Finger Joint/
4. 1 and 2
5. exp TENOSYNOVITIS/
6. exp Tendon Injuries/
7. trigger finger.tw.
8. trigger thumb.tw.
9. trigger digit\$.tw.
10. snapping finger.tw.
11. snapping thumb.tw.
12. locking finger.tw.
13. locking thumb.tw.
14. or/3-13
15. glucocorticoid\$.tw.
16. exp Adrenal Cortex Hormones/
17. corticoster\$.tw.
18. methylprednisolone.tw.
19. betamethasone.tw.

20. triamcinolone.tw.
21. (steroid\$ adj2 inject\$).tw.
22. or/15-21
23. 14 and 22

Appendix 5. PEDro search strategy

Search 1

Tenosynovitis in Abstract or title and Body Part = hand or wrist

Search 2

Tendon in Abstract or title and Body Part = hand or wrist

Search 3

Trigger or snapping or locking in Abstract or title

Appendix 6. CENTRAL search strategy

- #1MeSH descriptor Fingers explode all trees
- #2MeSH descriptor Joints explode all trees
- #3MeSH descriptor Finger Joint explode all trees
- #4(#1 AND #2)
- #5MeSH descriptor Tenosynovitis explode all trees
- #6MeSH descriptor Tendinopathy explode all trees
- #7MeSH descriptor Tendon Injuries explode all trees
- #8MeSH descriptor Tendons explode all trees with qualifier: DE
- #9trigger finger:ti,ab
- #10trigger thumb:ti,ab
- #11trigger digit*:ti,ab
- #12snapping finger:ti,ab
- #13snapping thumb:ti,ab
- #14locking finger:ti,ab
- #15locking thumb:ti,ab
- #16(#3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15)
- #17MeSH descriptor Glucocorticoids explode all trees
- #18 glucocorticoid*:ti,ab
- #19MeSH descriptor Adrenal Cortex Hormones explode all trees
- #20corticoster*:ti,ab
- #21MeSH descriptor Methylprednisolone explode all trees
- #22methylprednisolone:ti,ab
- #23MeSH descriptor Betamethasone explode all trees
- #24betamethasone:ti,ab
- #25MeSH descriptor Triamcinolone explode all trees
- #26triamcinolone:ti,ab
- #27(steroid* near/2 inject*):ti,ab
- #28(#17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27)
- #29(#16 AND #28)

Appendix 7. DARE search strategy

1MeSH descriptor Fingers explode all trees
#2MeSH descriptor Joints explode all trees
#3MeSH descriptor Finger Joint explode all trees
#4(#1 AND #2)
#5MeSH descriptor Tenosynovitis explode all trees
#6MeSH descriptor Tendinopathy explode all trees
#7MeSH descriptor Tendon Injuries explode all trees
#8MeSH descriptor Tendons explode all trees with qualifier: DE
#9trigger finger:ti,ab
#10trigger thumb:ti,ab
#11trigger digit*:ti,ab
#12snapping finger:ti,ab
#13snapping thumb:ti,ab
#14locking finger:ti,ab
#15locking thumb:ti,ab
#16(#3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15)
#17MeSH descriptor Glucocorticoids explode all trees
#18 glucocorticoid*:ti,ab
#19MeSH descriptor Adrenal Cortex Hormones explode all trees
#20corticoster*:ti,ab
#21MeSH descriptor Methylprednisolone explode all trees
#22methylprednisolone:ti,ab
#23MeSH descriptor Betamethasone explode all trees
#24betamethasone:ti,ab
#25MeSH descriptor Triamcinolone explode all trees
#26triamcinolone:ti,ab
#27(steroid* near/2 inject*):ti,ab
#28(#17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27)
#29(#16 AND #28)

Appendix 8. Dissertation abstracts search strategy

Search 1

Trigger finger OR trigger thumb OR trigger digit* OR locking finger OR locking thumb OR locking digit*

Search 2

(Tenosynovitis OR tendon*) AND (finger OR thumb OR digit*) AND (glucocorticoid* OR corticoster*) in citation or abstract

WHAT'S NEW

Last assessed as up-to-date: 28 April 2008.

Date	Event	Description
23 April 2008	Amended	CMSSG ID A023-R
23 April 2008	Amended	Converted to new review format.

HISTORY

Protocol first published: Issue 1, 2006

Review first published: Issue 1, 2009

CONTRIBUTIONS OF AUTHORS

CP: main author, involved in all aspects of the review.

DW: text of review, data extraction and analysis.

JW: text of review, data extraction and analysis.

BM: text of review, selection of studies.

DECLARATIONS OF INTEREST

CP has conducted an RCT (Groningen Hand and Wrist Injection Therapy Trial - HAWITT) assessing the efficacy and safety of corticosteroid injections for trigger finger, De Quervain's tenosynovitis, and carpal tunnel syndrome in a primary care population. The HAWITT trial was sponsored by an unrestricted educational grant from the pharmaceutical company Bristol-Myers Squibb.

SOURCES OF SUPPORT

Internal sources

- Department of General Practice, University Medical Center Groningen, Netherlands.
- EMGO Institute, Vrije Universiteit Medical Center Amsterdam, Netherlands.

External sources

- No sources of support supplied

INDEX TERMS

Medical Subject Headings (MeSH)

Adrenal Cortex Hormones [*administration & dosage]; Anesthetics, Local [*administration & dosage]; Lidocaine [*administration & dosage]; Randomized Controlled Trials as Topic; Trigger Finger Disorder [*drug therapy]

MeSH check words

Adult; Humans