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TABLE OF CONTENTS

[Intervention Review]

Corticosteroid injection for de Quervain's tenosynovitis

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ABSTRACT

Background

De Quervain's tenosynovitis is a disorder characterised by pain on the radial (thumb) side of the wrist and functional disability of the hand. It can be treated by corticosteroid injection, splinting and surgery.

Objectives

To summarise evidence on the efficacy and safety of corticosteroid injections for de Quervain's tenosynovitis.

Search methods

We searched the following databases: the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2009, Issue 2), MEDLINE (1966 to April 2009), EMBASE (1956 to April 2009), CINAHL (1982 to April 2009), AMED (1985 to April 2009), DARE, Dissertation Abstracts and PEDro (physiotherapy evidence database).

Selection criteria

Randomised and controlled clinical trials evaluating the efficacy and safety of corticosteroid injections for de Quervain's tenosynovitis.

Data collection and analysis

After screening abstracts of studies identified by the search we obtained full text articles of studies which fulfilled the selection criteria. We extracted data using a predefined electronic form. We assessed the methodological quality of included trials by using the checklist developed by Jadad and the Delphi list. We extracted data on the primary outcome measures: treatment success; severity of pain or tenderness at the radial styloid; functional impairment of the wrist or hand; and outcome of Finkelstein's test, and the secondary outcome measures: proportion of patients with side effects; type of side effects and patient satisfaction with injection treatment.

Main results

We found one controlled clinical trial of 18 participants (all pregnant or lactating women) that compared one steroid injection with methylprednisolone and bupivacaine to splinting with a thumb spica. All patients in the steroid injection group (9/9) achieved complete relief of pain whereas none of the patients in the thumb spica group (0/9) had complete relief of pain, one to six days after intervention (number needed to treat to benefit (NNTB) = 1, 95% confidence interval (CI) 0.8 to 1.2). No side effects or local complications of steroid injection were noted.

Authors' conclusions

The efficacy of corticosteroid injections for de Quervain's tenosynovitis has been studied in only one small controlled clinical trial, which found steroid injections to be superior to thumb spica splinting. However, the applicability of our findings to daily clinical practice is limited, as they are based on only one trial with a small number of included participants, the methodological quality was poor and only pregnant and lactating women participated in the study. No adverse effects were observed.

PLAIN LANGUAGE SUMMARY

Corticosteroid injection for de Quervain's tenosynovitis

This summary of a Cochrane review presents what we know from research about the effect of Corticosteroid injections for de Quervain's tenosynovitis.

This review shows that in people with de Quervain's tenosynovitis,

We are uncertain whether Corticosteroid injections reduces pain because of the very low quality of the evidence.

What is de Quervain's tenosynovitis and what are corticosteroid injections?

De Quervain's tenosynovitis occurs when the tendon in your thumb and wrist becomes inflammed, painful and difficult to move. A tendon is the part of your body that connects your muscles to your bones. People with de Quervain's tenosynovitis have pain, tenderness, and swelling at the base of the thumb, especially when moving their wrist from side to side.

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

BACKGROUND

De Quervain's tenosynovitis is a disorder that is characterised by pain, tenderness and swelling over the thumb side of the wrist (at the radial styloid process). It is especially associated with sideward movements of the wrist and often leads to impairment of thumb function. It is caused by impaired gliding of the tendons of the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) muscles. These two tendons have almost the same function: the movement of the thumb away from the hand in the plane of the hand. This impaired gliding is most probably caused by thickening of the extensor retinaculum of the wrist (the thickened part of the general tendon sheath that holds the tendons of the extensor muscles in place).

De Quervain, a Swiss physician, is given credit for first describing this condition with a report of five cases in 1895 and eight additional cases in 1912. Although the term stenosing tenosynovitis is frequently used, the pathophysiology of de Quervain's disease does not involve inflammation. On histopathological examination the predominant features are degenerative changes (myxoid degeneration, fibrocartilagenous metaplasia and deposition of mucopolysaccharide). Pain is most probably elicited by mechanical impingement between the tendon and its narrowed fibro-osseous canal resulting in stimulation of nociceptors (Clarke 1998).

De Quervain's tenosynovitis has tended to fall under umbrella terms such as repetitive strain injury (RSI) and work-related musculoskeletal disorders of the upper limb (WRMSDs-UL) (Sluiter 2001; Yassi 1997). Several authors have proposed models in which complex interactions between genetic factors, biomechanical factors, biophysical characteristics and the psychological profile of a patient lead to WRMSDs (Aptel 2002; Kumar 2001). In a literature review of epidemiological studies strong evidence was found for links between some biomechanical risk factors and musculoskeletal disorders of the upper limb (Bernard 1997). Some have questioned the role of work in causing de Quervain's tenosynovitis (Kay 2000).

In a large community based study from the United Kingdom, the prevalence of de Quervain's tenosynovitis was found to be 0.5% in men and 1.3% in women (Walker-Bone 2004). Specific upper limb disorders, such as de Quervain's tenosynovitis, tended to cluster within individuals more often than would be expected by

chance and they were associated with greater disability and more use of health services than was nonspecific pain (Walker-Bone 2004). Data from the 1998 National Health Interview Survey/ Occupational Health Supplement in the United States show an estimated 12-month period prevalence of tendinitis of the hand, wrist and elbow (including tendinitis, synovitis, tenosynovitis, de Quervain's disease and epicondylitis) of 0.31% amongst 127 million workers (Tanaka 2001). The annual cost of all WRMDs is estimated to range from 13 to 20 billion US dollars in the United States (Aptel 2002).

Diagnosis of de Quervain's tenosynovitis is made by history and physical examination (Moore 1997). Symptoms consist of pain or tenderness at the radial styloid sometimes radiating to the thumb, forearm or shoulder, and on physical examination there might be swelling at the radial styloid with tenderness and crepitations on palpation. Finkelstein's test (deviating the wrist to the ulnar side, while grasping the thumb, resulting in pain) is typically positive. A positive Finkelstein's test has a between-observer repeatability (k) of 0.79 (Palmer 2000). Unfortunately there is no gold standard diagnostic confirmatory test for de Quervain's tenosynovitis. In the literature a variety of terminology (e.g. tendinitis, peritendinitis, tenosynovitis, tenovaginitis) and case definitions are used for this condition. In 1998, 2001 and 2007 efforts were made to construct reliable classifications and case definitions for soft tissue rheumatic disorders of the upper limb, including de Quervain's tenosynovitis (Harrington 1998; Sluiter 2001; Huisstede 2007).

De Quervain's tenosynovitis can be treated by operative and non-operative treatment. Operative therapy (slitting or removing a strip of the tendon sheet) has been reported to be effective with a 91% cure rate, but is more invasive and associated with higher costs and the possibility of surgical complications (Ta 1999). Local anaesthetic and corticosteroid injections for musculoskeletal diseases became popular in the 1950s. The effectiveness of injection therapy is often attributed to the anti-inflammatory effects of corticosteroids but the exact mechanism of action remains unclear since on histopathologic examination inflammation cannot be demonstrated. In a systematic review of the effectiveness of corticosteroid injection for de Quervain's tenosynovitis, which included seven observational studies with a total of 459 wrists, 83% of the 226 wrists that received injection alone were cured, 61% of the 101 wrists that received injection and splint immobilisation were cured and 14% of those who received splinting alone were cured (Richie 2003). Other conservative treatment modalities, such as heat, cold, heat induction, strapping, splints, rest, massage, counter-irritants and medications were found not to be effective (Moore 1997). There are no reports available that describe the natural course of untreated de Quervain's tenosynovitis. Potential complications of local corticosteroid injections for musculoskeletal disorders such as de Quervain's tenosynovitis are local infection, post injection steroid flare (temporary worsening of pain in the first 24 to 36 hours after injection), atrophy (thinning) of subcutaneous fat, local depigmentation of the skin and, very rarely, tendon rupture (Cardone 2002).

De Quervain's tenosynovitis can lead to marked disability and absence from work due to impaired functioning of the hand. Local corticosteroid injection has been suggested to be effective, safe and easy to apply therefore it was decided to perform a systematic review of the efficacy and safety of corticosteroid injections for de Quervain's tenosynovitis. Although the effectiveness of corticosteroid injections has been addressed in a previous systematic review (Richie 2003) a more comprehensive review, according to the standards of the Cochrane Collaboration, can provide valuable additional information. The Richie 2003 review has major shortcomings: None of the identified studies were randomised or used controls, pooling of data was not performed in a standardised manner and it was stated only that the "MEDLINE and Ovid databases were searched". Search strategy, selection criteria and method of data synthesis were not specified and it was not clear which databases were searched on the Ovid platform.

OBJECTIVES

To review systematically the evidence from clinical trials on the efficacy and safety of corticosteroid injections for de Quervain's tenosynovitis in adults.

METHODS

Criteria for considering studies for this review

Types of studies

All randomised controlled trials (RCTs) and controlled clinical trials (CCTs) evaluating injection therapy with corticosteroids were included in this review.

Types of participants

We only included studies containing a study population with a clinical diagnosis of de Quervain's tenosynovitis (pain and tenderness over the radial styloid and either pain at the radial styloid reproduced by resisted thumb extension or a positive Finkelstein's test result). We excluded studies addressing treatment of De Quervain's tenosynovitis of infectious origin.

Types of interventions

We only included studies evaluating the effectiveness of local corticosteroid injections. The corticosteroid could be of any volume,

type and concentration, a local anaesthetic agent could be added or not, and any injection technique could be used. We planned to include studies comparing corticosteroid injection to placebo, injection with local anaesthetic, injection with a different type of steroid, splinting, systemic analgesics (including NSAIDs), systemic steroids, surgery, combination treatments or no intervention.

Types of outcome measures

Primary outcomes

- Treatment success: yes or no (we anticipated that the definition of treatment success may vary across trials).
- Severity of pain or tenderness at the radial styloid.
- Finkelstein's test negative: yes or no.
- Functional status of the finger (using validated instruments to measure hand function).
- Proportion of patients with adverse effects of steroid injection.

Secondary outcomes

- Patient satisfaction (using validated questionnaires).

Search methods for identification of studies

We searched the following electronic databases:

- the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2009, Issue 2);
- MEDLINE (1966 to April 2009, Ovid platform);
- EMBASE (1956 to April 2009, Ovid platform);
- CINAHL (1982 to April 2009, Ovid platform);
- AMED (1985 to April 2009, Ovid platform);
- PEDro, the physiotherapy evidence database (www.pedro.org.au)
- DARE (the Database of Abstracts of Reviews of Effectiveness; via *The Cochrane Library* 2009, Issue 2);
- 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. We checked the references of all relevant publications (RCTs and reviews) to identify additional trials. We contacted content experts for unpublished data. There were no language restrictions.

Data collection and analysis

Trial selection

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

Quality appraisal

Two review authors independently extracted all data. We assessed each trial 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. randomisation;
2. concealment of allocation;
3. blinding of outcome assessor, care provider and patient;
4. reporting of withdrawals and drop-outs;
5. similarity of groups at baseline regarding the 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 adequate, inadequate or unclear (if insufficient information was presented).

Data extraction

Two authors extracted details of the study population, interventions, treatment periods, length of follow up, complications, baseline demographic data and baseline and end of study outcomes using a pre-defined electronic form. We arbitrarily defined short-term outcomes 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. We consulted a third author to help resolve differences.

Data analysis

For continuous data, we planned to calculate mean differences (MD) for outcomes measured using the same scale, and when the same outcomes were measured using different scales we were to use standardised mean differences (SMD). We planned to calculate absolute and relative difference in the change from baseline for continuous outcomes. We were to calculate absolute benefit as the improvement in the treatment group minus the improvement

in the control group in original units. We were to calculate relative difference in the change from baseline as the absolute benefit divided by the baseline mean.
For dichotomous data, we planned to present the results for each study as relative risk and the number needed to treat. However, we made a post hoc decision to present the results as risk difference (RD) and number needed to treat (NNT) to benefit, as only one eligible study was identified and no events (treatment success) were observed in any of the participants in the control group.

Heterogeneity

To assess heterogeneity of trial results we planned to use the Cochrane Q-test and the I^2 statistic. In case of significant statistical heterogeneity we planned to explore potential sources 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 we used the random-effects model 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 (i.e. heterogeneity) across studies, we used the I^2 statistic 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% represents considerable heterogeneity.

Subgroup analysis

We planned the following subgroup analyses:

- 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

We compiled a clinical relevance table for the primary outcomes to improve the readability of the review (Table 1). For dichotomous outcomes, we calculated the absolute risk difference using the risk difference (RD) statistic, and the relative per cent change using the relative risk (RR) - 1 statistic in RevMan 5 (RevMan 2008). We determined the number needed to treat (NNT) by calculating the inverse of the risk difference (RD).

Grading of evidence

Finally we graded the evidence obtained in this systematic review according to the conventions 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 with > 80% follow up (imputations based on methods such as Last Observation Carried Forward (LOCF) are acceptable);
- concealment of treatment allocation.

Gold: at least one randomised clinical trial 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 with > 80% follow up (imputations based on methods such as LOCF are acceptable);
- concealment of treatment allocation.

Silver: a systematic review or randomised 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 randomised trial with a 'head-to-head' comparison of agents would be considered silver level ranking unless a reference was 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 from at least one high quality case series without controls (including simple before/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

The electronic search resulted in retrieval of a total of 561 titles. We found no titles in PEDro. After screening the titles and abstracts, we selected five possible studies for further evaluation (Avci 2002; Goldfarb 2007; Jirarattanaphochai 2004; Kosuwon 1996; Weiss 1994). We retrieved full text articles of these five studies. We excluded four studies: one appeared to be a retrospective cohort study (Weiss 1994) and three studies did not study the comparison of interest (in one study steroid injection was compared to steroid injection with additional oral medication (Jirarattanaphochai 2004), in one study steroid injection was compared to steroid injection followed by wrist immobilisation in a splint (Kosuwon 1996) and

in one injection with steroid, lidocaine and bupivacaine alone were compared to injections with steroid, lidocaine, bupivacaine and bicarbonate (Goldfarb 2007).

We were also aware of an ongoing randomised controlled trial assessing the effectiveness of corticosteroid injections in the setting of primary care, but the results of this study were not published when our search was performed (see 'Characteristics of ongoing studies').

The included study (Avci 2002) was a controlled clinical study including 19 wrists in 18 pregnant or lactating women (five wrists of pregnant women, 14 of lactating women). It compared one injection of 0.25 ml of methylprednisolone (10 mg) with 0.5% bupivacaine to thumb spica splinting in a secondary care setting. Injections were given into the tendon-sheath. Diagnostic criteria were a tender nodule over the radial styloid and a positive Finkelstein's test result. The main outcome (complete relief of pain and a negative Finkelstein's test result) was measured one to six days after injection.

Risk of bias in included studies

The included study used pseudo-randomisation (participants were randomised according to their order of application), there was no description of allocation concealment (but since there was alternate allocation it is likely that allocation concealment was inadequate) and participants, care providers and outcome assessors were not blinded. Withdrawals and drop-outs were reported and an intention-to-treat analysis was used, but it was not clear whether the two treatment groups were similar at baseline assessment regarding important prognostic indicators. The main outcome measure was "complete pain relief". No point estimates and measures of variability were presented for the outcome measures.

Effects of interventions

The only primary outcome measure assessed was complete relief of pain. All patients in the steroid injection group (9/9) achieved complete relief of pain and none of the patients in the thumb spica group (0/9) had complete relief of pain, one to six days after the intervention. The number needed to treat was thus 1 (95% CI 0.8 to 1.2). No side effects or local complications of steroid injection were noted (Analysis 1.1) (Table 1).

DISCUSSION

In this review, which includes only one small controlled clinical trial (Avci 2002) with 18 participants, we found silver level evidence for the superiority of corticosteroid injection over thumb spica splinting within six days of injection. The number needed to treat was 1 for this intervention, which means that every participant treated with local corticosteroid injection for de Quervain's tenosynovitis achieves complete relief of pain within six days of treatment, while none of the participants treated with thumb spica splints achieves complete relief of pain.

The large effect size of steroid injections for de Quervain' tenosynovitis reported in this review is consistent with findings in another systematic review which included only non-randomised studies (Richie 2003), in which a cure rate of 83% in 459 wrists receiving steroid injections alone was reported and no side effects were observed.

There are several important limitations to this review. Only one study was found, which included only 18 participants. The risk of bias may be considerable since the included study used pseudo-randomisation and allocation concealment and blinding were inadequate. The study also included a selected patient population (pregnant and lactating women), was carried out in a selected healthcare setting (specialist hospital care) and compared the effectiveness of local corticosteroid only to thumb spica splinting; generalisability was therefore limited. Long-term treatment effects were not assessed. Given the weak evidence base it is not possible to draw any firm conclusions regarding the effectiveness of steroid injections for de Quervain tenosynovitis. The applicability of the findings of this review to daily clinical practice is therefore limited and needs to be confirmed in larger, better designed randomised controlled trials of longer duration.

Several other issues regarding steroid injections for de Quervain's tenosynovitis remain to be clarified. There is no universally agreed case definition and there are no validated outcome measures for research purposes. Furthermore, the efficacy, safety and cost-effectiveness of steroid injection has never been compared directly to surgical therapy or a wait and see strategy. Long-term effectiveness has also never been studied.

AUTHORS' CONCLUSIONS

Implications for practice

There is silver level evidence that corticosteroid injections are superior to thumb spica splinting for relieving pain in the treatment of de Quervain's tenosynovitis, but the evidence is based on one very small controlled clinical trial of short duration and poor methodological quality, which included only pregnant and lactating women.

Implications for research

A case definition for de Quervain's tenosynovitis should be formulated for research purposes. Validated and relevant outcome measures for interventions for de Quervain's tenosynovitis should be

developed. Future randomised controlled trials should have adequate sample sizes, better methodological quality (including adequate randomisation procedures and allocation concealment) and also study other types of participants (besides pregnant and lactating women). Longer follow up is needed and the findings should be reported according to the CONSORT statement. Studies are needed which compare corticosteroid injections to placebo and to surgery, and which compare different types and dosages of corticosteroids. Future studies should also address the natural course of de Quervain's tenosynovitis.

ACKNOWLEDGEMENTS

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

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

Avci 2002

Methods	Randomised controlled study: allocation of intervention based on order of application Method of blinding unclear Parallel groups
Participants	Secondary care Pregnant (5 participants) or lactating (13 participants) women Mean age 28 years (range: 20 to 36) Inclusion criteria: tender nodule over the radial styloid and a positive Finkelstein's test result Exclusion criteria: a past history of similar symptoms, systemic disorders such as diabetes or connective tissue diseases that cause tenosynovitis Flow of participants: 18 enrolled, 18 randomised 9 randomised to corticosteroid + anaesthetic injection versus 9 randomised to thumb spica splinting 18 received allocated intervention 0 lost to follow up 18 participants analysed
Interventions	Group 1: 1 injection of 0.25 ml methylprednisolone (10 mg) with 0.5% bupivacaine into the tendon sheath Group 2: thumb spica splints worn during daytime
Outcomes	Definition of treatment success: complete relief of pain and a negative Finkelstein test result
Notes	-

Risk of bias ***Risk of bias***

Bias	Authors' judgement	Support for judgement
Allocation concealment?	High risk	Unlikely to be adequately concealed, as allocation of intervention based on order of application

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

Study	Reason for exclusion
Goldfarb 2007	Not comparison of interest: injection with steroid, lidocaine and bupivacaine alone was compared to injection with steroid, lidocaine, bupivacaine and bicarbonate
Jirarattanaphochai 2004	Not comparison of interest: steroid injection was compared to steroid injection with additional oral medication

(*Continued*)

Kosuwon 1996	Not comparison of interest: steroid injection was compared to steroid injection followed by wrist immobilisation in a splint
Weiss 1994	Not a randomised study: retrospective cohort study

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

Peters 2007

Trial name or title	The Groningen Hand and Wrist Injection Therapy Trial
Methods	Randomised controlled study Blinding of participants and outcome assessor Parallel groups
Participants	Primary care Adults Inclusion criteria: a history of radial styloid tenderness and a positive Finkelstein's test and/or crepitus over APB and EPL tendons Exclusion criteria: less than 18 years of age, presence of an absolute contraindication for corticosteroid injection, prior treatment in the last 6 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: 1 or 2 injections of 1 ml triamcinolonacetonide 10 mg/ml Group 2: 1 or 2 injections of 1 ml 0.9 % NaCl
Outcomes	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 signs) 2. Perceived improvement (by patient): much worse, worse, not better/not worse, better, much better 3. Severity of pain at the radial styloid: 11-point numeric rating scale: 0 to 10 4. 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 Deusiglaan 1, 9713 AV Groningen, the Netherlands. E-mail: raju@dds.nl
Notes	-

APB = abductor pollicis longus
EPL= extensor pollicis brevis

DATA AND ANALYSES

Comparison 1. 0.25 ml of methylprednisolone (10 mg) + 0.5% bupivacaine vs thumb spica splint

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Complete relief of symptoms	1		Risk Difference (M-H, Random, 95% CI)	Subtotals only

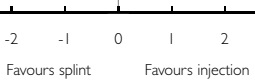
Analysis 1.1. Comparison 1 0.25 ml of methylprednisolone (10 mg) + 0.5% bupivacaine vs thumb spica splint, Outcome 1 Complete relief of symptoms.

Review: Corticosteroid injection for de Quervain's tenosynovitis

Comparison: 1 0.25 ml of methylprednisolone (10 mg) + 0.5% bupivacaine vs thumb spica splint

Outcome: 1 Complete relief of symptoms

Study or subgroup	Corticosteroid injection n/N	Thumb spica splint n/N	Risk Difference M-H,Random,95% CI	Weight	Risk Difference M-H,Random,95% CI
Avci 2002	9/9	0/9			1.00 [0.81, 1.19]



ADDITIONAL TABLES

Table 1. Clinical relevance for complete pain relief

Outcome	n Patients/ n Trials	Control event rate	Absolute RD [95% CI]	Relative % change	NNTB [95% CI]	Statistical significance	Quality of evidence
Complete pain relief	18/1	0% 0 out of 100	100 [81,119] 100 patients out of 100	1800% (I) [27% (I), 28, 300% (I)]	1 [0.8,1.2]	Statistically significant	Silver

RD = risk difference
I = Improvement
95% CI = 95% confidence interval
NNTB = number needed to treat to benefit

APPENDICES

Appendix 1. MEDLINE search strategy

1. exp tenosynovitis/
2. tenosynovitis.tw.
3. exp TENDINITIS/
4. tend?nitis.tw.
5. peritendinitis.tw.
6. tendovaginitis.tw.
7. quervain$.tw.
8. exp Cumulative Trauma Disorders/
9. overuse syndrome$.tw.
10. repetit$ strain injur$.tw.
11. repetit$ motion disorder$.tw.
12. or/1-11
13. exp GLUCOCORTICOIDS/
14. glucocorticoid$.tw.
15. exp Adrenal Cortex Hormones/
16. corticoster$.tw.
17. exp Methylprednisolone/
18. methylprednisolone.tw.
19. exp BETAMETHASONE/
20. betamethasone.tw.
21. exp TRIAMCINOLONE/
22. triamcinolone.tw.
23. (steroid$ adj2 inject$).tw.
24. or/13-23
25. 12 and 24

Appendix 2. EMBASE search strategy

1. exp TENOSYNOVITIS/
2. tenosynovitis.tw.
3. exp TENDINITIS/
4. tend?nitis.tw.
5. peritendinitis.tw.
6. tendovaginitis.tw.
7. quervain$.tw.
8. exp Cumulative Trauma Disorder/
9. overuse syndrome$.tw.
10. repetit$ strain injur$.tw.
11. repetit$ motion disorder$.tw.
12. or/1-11
13. exp Glucocorticoid/
14. glucocorticoid$.tw.
15. exp Corticosteroid/
16. corticoster$.tw.
17. exp METHYLPREDNISOLONE/
18. methylprednisolone.tw.
19. exp BETAMETHASONE/
20. betamethasone.tw.
21. exp TRIAMCINOLONE/
22. triamcinolone.tw.
23. (steroid$ adj2 inject$).tw.
24. or/13-23
25. 12 and 24
26. random$.ti,ab.
27. factorial$.ti,ab.
28. (crossover$ or cross over$ or cross-over$).ti,ab.
29. placebo$.ti,ab.
30. (doubl$ adj blind$).ti,ab.
31. (singl$ adj blind$).ti,ab.
32. assign$.ti,ab.
33. allocat$.ti,ab.
34. volunteer$.ti,ab.
35. crossover procedure.sh.
36. double blind procedure.sh.
37. randomized controlled trial.sh.
38. single blind procedure.sh.
39. or/26-38
40. exp animal/ or nonhuman/ or exp animal experiment/
41. exp human/
42. 40 and 41
43. 40 not 42
44. 39 not 43

Appendix 3. CINAHL search strategy

1. exp tenosynovitis/
2. tenosynovitis.tw.
3. exp TENDINITIS/
4. tend?nitis.tw.
5. peritendinitis.tw.
6. tendovaginitis.tw.
7. quervain$.tw.
8. exp Cumulative Trauma Disorders/
9. overuse syndrome$.tw.
10. repetit$ strain injur$.tw.
11. repetit$ motion disorder$.tw.
12. or/1-11
13. exp GLUCOCORTICOIDS/
14. glucocorticoid$.tw.
15. exp Adrenal Cortex Hormones/
16. corticoster$.tw.
17. exp Methylprednisolone/
18. methylprednisolone.tw.
19. exp BETAMETHASONE/
20. betamethasone.tw.
21. exp TRIAMCINOLONE/
22. triamcinolone.tw.
23. (steroid$ adj2 inject$).tw.
24. or/13-23
25. 12 and 24

Appendix 4. AMED search strategy

1 exp Tenosynovitis/
2 tenosynovitis.tw.
3 tend?nitis.tw.
4 peritendinitis.tw.
5 tendovaginitis.tw.
6 quervain$.tw. (12)
7 overuse syndrome$.tw.
8 repetit$ strain injur$.tw.
9 repetit$ motion disorder$.tw.
10 or/1-9
11 exp Adrenal cortex hormones/
12 glucocorticoid$.tw.
13 corticoster$.tw.
14 methylprednisolone.tw.
15 betamethasone.tw.
16 triamcinolone.tw.
17 (steroid$ adj2 inject$).tw.
18 or/11-17

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
Quervain* in Abstract or title

Appendix 6. CENTRAL search strategy

#1 MeSH descriptor Tenosynovitis explode all trees in MeSH products?
#2 tenosynovitis in All Fields in all products?
#3 MeSH descriptor Tendinitis explode all trees in MeSH products?
#4 tendonitis or tendinitis in All Fields in all products?
#5 peritendinitis in All Fields in all products?
#6 tendovaginitis in All Fields in all products?
#7 quervain* in All Fields in all products?
#8 MeSH descriptor Cumulative Trauma Disorders explode all trees in MeSH products?
#9 overuse syndrome* in All Fields in all products?
#10 repetit* next strain next injur* in All Fields in all products?
#11 repetit* next motion next disorder* in All Fields in all products?
#12 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11)?
#13 MeSH descriptor Glucocorticoids explode all trees in MeSH products?
#14 glucocorticoid* in All Fields in all products?
#15 MeSH descriptor Adrenal Cortex Hormones explode all trees in MeSH products?
#16 corticoster* in All Fields in all products?
#17 MeSH descriptor Methylprednisolone explode all trees in MeSH products?
#18 Methylprednisolone in All Fields in all products?
#19 betamethasone in All Fields in all products?
#20 MeSH descriptor Betamethasone explode all trees in MeSH products?
#21 MeSH descriptor Triamcinolone explode all trees in MeSH products?
#22 TRIAMCINOLONE in All Fields in all products?
#23 steroid* near/2 inject* in All Fields in all products?
#24 (#13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #21 OR #22 OR #23)?
#25 (#12 AND #24)

Appendix 7. DARE search strategy

#1 MeSH descriptor Tenosynovitis explode all trees in MeSH products?
#2 tenosynovitis in All Fields in all products?
#3 MeSH descriptor Tendinitis explode all trees in MeSH products?
#4 tendonitis or tendinitis in All Fields in all products?
#5 peritendinitis in All Fields in all products?
#6 tendovaginitis in All Fields in all products?
#7 quervain* in All Fields in all products?
#8 MeSH descriptor Cumulative Trauma Disorders explode all trees in MeSH products?
#9 overuse syndrome* in All Fields in all products?
#10 repetit* next strain next injur* in All Fields in all products?
#11 repetit* next motion next disorder* in All Fields in all products?
#12 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11)?
#13 MeSH descriptor Glucocorticoids explode all trees in MeSH products?

#14 glucocorticoid* in All Fields in all products?
#15 MeSH descriptor Adrenal Cortex Hormones explode all trees in MeSH products?
#16 corticoster* in All Fields in all products?
#17 MeSH descriptor Methylprednisolone explode all trees in MeSH products?
#18 Methylprednisolone in All Fields in all products?
#19 betamethasone in All Fields in all products?
#20 MeSH descriptor Betamethasone explode all trees in MeSH products?
#21 MeSH descriptor Triamcinolone explode all trees in MeSH products?
#22 TRIAMCINOLONE in All Fields in all products?
#23 steroid* near/2 inject* in All Fields in all products?
#24 (#13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #21 OR #22 OR #23)?
#25 (#12 AND #24)

Appendix 8. Dissertation abstracts search strategy

(Quervain* OR overuse syndrome* OR repetitive strain OR repetitive motion) AND (glucocorticoid* OR corticoster*)

HISTORY

Protocol first published: Issue 1, 2006

Review first published: Issue 3, 2009

Date	Event	Description
17 July 2008	Amended	Converted to new review format. CMSG ID A022-R

CONTRIBUTIONS OF AUTHORS

CP: main author

DW: text of review, data extraction and analysis

JW: data extraction and analysis

BM: selection of studies

DECLARATIONS OF INTEREST

CP has conducted a randomised controlled trial (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 is sponsored by an unrestricted educational grant by the pharmaceutical company Bristol-Myers Squibb.

SOURCES OF SUPPORT

Internal sources

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

External sources

- No sources of support supplied

INDEX TERMS

Medical Subject Headings (MeSH)

Adrenal Cortex Hormones [*therapeutic use]; Anti-Inflammatory Agents [*therapeutic use]; De Quervain Disease [*drug therapy; therapy]; Methylprednisolone [*therapeutic use]; Pregnancy Complications [drug therapy; therapy]; Splints

MeSH check words

Female; Humans; Pregnancy