

Acupuncture for shoulder pain (Review)

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[Intervention Review]

Acupuncture for shoulder pain

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ABSTRACT

Background

There are many commonly employed forms of treatment for shoulder disorders. This review of acupuncture is one in a series of reviews of varying interventions for shoulder disorders including adhesive capsulitis (frozen shoulder), rotator cuff disease and osteoarthritis. Acupuncture to treat musculoskeletal pain is being used increasingly to confer an analgesic effect and to date its use in shoulder disorder has not been evaluated in a systematic review.

Objectives

To determine the efficacy and safety of acupuncture in the treatment of adults with shoulder pain.

Search strategy

The Cochrane Controlled Trials Register, MEDLINE, EMBASE and CINAHL were searched from inception to December 2003, and reference lists from relevant trials were reviewed.

Selection criteria

Randomised and quasi-randomised trials, in all languages, of acupuncture compared to placebo or another intervention in adults with shoulder pain. Specific exclusions were duration of shoulder pain less than three weeks, rheumatoid arthritis, polymyalgia rheumatica, cervically referred pain and fracture.

Data collection and analysis

Two reviewers independently extracted trial and outcome data. For continuous outcome measures where the standard deviations were not reported it was either calculated from the raw data or converted from the standard error of the mean. If neither of these was reported, authors were contacted. Where results were reported as median and range, the trial was not included in the meta-analysis, but presented in Additional Tables. Effect sizes were calculated and combined in a pooled analysis if the study end-points population and intervention were homogenous. Results are presented separately for rotator cuff disease, adhesive capsulitis, full thickness rotator cuff tear and mixed diagnoses, and, where possible, combined in meta-analysis to indicate effect of acupuncture across all shoulder disorders.

Main results

Nine trials of varying methodological quality met the inclusion criteria. For all trials there was poor description of interventions. Varying placebos were used in the different trials. Two trials assessed short-term success (post intervention) of acupuncture for rotator cuff disease and could be combined in meta analysis. There was no significant difference in short-term improvement associated with acupuncture when compared to placebo, but due to small sample sizes this may be explained by Type II error. Acupuncture was of benefit over placebo in improving the Constant Murley Score (a measure of shoulder function) at four weeks (WMD 17.3 (7.79, 26.81)). However, by four months, the difference between the acupuncture and placebo groups, whilst still statistically significant, was no longer likely to be clinically significant (WMD 3.53 (0.74, 6.32)). The Constant Murley Score is graded out of 100, hence a change of 3.53 is unlikely to be of substantial benefit. The results of a small pilot study demonstrated some benefit of both traditional and ear acupuncture plus mobilization over mobilization alone. There was no difference in adverse events related to acupuncture when compared to placebo, however this was assessed by only one trial

Authors' conclusions

Due to a small number of clinical and methodologically diverse trials, little can be concluded from this review. There is little evidence to support or refute the use of acupuncture for shoulder pain although there may be short-term benefit with respect to pain and function. There is a need for further well designed clinical trials.

PLAIN LANGUAGE SUMMARY

Acupuncture for shoulder pain

Does acupuncture work for treating shoulder pain?

To answer this question, scientists found and analyzed 9 research studies. The studies tested over 500 people who had shoulder pain. People had either acupuncture, a placebo (fake therapy), ultrasound, gentle movement or exercises usually for 20-30 minutes, two to three times a week for 3 to 6 weeks. Even though the studies were small and not of the highest quality, this Cochrane review provides the best evidence we have today.

What causes shoulder pain and how can acupuncture help?

Shoulder pain can be caused by a number of different conditions. It can be caused by rotator cuff disease, peri-arthritis or adhesive capsulitis (frozen shoulder). Shoulder pain can sometimes go away on its own but may last up to 12 to 18 months. Drug and non-drug treatments are used to relieve pain and/or swelling. Acupuncture is a non-drug therapy being used more and more to treat shoulder pain. It is thought that acupuncture works either by releasing chemical compounds in the body that relieve pain, by overriding pain signals in the nerves or by allowing energy (Qi) or blood to flow freely through the body. It is not known whether acupuncture works or is safe.

How well does acupuncture work?

The improvements with acupuncture for pain and function were about the same as the effects of receiving a fake therapy for 2 to 4 weeks.

One study showed that acupuncture improved shoulder function more than fake therapy after 4 weeks. But after 4 months, improvements were about the same with only an improvement of 4 more points on a scale of 0 to 100 with acupuncture.

One small study showed that acupuncture plus exercise was better than just exercise for improving pain, range of motion and function for up to 5 months.

How safe is it?

Side effects were not measured in many of the studies. One study showed that side effects such as fainting, headache, dizziness, swelling or leg weakness, were about the same with acupuncture or fake therapy.

What is the bottom line?

There is not enough evidence to say whether acupuncture works to treat shoulder pain or whether it is harmful.

From the little evidence that there is, acupuncture may improve pain and function over the short term (2 to 4 weeks).

BACKGROUND

Conditions causing shoulder pain are common and contribute substantially to the musculoskeletal morbidity of the community (Bjelle 1989). The prevalence of shoulder disorders has been reported to range from seven to 36% of the general population (Lundberg 1969). Shoulder disorders account for 1.2% of all general practice encounters in Australia, being third only to back and neck complaints as musculoskeletal reasons for primary care consultation (Bridges-Webb 1992). In Dutch general practice the incidence of shoulder disorders has been estimated to be 11.2 per 1000 registered patients per year (van der Windt 1995). The shoulder is frequently injured, particularly in competitive sports with eight to 13% of athletic injuries involving the shoulder (Hill 1983).

Prevalence of shoulder disorders has been shown to increase with age (Badley 1992). This finding has implications for the provision of health care in view of the aging of the population as a whole. Others however (Allander 1974; Ingemar 1993) have demonstrated a decline in both the prevalence and incidence of shoulder pain with age, the peak prevalence occurring in the 56 - 60 year age group. As this section of the community is likely to be in paid employment, such peak prevalence has impact on the direct and indirect cost of shoulder disorders to the community.

Substantial disability may result from shoulder disorders. Moving the shoulder allows placement of the hand, hence compromised shoulder mobility impacts substantially on the performance of tasks essential to daily living (e.g. dressing, personal hygiene, eating and work). In addition, shoulder pain is often associated with impaired ability to sleep, so affecting mood and concentration. People with shoulder pain scored substantially less than normal values on the SF-36 (a standardised measure of general health) for physical function, social function, physical role function, emotional role function and pain (Gartsman 1998; Beaton 1996). Shoulder disorders are often recalcitrant with some studies demonstrating persisting pain and disability from 12 months (van der Windt 1995) to 18 months (Chard 1991) in up to 50% of cases.

There are many commonly used treatments for shoulder disorders, including physiotherapy modalities, non-steroidal anti-inflammatory drugs, glucocorticosteroid injections, oral glucocorticosteroids, manipulation under anaesthesia, hydrodilatation (distension arthrography), acupuncture and surgery. Whilst some interventions can be regarded as efficacious, overall there is lim-

ited evidence regarding the efficacy of these interventions (Green 1998). Furthermore, the interpretation of results of existing studies is often hampered by the fact that these disorders are labelled and defined in diverse and often conflicting ways (Green 1998).

This review is one in a series of reviews aiming to establish the efficacy of common interventions for shoulder pain. This series of reviews form the update of an earlier Cochrane Review of all interventions for shoulder disorders (Green 1999). Since our previous review, many new clinical trials, studying a diverse range of interventions, have been performed. In order to update our review we have subdivided it into a series of reviews investigating the evidence for efficacy of single interventions. We have also broadened our review to include all randomised or quasi-randomised clinical trials regardless of whether outcome assessment was blinded (unblinded trials were excluded from the original review).

Acupuncture to treat musculoskeletal pain is being increasingly accepted, by both clinicians and consumers of health care. Approximately one million consumers utilise acupuncture annually in the United States (Paramore 1997), and a large percentage of these suffer musculoskeletal disorders (Diehl 1997).

Acupuncture is thought to confer an analgesic effect (Batra 1985; Viola 1998). Several hypotheses for this effect have been proposed. Some authors attribute the analgesic effects to the release of b-endorphins in the lumbar spine and increased 5-Hydroxy tryptophan level in the cerebrum (Viola 1998). Other explanations include the overriding of the pain stimulus by the biochemical lines of acupuncture in the transmitting process of the central nervous system (Viola 1998), and the more traditional explanation of the freeing of a blockage of "Qi" (energy flow) or a stagnation of blood by acupuncture (Viola 1998).

Although acupuncture is sometimes used for the treatment of shoulder pain, few studies have investigated the efficacy of this intervention, and to our knowledge, no systematic review has been published specifically addressing the effectiveness of acupuncture for relief of pain and dysfunction of the shoulder. This review aims to investigate the efficacy and safety of acupuncture for shoulder pain.

OBJECTIVES

To determine the efficacy and safety of acupuncture in the treatment of people with shoulder pain and dysfunction.

METHODS

Criteria for considering studies for this review

Types of studies

a) Randomised or quasi-randomised controlled trials regardless of publication type. Studies where participants were not randomised into intervention groups were excluded from the review.

b) Trials in which allocation to intervention or control group was not concealed from the outcome assessor were included but recorded as such in the table of included studies.

c) Studies in all languages were translated into English and considered for inclusion in the review.

Types of participants

Inclusion in this review was restricted to trials with participants meeting the following criteria:

a) Adults >16 years of age.

b) Shoulder pain or disorder for greater than 3 weeks, irrespective of diagnostic label (unless an exclusion criteria). Studies that included various soft tissue disorders were considered if the results on shoulder pain were presented separately or if 90% or more of participants in the study had shoulder pain.

c) Studies of participants suffering a history of significant trauma or systemic inflammatory conditions such as rheumatoid arthritis, polymyalgia rheumatica and fracture, hemiplegic shoulders, post-operative and peri-operative shoulder pain and pain in the shoulder region as part of a complex myofascial neck/shoulder/arm pain were excluded.

Trials were sub-grouped into type of shoulder disorder for analysis (see methods section).

In our previous review, we performed a methodological review of the selection criteria used in the included studies (Green 1998). Study populations were broadly able to be categorised as either adhesive capsulitis (which included frozen shoulder and periarthritis) or rotator cuff disease (which included supraspinatus tendonitis, infraspinatus tendonitis, rotator cuff tendonitis, rotator cuff lesion, bursitis or subscapularis tendonitis) based upon the diagnostic labels and/or definitions of these labels when described. Some trials did not specify a diagnosis and some trials gave no selection criteria or definition of study population (Green 1998). For this review we were broadly able to categorise the participants as adhesive capsulitis (including frozen shoulder and periarthritis), rotator cuff disease, osteoarthritis, and mixed diagnoses (including trials where a definition of study population was not specified).

Types of interventions

All randomised controlled comparisons of acupuncture versus placebo, no treatment, another intervention, or of varying types and dosages of acupuncture compared to each other were included and comparisons established according to intervention.

Types of outcome measures

No studies were excluded on the basis of outcome measure used. Outcomes reported in trials were pain, time to maximum pain relief, shoulder discomfort, range of motion (external and internal rotation, flexion, extension, and abduction), shoulder function, success or failure of treatment, and adverse events.

Search methods for identification of studies

MEDLINE, EMBASE, CINAHL (includes all major physiotherapy and occupational therapy journals from U.S.A., Canada, England, Australia and New Zealand), and Science Citation Index (SCISEARCH) were searched from inception to December 2003.

The following search terms were used in MEDLINE (see additional Table 1 for search strategies for other databases):

Table 1. Search Strategy

CINAHL	CENTRAL
1.Shoulder Pain/ 2.Shoulder Impingement Syndrome/ 3.Rotator Cuff 4.exp Bursitis/ 5.((shoulder\$ or rotator cuff) adj5 (bursitis or frozen or impinge\$ or tendinitis or tendonitis or pain\$)).mp.	1.shoulder next pain 2.rotator next cuff 3.bursitis 4.tendinitis 5.tendonitis 6.frozen next shoulder

Table 1. Search Strategy (Continued)

6.rotator cuff.mp. 7.adhesive capsulitis.mp. 8.or/1-7 9.ACUPUNCTURE/ 10.ELECTROACUPUNCTURE/ 11.acupuncture\$.tw. 12.electroacupuncture.tw. 13.or/9-12 14.Clinical trial.pt. 15.exp Cllinical Trials/ 16.trial\$.mp 17.random\$.mp. 18.(single or doube) adj (blind\$ or mask\$).mp. 19.placebo\$.mp. 20.or/14-19 21.8 and 13 and 20	7.#1 or #2 or #3 or #4 or #5 or #6 8.acupuncture 9.electroacupuncture 10.acupuncture next therapy 11.#8 or #9 or #10 12.#7 and #11
1 Shoulder Pain/ 2 Shoulder Impingement Syndrome/ 3 Rotator Cuff/ 4 exp Bursitis/ 5 ((shoulder\$ or rotator cuff) adj5 (bursitis or frozen or impinge\$ or tendinitis or tendonitis or pain\$)).mp. 6 rotator cuff.mp. 7 adhesive capulitis.mp 8 or/1-7 9 ACUPUNCTURE/ 10 exp Acupuncture Therapy/ 11 ELECTROACUPUNCTURE/ 12 acupuncture\$.tw 13 electroacupuncture\$.tw. 14 or/9-13 15 clinical trial.pt. 16 random\$.mp 17 ((single or double) adj (blind\$ or mask\$)).mp 18 placebo\$.mp. 19 or/15-18	20 8 and 14 and 19 In addition, the Cochrane Controlled Trials Register (CCTR) Issue 4, 2003 was searched. Data collection and analysis Following identification of potential trials for inclusion by the previously outlined search strategy, the methods sections of all identified trials were reviewed independently according to predetermined criteria (see selection criteria), by two reviewers. All articles were coded and details of source, intervention, population and funding recorded. Where the two reviewers disagreed it was planned that discussion would be facilitated in order to reach consensus, however, there were no disagreements. Trials meeting inclusion criteria were then collated, and the methods and results sections re-sent to the same two reviewers for assessment of trial validity and data extraction. ASSESSMENT OF VALIDITY Validity of included trials was assessed by description of whether they met key criteria (including appropriate randomisation, allocation concealment, blinding, number lost to follow up and intention to treat analysis). Trial quality was not scored numerically. The only quantitative scoring was given for allocation concealment, ranked as: A: adequate B: unclear, or C: inadequate. Whether or not trials were appropriately randomised (as described

in the Cochrane Reviewer's Handbook)(Alderson 2003); blinded participants, care providers and outcome assessor; had complete follow up and used an intention to treat analysis was recorded on a pre-piloted data extraction sheet and later transposed into the Characteristics of Included Studies table.

Trial quality was assessed in this qualitative way as opposed to using a numerical or summary scale due to concerns regarding the validity of such scales and lack of information about whether all the criteria included in such scales impact on the overall outcome of the trial (Juni 1999).

DATA EXTRACTION AND ANALYSIS

In order to assess efficacy, raw data for outcomes of interest (specifically means and standard deviations for continuous outcomes and number of events for binary outcomes) were extracted where available from the published reports. All standard errors of the mean were converted to standard deviation. Wherever data were converted or imputed, this was recorded in the notes section of the Characteristics of Included Studies table. For trials where the required data were not reported or able to be calculated, further details were requested from first authors. If no further details were provided, the trial was included in the review and fully described, but not included in the meta-analysis (i.e., not included in the pooling of study data). An entry to that effect was made in the notes section of the Characteristics of Included Studies table.

When trial results were not normally distributed and so reported as median and range, the trial was not included in the meta-analysis but results presented in Additional Tables.

Meta-analysis was facilitated by RevMan software. The following choices of statistic and 95% confidence intervals were presented for all outcomes:

CONTINUOUS OUTCOMES:

Weighted mean difference using a fixed effect model was selected when outcomes were measured on standard scales. When like outcomes were reported on non standard scales, using differing units and methods of assessment (for example disability scales), a standardised mean difference was selected. Possible clinical and methodological reasons for heterogeneity were explored, and in the

presence of significant heterogeneity, trial results were not combined.

DICHOTOMOUS OUTCOMES:

Relative risk using a fixed effects model was selected for interpretation of dichotomous outcome measures in this review as we believe that this is the most appropriate statistic for interpretation when the event is common. Reasons for heterogeneity were evaluated and in the event of significant heterogeneity trial results were not pooled.

SUBGROUP ANALYSIS

Shoulder pain and disorder may be caused by varying underlying pathologies, and the diagnostic criteria for defining these disorders are not consistent nor reliably applied. Resulting from this, many trials investigate interventions in non-defined or mixed populations of participants, while others report a specific diagnosis, for example, rotator cuff disease or adhesive capsulitis. Trials included in this review were therefore divided into subgroups based on the description of the study population provided by the trial. Results were analysed both within diagnostic subgroups and across all disorders. This was planned a priori.

RESULTS

Description of studies

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

Eighteen potentially eligible trials were identified by the search strategy. We are awaiting further information from three trialists (Batra 1985; Mencke 1988; Xu 1982) to ascertain details for inclusion or exclusion. One of these studies was published in German (Mencke), and one was published in Chinese (Xu) with the third published in English. The review will be updated once details regarding the inclusion/exclusion criteria from the remaining studies awaiting assessment have been obtained from authors (Table 2).

Table 2. Trials Waiting To Be Assessed

Study Identifier	Methods	Participants	Interventions	Outcomes	Notes
Mencke 1988	Random allocation: unclear Concealed allocation: unclear Baseline comparability: unclear Blind assessors: unclear	Number of Participants: 53 Inclusion Criteria: Translation not provided Exclusion Criteria: Translation not provided	Group 1: 'Typical' acupuncture (T) Group 2: 'Atypical' acupuncture (A) Group 3: T and A Unclear what is meant by 'typical', 'atypical' and 'TnA'	1. Pain 2. Orthopedic examination Not able to determine timing of follow up	Awaiting translation. Have written to author to ask what the randomisation process was; require translation of quality in-

Table 2. Trials Waiting To Be Assessed (Continued)

	Blind participants: unclear Blind therapists: not possible Adequate follow-up: unclear Intention-to-treat analysis: unclear Between-group comparisons: yes Point estimates and variability: unclear Eligibility criteria: yes				formation; trial information; and outcome data
Batra 1985	Random allocation: Unclear Concealed allocation: Unclear Baseline comparability: Unclear Blind assessors: Yes Blind participants: Yes Blind therapists: Not possible Adequate follow-up: Unclear Intention-to-treat analysis: Yes Between-group comparisons: Yes Point estimates and variability: Dichotomised data only Eligibility criteria: Yes	Number of Participants: 28 Inclusion Criteria: Painful restriction of shoulder and arm movement Exclusion Criteria: None given	Group 1: Acupuncture consisting of three 20 minutes sessions a week for a total of 10 sessions with acupuncture needles inserted until 'Tehchi' phenomena reached ie. sense of soreness, numbness, heaviness with needles connected to electronic stimulator with an intermittent current of comfortable intensity given at 2 second frequency Group 2: Placebo acupuncture consisting of same procedure but with needles inserted 2 cm distant from actual acupuncture points	1. Patients subjective rating of pain relief 2. Changes in analgesic intake 3. Physician evaluation of range of motion Assessments at post intervention only	Require information on randomisation.
Xu 1982	Random allocation: yes - unclear how Concealed allocation: unclear Baseline comparability: unclear Blind assessors: unclear	Number of Participants: 240 Inclusion Criteria: Shoulder periarthritis; No other translation provided Exclusion Criteria: Translation not pro-	Group 1: Unclear. Query shoulder and knee acupuncture Group 2: Unclear. Query shoulder acupuncture alone	1. Recovery (pain/movement) 2. Effectiveness (a sum of recovery and improvement) Assessments at post intervention and 10 days	Require description of randomisation procedure, confirmation of intervention, interval of follow-up assessments plus any additional trans-

Table 2. Trials Waiting To Be Assessed (Continued)

Blind participants: unclear	Blind therapists: not possible	Adequate follow-up: no	Intention-to-treat analysis: yes	Between-group comparisons: unclear	Point estimates and variability: NA	Eligibility criteria: unclear	lution of trial information and outcome data. May be excluded if pertains to knee.
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Nine of the 18 trials met the inclusion criteria (Berry 1980; Ceccherelli 2001; Dyson-Hudson 2001; Kleinhenz 1999; Lin 1994; Moore 1976; Romoli 2000; Sun 2001; Yuan 1995). The reasons for exclusion of remaining six studies (D'Orta 1985; Hanson 1997; Hu 1993; Nabeta 2002; Peng 1987; Wang 1997) are listed in the Table of Excluded Studies. Details of the nine included studies are given in the Table of Included studies and are described below.

Results from six trials were published in English (Berry 1980; Ceccherelli 2001; Dyson-Hudson 2001; Kleinhenz 1999; Moore 1976; Sun 2001) and two were published in Chinese (Lin 1994; Yuan 1995). The study design of the ninth trial was published in English and results from the pilot of the trial were obtained from the author (Romoli 2000).

There was methodological and clinical diversity in the included trials. Shoulder conditions included rotator cuff syndrome (Berry 1980; Kleinhenz 1999), periarthritis (Yuan 1995), adhesive capsulitis (frozen shoulder) (Lin 1994; Sun 2001) and general or mixed shoulder pain (Ceccherelli 2001; Dyson-Hudson 2001; Romoli 2000). In one of these trials, the participants had shoulder pain as a result of wheelchair use (Dyson-Hudson 2001). One trial was in a population with periarticular disease (tendonitis or bursitis) or osteoarthritis (Moore 1976).

Three studies compared acupuncture to placebo (Berry 1980; Kleinhenz 1999; Moore 1976). Placebo methods included using placebo needles that did not penetrate the skin (Kleinhenz 1999; Moore 1976) and placebo tolmetin sodium plus placebo ultrasound (Berry 1980).

Five trials compared acupuncture to other interventions. One of these trials included both an ultrasound group and a steroid injection group as comparisons (Berry 1980). Other comparison interventions included nerve block (Lin 1994), mobilization alone (Romoli 2000), exercise (Sun 2001) and Trager (Dyson-Hudson 2001). Trager is a form of body work and movement re-education based on the Trager theory that puts forward the notion that the mind contributes to pain by maintaining muscles and other soft tissue in a chronically contracted and inflammatory position. Trager includes gentle movements to loosen joints and release chronic pain and a system of effortless movement sequences called mentastics exercises.

Two studies compared different types of acupuncture with comparisons made between deep and shallow acupuncture (Ceccherelli 2001) and acupuncture with sites determined by pathogenesis according to traditional Chinese medicine and the distribution of Jing-Luo (Yuan 1995).

The type of acupuncture used in each trial varied only slightly and was described as traditional or classic acupuncture (i.e. according to traditional Chinese medicine) which includes (though not always specified) reaching the point where the phenomena of soreness, numbness & heaviness are experienced. There was some variation in number of points used and in some cases electrical stimulus was added (Batra 1985). Moxibustion was used in one trial (Berry 1980). Treatments were typically of twenty to thirty minutes duration and were conducted two or three times a week for a period of three to six weeks, resulting in the course of most treatments ranging between eight and 12 sessions. Exceptions were

in the trial by Moore (Moore 1976) where treatment was once a week for three weeks and in the trial by Yuan (Yuan 1995) where participants received a session every second day for a total of five treatments. The treatment procedures and regimen were not always described fully in each trial, and are summarised in the 'interventions' column of the Characteristics of Included Studies table.

Risk of bias in included studies

Included studies were of varying methodological quality. A full description of each trial against the predetermined quality assessment criteria can be found in the Characteristics of Included Studies table. Trial populations were on the whole small (median sample size = 44, range 18 to 150). The smallest trial had six drop-outs and it is not stated if an intention to treat analysis was carried out. The second smallest trial (N=24) was only the pilot phase of a larger trial that is underway and the unpublished data from the pilot study was provided by the trialist (Romoli 2000). Allocation concealment was adequate in three trials (Kleinhenz 1999; Romoli 2000; Yuan 1995), unclear in five (Ceccherelli 2001; Dyson-Hudson 2001; Lin 1994; Moore 1976; Sun 2001) and inadequate in one (Berry 1980). Seven trials blinded outcome assessor (Berry 1980; Dyson-Hudson 2001; Kleinhenz 1999; Moore 1976; Romoli 2000; Sun 2001; Yuan 1995) and two blinded participants (Kleinhenz 1999; Moore 1976). There was adequate follow-up in five trials (Berry 1980; Ceccherelli 2001; Kleinhenz 1999; Moore 1976; Sun 2001). Eight trials presented sufficient data to be included in meta-analysis. Data from the ninth trial (Moore 1976) is included in Addi-

tional Table 1.

Effects of interventions

ACUPUNCTURE COMPARED TO PLACEBO

Two trials assessed success rate of acupuncture in the short term (defined as a positive rating by participants in Kleinhenz 1999 and by no need for follow-up steroid injection by assessors in Berry 1980) for rotator cuff disease. There was no significant difference between success rates in the acupuncture group compared to the placebo group (RR 1.01 (0.69 to 1.48)). Nor was there a significant difference between acupuncture and placebo in reducing pain or increasing the range of abduction in the short term (Berry 1980). One small trial did demonstrate a significant difference post intervention (4 weeks) favouring the acupuncture group for improved shoulder pain, range of movement and functioning measured by a composite score of these factors (The Constant Murley Score) (WMD 17.3 (7.79, 26.81) out of a total score of 100). At four months follow-up a significant difference remained between the groups, however the difference between the change in scores in the acupuncture group and the change in scores in the placebo group was unlikely to be clinically significant (WMD 3.53(0.74 to 6.32)) (i.e.. a change of 3.53 on a scale of 100 is unlikely to represent a clinically significant improvement). A third trial, whose results could not be included in the meta-analysis due to insufficient data, failed to demonstrate a significant difference between acupuncture and placebo in a measure of subjective improvement post intervention (Moore 1976) (Table 3).

Table 3. Results of included studies with data not appropriate for metaview

Study ID	Interventions	Data and results
Moore, 1976	ACUPUNCTURE VERSUS PLACEBO	Average post treatment (4 week) improvement rating (ie how much have you improved?) in acupuncture group 23%, in placebo group 39% (not statistically significant)

Only one trial included adverse effects as an outcome (Kleinhenz 1999), finding no difference between groups with respect to the incidence of fainting, headache, dizziness, inflammatory reactions or leg weakness.

ACUPUNCTURE COMPARED TO STEROID INJECTION

One trial compared acupuncture to anterior glenohumeral injection of corticosteroid for rotator cuff disease, with only 12 participants in each group (Berry 1980). There was no significant difference from placebo following treatment with respect to pain

(WMD 7.5 (-12.47 to 27.47)), range of abduction (WMD 2.9 (-26.83 to 32.62) or success rate (RR 0.83 (0.35 to 2.00)).

ACUPUNCTURE COMPARED TO ULTRASOUND

The same trial (Berry 1980) with 12 participants per group compared acupuncture to ultrasound and demonstrated no significant difference between groups following treatment with respect to pain (WMD -7.10 (-32.90 to 18.70)), range of abduction (WMD 7.9 (-21.59 to 37.39) or success rate (RR 0.83 (0.35 to 2.00)).

ELECTROACUPUNCTURE COMPARED TO STELLATE

GANGLION BLOCK AND SUPRASCAPULAR NERVE BLOCK

A trial of 100 participants with adhesive capsulitis, published in Chinese, investigated the relative effects of electroacupuncture and regional nerve block (anaesthesia of stellate ganglion and suprascapular nerve) (Lin 1994). There was a significant difference favouring nerve block over acupuncture in reducing pain at 30 hours follow-up (WMD 1.33 (1.22 to 1.44)) (out of a total score of 4). The time to achieve maximum pain relief was significantly shorter in the nerve block group (WMD 64.96 (60.50 to 69.42 minutes)). There was a statistically significant but small difference favouring nerve block in increasing range of flexion (WMD -7.00 (-11.17 to -2.83)). No adverse effect was assessed for either intervention. This trial gives no information as to the relative effect of either intervention compared to no treatment or placebo.

ACUPUNCTURE PLUS MOBILISATION VERSUS ACUPUNCTURE ALONE

In a pilot study of participants with general shoulder pain (of no particular diagnosis) (Romoli 2000), eight in the acupuncture plus mobilization group and eight in the mobilization only group, results post intervention revealed no significant difference between the acupuncture plus mobilization compared to mobilization alone with respect to pain at rest (WMD -0.37(-1.85 to 1.11)), pain on movement (WMD 0.25 (-1.87 to 2.37)) (out of a total of 10), or active flexion (WMD -13.13(-39.79 to 13.53) and abduction (WMD -14.37 (-49.94 to 21.20)). No longer term follow-up data were provided by the trialist, nor is there information regarding the effect of either intervention compared to placebo or no treatment.

ACUPUNCTURE PLUS EXERCISE VERSUS EXERCISE ALONE

A small trial comparing acupuncture and exercise with exercise alone for adhesive capsulitis (Sun 2001) showed a significant difference favouring the acupuncture plus exercise group in a composite measure of pain, range of motion and functioning post intervention (WMD 9.20 (0.54 to 17.86)) (out of a total score of 100). The effect remained at 20 weeks follow-up (WMD 9.40 (0.52 to 18.28)).

ACUPUNCTURE VERSUS TRAGAR

One trial compared acupuncture and Tragar for the treatment of general shoulder pain (no particular diagnosis) due to wheel chair use (Dyson-Hudson 2001). There were no significant differences in pain scores post intervention (WMD 1.70 (-21.91 to 25.31)) or at five weeks follow-up (WMD 16.00 (-9.03 to 41.03)) (out of a total of 150) between the groups. This trial provides no information about the benefits of acupuncture or Tragar compared to placebo or no intervention.

DEEP VERSUS SHALLOW ACUPUNCTURE

In a trial comparing deep acupuncture and shallow acupuncture in those with general shoulder pain (no particular diagnosis) there was a significant difference favouring deep acupuncture over shallow acupuncture with respect to pain post intervention (WMD -10.31 (-15.44 to -5.18)) and at three months follow-up (-8.00 (-12.20 to -3.80)). Pain was recorded using the Mc Gill Pain Questionnaire (Melzack 1975) (Ceccherelli 2001).

JING LUO VERSUS TRADITIONAL CHINESE MEDICINE ACUPUNCTURE

There was a significantly greater recovery rate in the group where acupuncture sites were determined according to the distribution of Jing Luo compared to sites determined according to pathogenesis in the theory of traditional Chinese medicine (RR 1.50 (1.08 to 2.09)) for peri-arthritis (Yuan 1995). This trial gives no information about the benefits of acupuncture compared to placebo or no treatment.

DISCUSSION

Based on our review, no firm conclusions can be drawn regarding the efficacy of acupuncture for shoulder disorders. Nine trials of varying methodological quality, most of which were small, met the inclusion criteria. There were often incomplete descriptions of interventions, which varied between trials. There were a large number of different comparison groups, including different placebo interventions.

There were few significant findings with regard to the use of acupuncture when compared to placebo or other interventions. Due to small sample sizes it is possible that this may be explained by Type II error. Acupuncture was of benefit over placebo in improving the Constant Murley Score (a measure of shoulder function), however, by the three month follow-up, the difference between the acupuncture and placebo groups, whilst still statistically significant, was no longer likely to be clinically significant. Acupuncture used in combination with exercise was demonstrated to be more effective than exercise alone in one small trial. Deep acupuncture was shown to be more effective than shallow acupuncture and acupuncture using sites determined by Jing Luo was more effective than that using sites determined by traditional Chinese medicine, however, neither of these trials included placebo or other intervention comparison groups. In one of the larger trials, nerve block was found to be more effective than acupuncture on a range of outcome measures but no follow-up data were reported and the pain outcome measurement used may be inappropriate. Few trials reported adverse events associated with acupuncture when compared to placebo or other interventions.

This review has highlighted the paucity of methodologically rigorous, well described randomised controlled trials with adequate sample sizes assessing acupuncture for shoulder disorders. Trials

lack standardised interventions, placebos and comparisons. A limited amount of pooling was possible in this review which indicates that some progress has been made with regard to the selection of standardised, valid and reliable outcome measures since our initial review in 1999. However, it is still true that the failure to apply a core set of measures to determine outcome in shoulder disorders limits the degree to which the results of different trials can be compared and/or pooled and firm conclusions regarding efficacy can be drawn.

Our analysis did differentiate between the nature of the populations being studied, however, there were few trials within each of these sub-groups and over all few conclusions could be made. This is nevertheless an important point to keep in mind when considering the efficacy of acupuncture as it may vary depending on the different underlying causes of shoulder pain. As there were a small number of trials and they were testing varying interventions in various populations against varying controls, it is difficult to interpret the evidence and draw conclusions about the value of acupuncture for these disorders.

Of particular note is that few trials measure disability associated with shoulder disorder. Disability may in fact be the most important endpoint, particularly from the patient's perspective, and we would encourage future trials to use shoulder specific disability as a primary outcome in determining effect.

Further standardisation in timing of outcome assessment is also required as is longer term follow-up of outcomes to determine any lasting effects. Some of the included trials did not blind the outcome assessor and therefore, given the measures of effect were based on the subjective outcomes of pain and treatment success, it is likely the results of the included trials may have overestimated effect (Schulz 2002).

AUTHORS' CONCLUSIONS

Implications for practice

Due to a small number of clinical and methodologically diverse trials, little can be concluded from this review. There is little evidence to either support or refute the use of acupuncture for treating shoulder pain and more trials are needed. The limited evidence available indicates some short term benefit of acupuncture compared to placebo with respect to shoulder specific disability. Little is known of the potential for adverse effects.

Implications for research

Systematic reviews and meta-analyses of randomised controlled

trials serve to identify areas of clinical practice where further research is required. When sound conclusions about efficacy cannot be made after this process, there is a need for methodologically sound randomised controlled trials to justify or censure current treatment strategies.

One trial included in this review (Kleinhenz 1999) developed an appropriate placebo for use in acupuncture trials which may inform future trials.

Further trials should consider assessing the effect of acupuncture when combined with other modalities, define study population by clear diagnostic criteria, use standardised outcome measures for disability and pain, be adequately powered, follow up participants to determine longer term outcome and give consideration to adverse effect.

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies [ordered by study ID]

Berry 1980

Methods	Random allocation: Yes; Concealed allocation: No; Baseline comparability: Yes; Blind assessors: Yes; Blind participants: No; Blind therapists: Not possible; Adequate follow-up: Yes; Intention-to-treat analysis: No; Between-group comparisons: Yes; Point estimates and variability: Yes; Eligibility criteria stated: Yes	
Participants	60 participants. Inclusion criteria: Rotator cuff disease "pain on resisted movements of the shoulder and loss of passive abduction". Exclusion criteria: Inflammatory conditions, fracture, frozen shoulder (not defined)	
Interventions	Group 1 (Non-steroidal anti-inflammatory drug: NSAID): 400mg tolmetin sodium 3x day plus anterior injection of 40mg methyl prednisolone Group 2: 2 ml 2% lignocaine vs 400mg tolmetin sodium 3x day only. Group 3: acupuncture once a week with moxibustion Group 4: placebo NSAID and placebo ultrasound Group 5: ultrasound	
Outcomes	1. Pain using a 100mm visual analogue scale. 2. 4 point scale for none, mild, moderate and severe pain. 3. Shoulder abduction using a goniometer. 4. Comparative assessment by patient and assessor 5. Success or failure of treatment 6. Adverse effects Assessed at start of study and at two and four weeks.	
Notes		
Risk of bias		
Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

Ceccherelli 2001

Methods	<p>Random allocation: Yes Assignment board; Concealed allocation: Unclear; Baseline comparability: Yes; Blind assessors: Unclear; Blind participants: Unclear; Blind therapists: Not possible; Adequate follow-up: Yes; Intention-to-treat analysis: Unclear; Between-group comparisons: Yes; Point estimates and variability: Yes; Eligibility criteria: Yes</p>	
Participants	<p>44 participants Inclusion criteria: Shoulder pain radiating to the superior arm with: 1. preceding episode of acute pain; 2. contraction of rotatory muscles and/or trapezius and levator scapuli; 3. reappearance of acute pain after functional overload; 4. either no x-ray alternations or calcification of the head of the humerus or in the periarticular soft tissue or intervertebral spaces conserved without spondylosis or no adhesive capsulitis with anatomical compromise of the movements Exclusion criteria: 1. chronic systemic disease; 2. rheumatologic illness; 3. primary fibromialgia; 4. neurologic or psychiatric illness or chronic consumption of benzodiazepines; 5. chronic exposure to heavy metals or neurotoxic solvents</p>	
Interventions	<p>Group 1: Deep acupuncture consisting of two 20 minutes sessions a week for five weeks using .30mm diametre, 29 mm long needles placed 25mm into skin in standard acupuncture points (SI9, SI3, GV 14, TE 15, TE 14, LI 15, LI11). Needles stimulated with rotatory left and right movements for 30 seconds every 5 minutes. Group 2: Shallow acupuncture consisting of two twenty minutes sessions a week for five weeks using .30mm diametre, 15 mm long needles placed 4mm into skin in standard acupuncture points (SI9, SI3, GV 14, TE 15, TE 14, LI 15, LI11). Needles stimulated with rotatory left and right movements for 30 seconds every 5 minutes.</p>	
Outcomes	<p>McGill Pain Questionnaire: 1. Numerical values 2. Number of words used Assessed at baseline, immediately post intervention, and at one month and three months</p>	
Notes		
<i>Risk of bias</i>		
Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Dyson-Hudson 2001

Methods	Random allocation: Yes, Block randomisation; Concealed allocation: Unclear; Baseline comparability: Yes; Blind assessors: Yes; Blind participants: Not possible; Blind therapists: Not possible; Adequate follow-up: No; Intention-to-treat analysis: Unclear; Between-group comparisons: Yes; Point estimates and variability: Yes; Eligibility criteria: Yes	
Participants	20 wheelchair users Inclusion criteria: Chronic shoulder pain of musculoskeletal origin; at least one year post spinal cord injury; use wheelchair as primary means of mobility Exclusion criteria: Shoulder pain of non-musculoskeletal origin; pregnant; bleeding disorder; IV heparin; narcotic pain medication; history of hospitalisation for psychopathology	
Interventions	Group 1: Acupuncture consisting of two 20-30 minute sessions for five weeks using .20 mm diameter, 40mm long needles placed 1-3cm into skin and manually stimulated to achieve Qi sensation ie. heaviness, soreness, numbness. Needles retained for 20 minutes with one additional manual stimulation. Group 2: Trager Psychophysical Integration. This approach has no set protocol but includes table work and mentastics exercises. Table work includes gentle movements to loosen joints, ease movement and release chronic pain. Mentastics is a system of simple effortless movement sequences to reinforce and enhance the feeling of relaxation and pain free movement experienced during table work. It is based on Tragers' theory that the mind, through the nervous system, contributes to pain by maintaining the muscles in a chronically contracted and inflamed position.	
Outcomes	1. Wheelchair Users Shoulder Pain Index (WUSPI) 2. Shoulder pain intensity VAS using a 10 point scale 3. Verbal rating scale of change in shoulder pain 4. Range of Movement 5. Analgesia Assessed post intervention and at five weeks	
Notes		
<i>Risk of bias</i>		
Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Kleinhenz 1999

Methods	Random allocation: Yes Central external randomisation by phone call; Concealed allocation: Yes; Baseline comparability: Yes; Blind assessors: Yes; Blind participants: Yes; Blind therapists: Not possible; Adequate follow-up: Yes; Intention-to-treat analysis: Yes; Between-group comparisons: Yes; Point estimates and variability: Yes; Eligibility criteria: Yes	
Participants	52 Athletes with rotator cuff disease, excluding rotator cuff tear on ultrasound. Inclusion criteria: rotator cuff disease due to sport; 18 - 50 years old; shoulder pain for > 4 weeks; no acupuncture therapy in past 6 months Exclusion criteria: cervical or thoracic pain; previous surgery; rotator cuff tear; calcific tendinitis; arthritis	
Interventions	Group 1: 8 acupuncture sessions in 4 weeks Group 2: Identical regime of placebo ultrasound	
Outcomes	1. Change from baseline in Constant Murley score (combined pain, function and range of motion scale) Assessment was made at least two days after the last treatment (treatment lasted 4 weeks) and three months after end-point assessment, letters were sent to the participants with the first subjective items (35 points) of the modified Constant-Merley score.	
Notes		
<i>Risk of bias</i>		
Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Lin 1994

Methods	Random allocation: Unclear method; Concealed allocation: Unclear; Baseline comparability: Yes; Blind assessors: Unclear; Blind participants: Unclear; Blind therapists: Not possible; Adequate follow-up: No; Intention-to-treat analysis: Yes; Between-group comparisons: Yes; Point estimates and variability: Yes; Eligibility criteria: No	
Participants	150 participants with "frozen shoulder". Eligibility criteria not defined	
Interventions	Group 1: Stellate ganglion block and suprascapular nerve block Group 2: Electroacupuncture Group 3: Combined stellate ganglion block, suprascapular block and electroacupuncture	
Outcomes	1. Pain on a 4 point scale, time to maximum pain relief and range of motion. Assessment at 1, 5, 10, 20 and 30 hours post treatment.	

Lin 1994 (Continued)

Notes	Published in Chinese Standard errors converted to standard deviation	
Risk of bias		
Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Moore 1976

Methods	Random allocation: stated yes, Unclear method; Concealed allocation: Unclear; Baseline comparability: No; Blind assessors: Yes; Blind participants: Yes; Blind therapists: Not possible; Adequate follow-up: Yes; Intention-to-treat analysis: No; Between-group comparisons: Yes; Point estimates and variability: No; Eligibility criteria: Yes	
Participants	42 participants. Inclusion criteria: shoulder pain fitting into the category of periarticular disease (tendonitis/bursitis) or osteoarthritis Exclusion criteria: history/physical findings of systemic, inflammatory arthritis	
Interventions	Group 1: classic acupuncture of 7 acupuncture points believed to relieve shoulder or upper extremity pain, 1 treatment a week for 3 weeks Group 2: placebo with no needle penetration of the skin, 1 treatment a week for 3 weeks Half of the participants were treated in an encouraging "positive setting" environment and the other half in a "negative setting" with as little encouragement as possible thus there were 4 different experimental conditions	
Outcomes	1. Goniometer measure of range of shoulder external and internal rotation, flexion, extension and abduction 2. Shoulder discomfort as appraised by participant on scale from 1-10 3. Hypnotic susceptibility assessed using Spiegel Hypnotic Induction Profile expressed on a 5 point scale 4. Self-administered post-treatment questionnaire asking participant to speculate as to which of the placebo or acupuncture he/she had received Assessment at baseline and at 4 weeks	
Notes	Data not able to be used in meta-analysis (no measure of variance) but included in additional table (Table 01)	
Risk of bias		
Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Romoli 2000

Methods	Random allocation: Yes Random sequence of numbers (computer generated); Concealed allocation: Yes; Baseline comparability: Unclear; Blind assessors: Yes; Blind participants: No; Blind therapists: Not possible; Adequate follow-up: No; Intention-to-treat analysis: Yes; Between-group comparisons: Unclear; Point estimates and variability: Unclear; Eligibility criteria: Yes	
Participants	24 participants. Inclusion criteria: Monolateral painful shoulder (diagnosis unspecified) Exclusion criteria: bilateral painful shoulder, painful shoulder post fracture, traumatic rupture of rotator cuff, painful shoulder in hemiplegia or mastectomy, rheumatic polymyalgia, rheumatoid arthritis, acromion-clavicular arthritis, cervical syndrome, polyradicular arthralgia, referred visceral pain, long term therapy with phenobarbital, reluctance to participate in study, prior treatment with physiotherapy or acupuncture, intake of antidepressant and benzodiazepines in 12 hours, and NSAIDS in 6-8 hours, surgery of shoulder, congenital abnormalities, diabetes, psychiatric illness, illiteracy	
Interventions	Group 1: Acupuncture and mobilisation. Acupuncture with manual stimulation using needles with a diameter of 0.35 and sufficient length to get to depth of 1-3 cm. Needles left in place for 15-20 minutes until qi or teh chi phenomena or propagated sensation along channel (PSC). Used 7 points in affected shoulder and homolateral upper limb, and 5 additional points. Group 2: Ear Acupuncture and Mobilisation. Both ears tested for points most sensitive to pressure. Every sensitive point located was treated. Group 3: Mobilisation only. Passive repetitive movements of the shoulder (rotation, flexion-extension, abduction-adduction) with glenohumeral tractions for 30 minutes. Mobilisation was the same in each of the interventions groups. Mobilisation occurred twice weekly for five weeks. Acupuncture occurred twice weekly for two weeks then once a week for 3 weeks.	
Outcomes	Pain measured on a visual analogue scale, and by the McGill Pain Questionnaire, range of motion, functional disability, general perceived benefit, total amount of pain medication taken, severity of main complaint. Range of motion and pain were measured before and after each treatment during both an active and passive phase. Assessment at baseline, at end of treatment, and at three and six months.	
Notes	Data from pilot trial provided by author.	
<i>Risk of bias</i>		
Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Sun 2001

Methods	<p>Random allocation: Yes Random Tables; Concealed allocation: Unclear; Baseline comparability: No; Blind assessors: Yes; Blind participants: No; Blind therapists: Not possible; Adequate follow-up: Yes; Intention-to-treat analysis: Yes; Between-group comparisons: Yes; Point estimates and variability: Yes; Eligibility criteria: Yes</p>	
Participants	<p>35 participants. Inclusion criteria: Shoulder pain; Pain at night with an inability to sleep on the affected side; Restriction of active and passive abduction and flexion; Abduction less than 90 degrees; External rotation less than 30 degrees Exclusion criteria: history of injury or surgery; clinical or radiological evidence of other pathology that could account for symptoms; evidence of cervical radiculopathy, paresis or other neurological changes in the upper limb or involved side; presence of underlying fracture; associated inflammatory arthritis; known renal or hepatic disease, haemopoietic disorder, malignancy, any mental disorder likely to interfere with course or assessment of the disease process; painful arc between 40 degrees and 120 degrees abduction indicative of rotator cuff disease</p>	
Interventions	<p>Group 1: Acupuncture plus exercise. Acupuncture with a 7.62cm long, 30 gauge needle placed 6.5 cm into skin followed by strong stimulation from wide amplitude needle rotation simultaneously with lifting and thrusting movements to evoke sensation ie. heaviness, soreness, numbness. The extrapoint of Zhongping was chosen. During the 20 minute acupuncture treatment the patient completed functional exercises, elevating, abducting, adducting, and completing internal rotation and external rotation of the affected arm. Group 2: Standard group exercise programme for 30 minutes, twice a week for six weeks of gentle shoulder stretching. Patients were instructed to perform exercises 10 times each morning, mid-day and evening at home.</p>	
Outcomes	<p>1. Constant Shoulder Assessment: has a maximum score of 100 points scores for pain, functioning, and range of motion. Assessment at baseline, post treatment and after 20 weeks.</p>	
Notes		
<i>Risk of bias</i>		
Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Yuan 1995

Methods	Random allocation: Yes Unclear method; Concealed allocation: Yes; Baseline comparability: Unclear; Blind assessors: Yes; Blind participants: Unclear Blind therapists: Not possible; Adequate follow-up: Unclear; Intention-to-treat analysis: Unclear; Between-group comparisons: Yes; Point estimates and variability: NA; Eligibility criteria:Unclear	
Participants	98 participants. Inclusion criteria: shoulder periarthritis; none other translated Exclusion criteria: none translated	
Interventions	Group 1: Acupuncture consisting of 30 minute sessions every second day for 10 days with sites determined according to the distribution of Jing-Luo. Needles rotated for one minutes every five minutes. Group 2: Acupuncture consisting of 30 minute sessions every second day for 10 days with sites determined according to the pathogenesis in the theory of traditional Chinese medicine. Needles rotated for one minute every five minutes.	
Outcomes	1. Recovery 2. Improvement 3. Effectiveness (the sum of recovery and improvement) Timing of assessments not stated	
Notes	Translated from Chinese. Additional information sought from authors regarding inclusion and exclusion criteria and method of randomisation.	
<i>Risk of bias</i>		
Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

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

D'Orta 1985	Compares experienced and novice practitioner: therefore not a trial of effect of acupuncture
Hanson 1997	Sequential allocation; not random allocation
Hu 1993	Shoulder acupuncture versus scalp acupuncture, not testing effect of acupuncture for shoulder pain
Nabeta 2002	Intervention for chronic dull neck and shoulder pain; not of shoulder disorder
Peng 1987	Correlational/prognostic indicator study, not a trial of effect of acupuncture.
Wang 1997	Compares acupuncture plus injection of herbs with acupuncture alone: not a trial of acupuncture

DATA AND ANALYSES

Comparison 1. ACUPUNCTURE VERSUS PLACEBO

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Pain Post Intervention	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 Rotator cuff disease	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
2 Range of abduction Post Intervention	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 Rotator cuff disease	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
3 Success rate (short term)	2		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
3.1 Rotator cuff disease	2	76	Risk Ratio (M-H, Fixed, 95% CI)	1.01 [0.69, 1.48]
4 Overall success (Constant Murley score) at 4 weeks	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
4.1 Rotator cuff disease	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
5 Overall success (Constant Murley score) at 4 months	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
5.1 Rotator cuff disease	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
6 Adverse effect	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
6.1 Fainting	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
6.2 Headaches	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
6.3 Dizziness	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
6.4 Inflammatory reaction	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
6.5 Leg weakness	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable

Comparison 2. ACUPUNCTURE VERSUS STEROID INJECTION

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Pain Post Intervention	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 Rotator cuff disease	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
2 Range of abduction Post Intervention	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 Rotator cuff disease	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
3 Success rate (short term)	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
3.1 Rotator cuff disease	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable

Comparison 3. ACUPUNCTURE VERSUS ULTRASOUND

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Pain Post Intervention	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 Rotator cuff disease	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
2 Range of abduction Post Intervention	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 Rotator cuff disease	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
3 Success rate (short term)	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
3.1 Rotator cuff disease	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable

Comparison 4. ELECTRO ACUPUNCTURE VERSUS STELLATE GANGLION AND SUPRASCAPULAR NERVE BLOCK

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Pain at 30 hours	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 Adhesive capsulitis	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
2 Time to maximum pain relief	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 Adhesive capsulitis	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
3 Range of flexion after treatment	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
3.1 Adhesive capsulitis	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable

Comparison 5. ACUPUNCTURE PLUS MOBILIZATION VERSUS MOBILIZATION

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Pain at rest	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 General Shoulder Pain (No Diagnosis Given)	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
2 Pain on movement	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 General Shoulder Pain (No Diagnosis Given)	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
3 Active flexion	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
3.1 General Shoulder Pain (No Diagnosis Given)	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
4 Active abduction	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
4.1 General Shoulder Pain (No Diagnosis Given)	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable

Comparison 7. ACUPUNCTURE VERSUS EXERCISE

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Constant Shoulder Assessment (Pain, Range of Motion, Function) post intervention	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 Adhesive Capulitis	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
2 Constant Shoulder Assessment (Pain, Range of Motion, Function) 20 weeks	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 Adhesive Capulitis	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable

Comparison 8. ACUPUNCTURE VERSUS TRAGAR

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Wheelchair Users Shoulder Pain Index (WUSPI) post intervention	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 General Shoulder Pain (No Diagnosis Given)	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
2 Wheelchair Users Shoulder Pain Index (WUSPI) at 5 week follow-up	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 General Shoulder Pain (No Diagnosis Given)	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable

Comparison 9. DEEP ACUPUNCTURE VERSUS SHALLOW ACUPUNCTURE

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 McGill Pain Questionnaire Post Intervention	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 General Shoulder Pain (No Diagnosis Given)	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
2 McGill Pain Questionnaire 3 Months Follow-up	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 General Shoulder Pain (No Diagnosis Given)	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable

Comparison 10. TRADITIONAL ACUPUNCTURE VERSUS JING LUO ACUPUNCTURE

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Recovery	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
1.1 Periarthritis	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable

Analysis 1.1. Comparison 1 ACUPUNCTURE VERSUS PLACEBO, Outcome 1 Pain Post Intervention.

Review: Acupuncture for shoulder pain

Comparison: 1 ACUPUNCTURE VERSUS PLACEBO

Outcome: 1 Pain Post Intervention

Study or subgroup	Acupuncture		Placebo		Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
	N	Mean(SD)	N	Mean(SD)		
1 Rotator cuff disease Berry 1980	12	34.1 (27.2)	12	22 (28.6)		12.10 [-10.23, 34.43]

Analysis 1.2. Comparison 1 ACUPUNCTURE VERSUS PLACEBO, Outcome 2 Range of abduction Post Intervention.

Review: Acupuncture for shoulder pain

Comparison: 1 ACUPUNCTURE VERSUS PLACEBO

Outcome: 2 Range of abduction Post Intervention

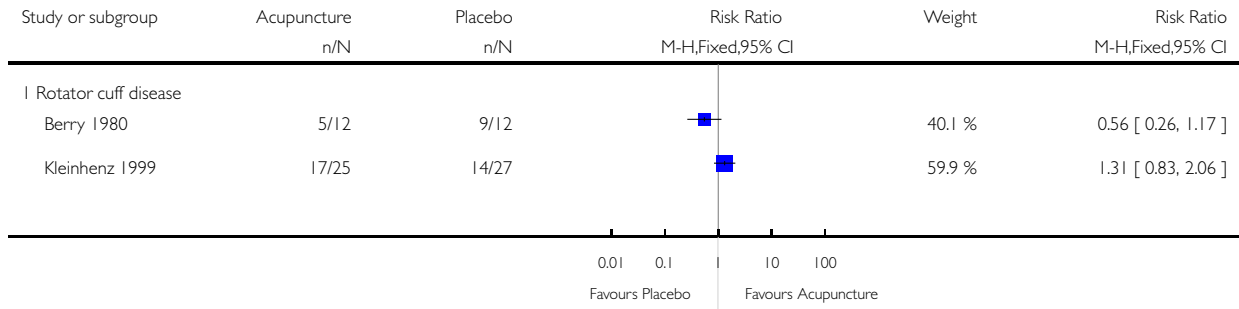
Study or subgroup	Acupuncture		Placebo		Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
	N	Mean(SD)	N	Mean(SD)		
1 Rotator cuff disease Berry 1980	12	103.5 (36.6)	12	120.8 (30.1)		-17.30 [-44.11, 9.51]

Analysis I.3. Comparison I ACUPUNCTURE VERSUS PLACEBO, Outcome 3 Success rate (short term).

Review: Acupuncture for shoulder pain

Comparison: I ACUPUNCTURE VERSUS PLACEBO

Outcome: 3 Success rate (short term)

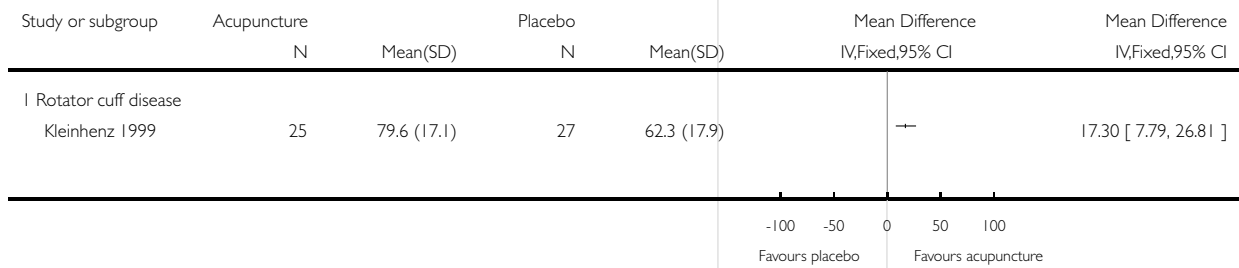


Analysis I.4. Comparison I ACUPUNCTURE VERSUS PLACEBO, Outcome 4 Overall success (Constant Murley score) at 4 weeks.

Review: Acupuncture for shoulder pain

Comparison: I ACUPUNCTURE VERSUS PLACEBO

Outcome: 4 Overall success (Constant Murley score) at 4 weeks

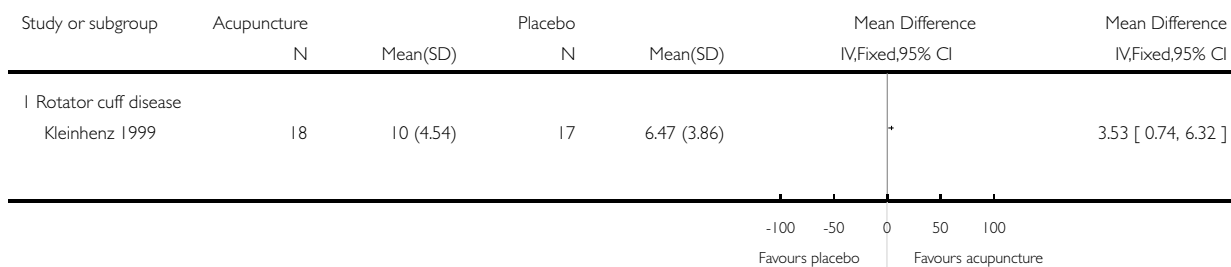


Analysis I.5. Comparison I ACUPUNCTURE VERSUS PLACEBO, Outcome 5 Overall success (Constant Murley score) at 4 months.

Review: Acupuncture for shoulder pain

Comparison: I ACUPUNCTURE VERSUS PLACEBO

Outcome: 5 Overall success (Constant Murley score) at 4 months

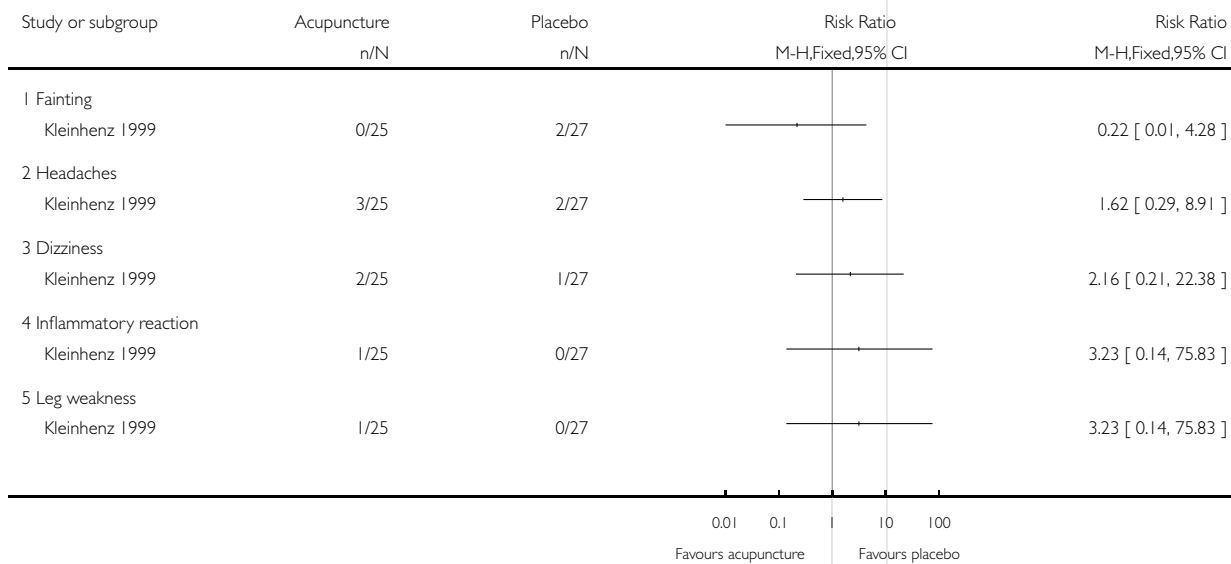


Analysis I.6. Comparison I ACUPUNCTURE VERSUS PLACEBO, Outcome 6 Adverse effect.

Review: Acupuncture for shoulder pain

Comparison: I ACUPUNCTURE VERSUS PLACEBO

Outcome: 6 Adverse effect

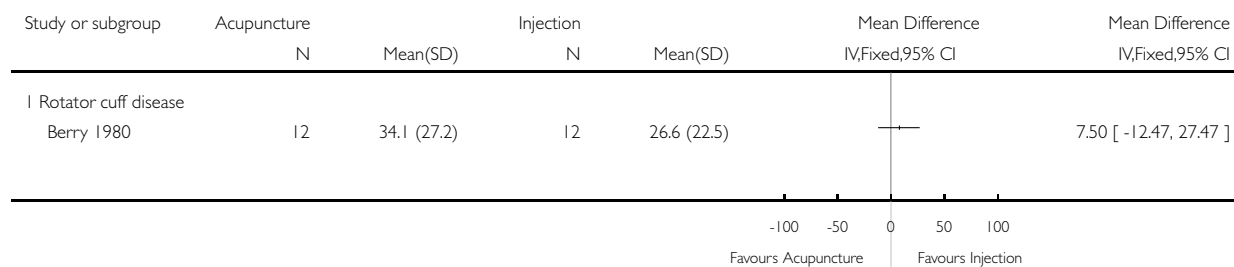


Analysis 2.1. Comparison 2 ACUPUNCTURE VERSUS STEROID INJECTION, Outcome 1 Pain Post Intervention.

Review: Acupuncture for shoulder pain

Comparison: 2 ACUPUNCTURE VERSUS STEROID INJECTION

Outcome: 1 Pain Post Intervention

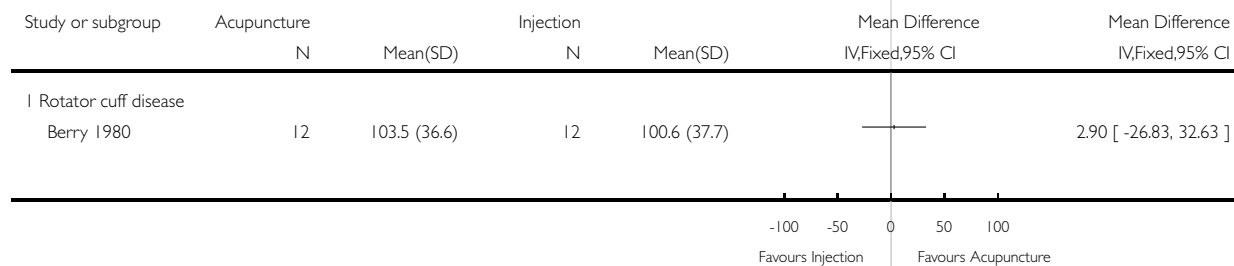


Analysis 2.2. Comparison 2 ACUPUNCTURE VERSUS STEROID INJECTION, Outcome 2 Range of abduction Post Intervention.

Review: Acupuncture for shoulder pain

Comparison: 2 ACUPUNCTURE VERSUS STEROID INJECTION

Outcome: 2 Range of abduction Post Intervention

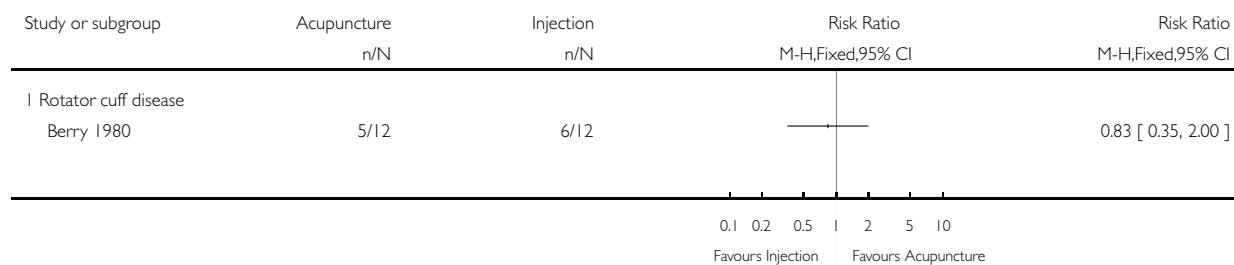


Analysis 2.3. Comparison 2 ACUPUNCTURE VERSUS STEROID INJECTION, Outcome 3 Success rate (short term).

Review: Acupuncture for shoulder pain

Comparison: 2 ACUPUNCTURE VERSUS STEROID INJECTION

Outcome: 3 Success rate (short term)

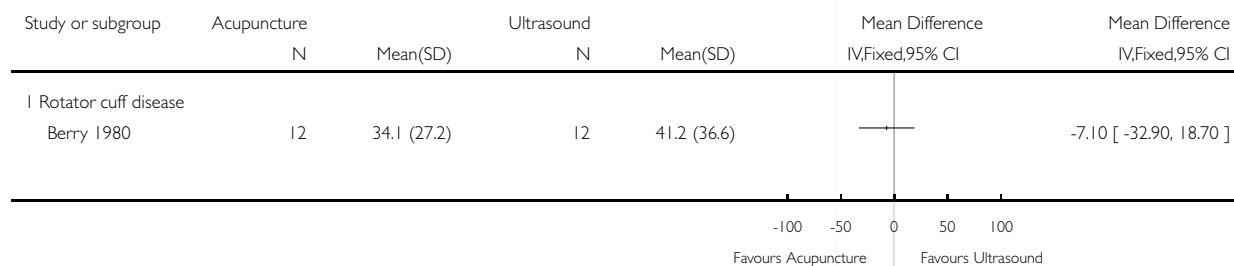


Analysis 3.1. Comparison 3 ACUPUNCTURE VERSUS ULTRASOUND, Outcome 1 Pain Post Intervention.

Review: Acupuncture for shoulder pain

Comparison: 3 ACUPUNCTURE VERSUS ULTRASOUND

Outcome: 1 Pain Post Intervention

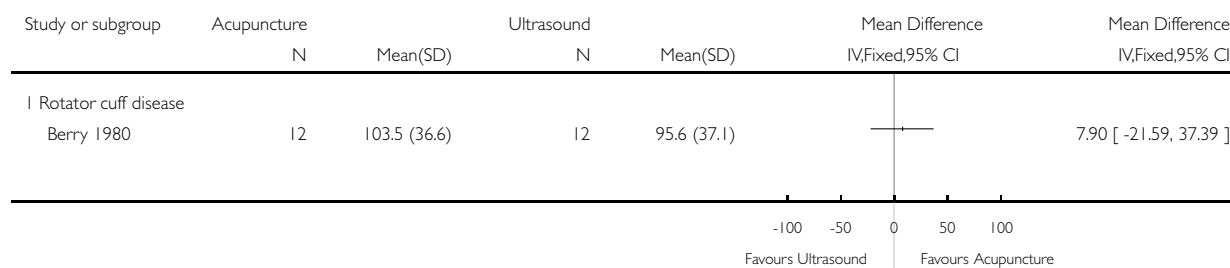


Analysis 3.2. Comparison 3 ACUPUNCTURE VERSUS ULTRASOUND, Outcome 2 Range of abduction Post Intervention.

Review: Acupuncture for shoulder pain

Comparison: 3 ACUPUNCTURE VERSUS ULTRASOUND

Outcome: 2 Range of abduction Post Intervention

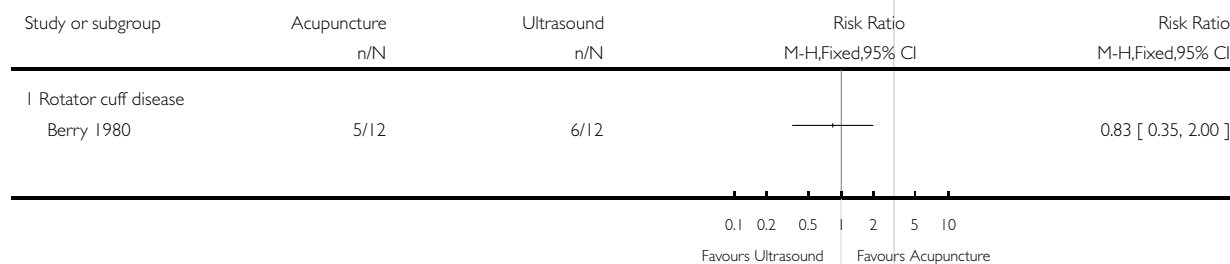


Analysis 3.3. Comparison 3 ACUPUNCTURE VERSUS ULTRASOUND, Outcome 3 Success rate (short term).

Review: Acupuncture for shoulder pain

Comparison: 3 ACUPUNCTURE VERSUS ULTRASOUND

Outcome: 3 Success rate (short term)



Analysis 4.1. Comparison 4 ELECTRO ACUPUNCTURE VERSUS STELLATE GANGLION AND SUPRASCAPULAR NERVE BLOCK, Outcome 1 Pain at 30 hours.

Review: Acupuncture for shoulder pain

Comparison: 4 ELECTRO ACUPUNCTURE VERSUS STELLATE GANGLION AND SUPRASCAPULAR NERVE BLOCK

Outcome: 1 Pain at 30 hours

Study or subgroup	Acupuncture		Nerve block		Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
	N	Mean(SD)	N	Mean(SD)		
I Adhesive capsulitis Lin 1994	50	2.41 (0.35)	50	1.08 (0.21)	+	1.33 [1.22, 1.44]

Analysis 4.2. Comparison 4 ELECTRO ACUPUNCTURE VERSUS STELLATE GANGLION AND SUPRASCAPULAR NERVE BLOCK, Outcome 2 Time to maximum pain relief.

Review: Acupuncture for shoulder pain

Comparison: 4 ELECTRO ACUPUNCTURE VERSUS STELLATE GANGLION AND SUPRASCAPULAR NERVE BLOCK

Outcome: 2 Time to maximum pain relief

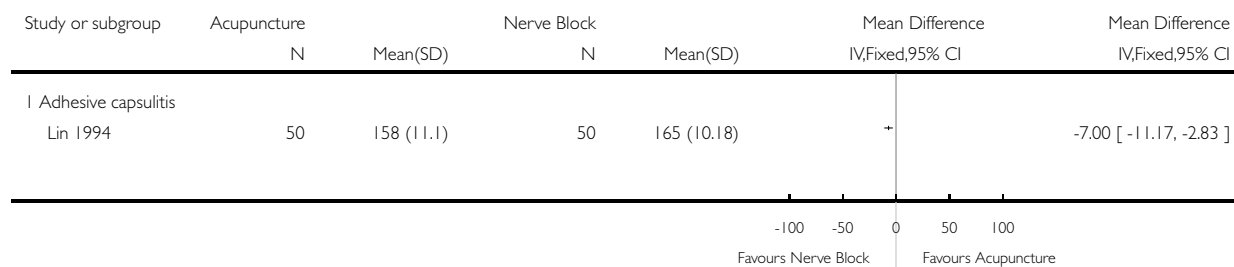
Study or subgroup	Acupuncture		Nerve block		Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
	N	Mean(SD)	N	Mean(SD)		
I Adhesive capsulitis Lin 1994	50	73.68 (15.27)	50	8.72 (5.09)	+	64.96 [60.50, 69.42]

Analysis 4.3. Comparison 4 ELECTRO ACUPUNCTURE VERSUS STELLATE GANGLION AND SUPRASCAPULAR NERVE BLOCK, Outcome 3 Range of flexion after treatment.

Review: Acupuncture for shoulder pain

Comparison: 4 ELECTRO ACUPUNCTURE VERSUS STELLATE GANGLION AND SUPRASCAPULAR NERVE BLOCK

Outcome: 3 Range of flexion after treatment

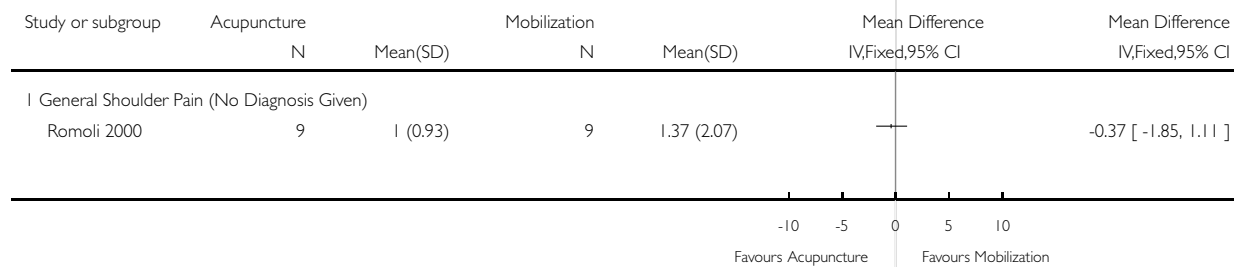


Analysis 5.1. Comparison 5 ACUPUNCTURE PLUS MOBILIZATION VERSUS MOBILIZATION, Outcome 1 Pain at rest.

Review: Acupuncture for shoulder pain

Comparison: 5 ACUPUNCTURE PLUS MOBILIZATION VERSUS MOBILIZATION

Outcome: 1 Pain at rest

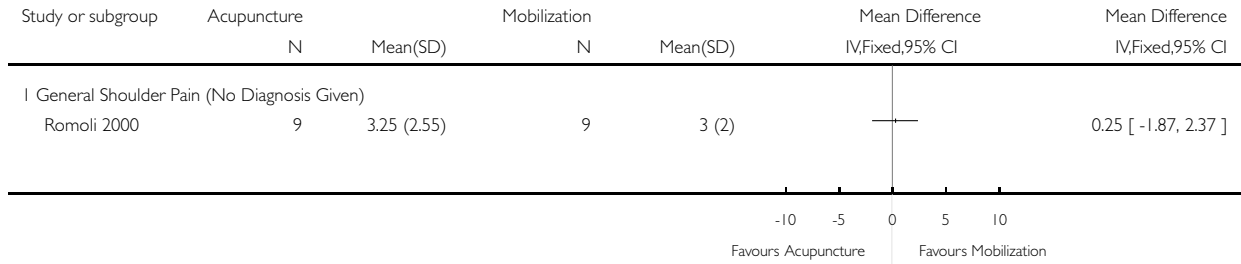


Analysis 5.2. Comparison 5 ACUPUNCTURE PLUS MOBILIZATION VERSUS MOBILIZATION, Outcome 2 Pain on movement.

Review: Acupuncture for shoulder pain

Comparison: 5 ACUPUNCTURE PLUS MOBILIZATION VERSUS MOBILIZATION

Outcome: 2 Pain on movement

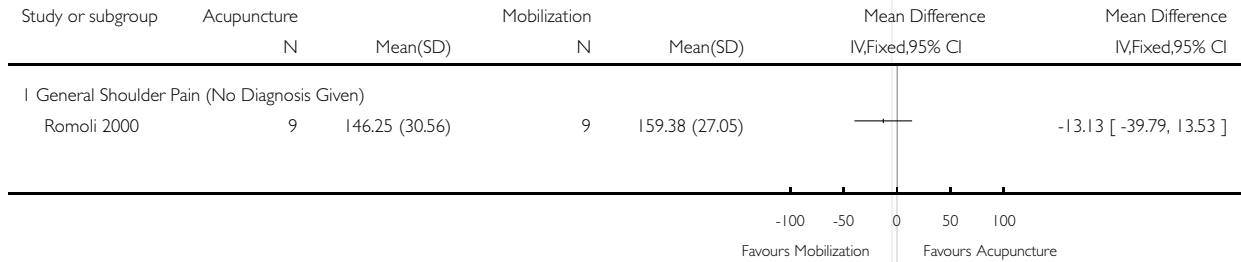


Analysis 5.3. Comparison 5 ACUPUNCTURE PLUS MOBILIZATION VERSUS MOBILIZATION, Outcome 3 Active flexion.

Review: Acupuncture for shoulder pain

Comparison: 5 ACUPUNCTURE PLUS MOBILIZATION VERSUS MOBILIZATION

Outcome: 3 Active flexion

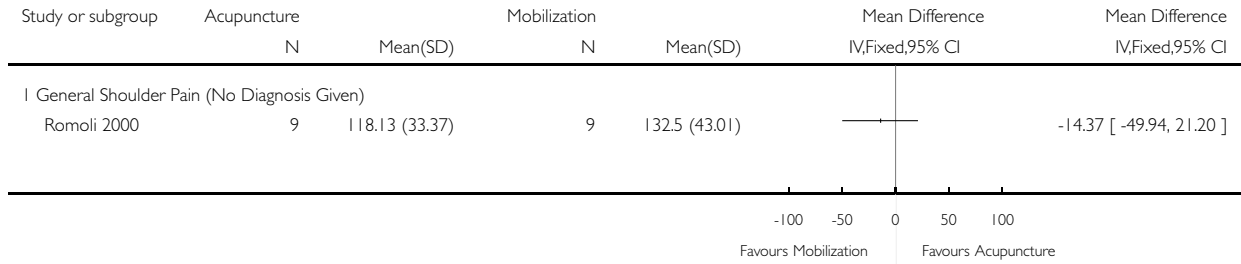


Analysis 5.4. Comparison 5 ACUPUNCTURE PLUS MOBILIZATION VERSUS MOBILIZATION, Outcome 4 Active abduction.

Review: Acupuncture for shoulder pain

Comparison: 5 ACUPUNCTURE PLUS MOBILIZATION VERSUS MOBILIZATION

Outcome: 4 Active abduction

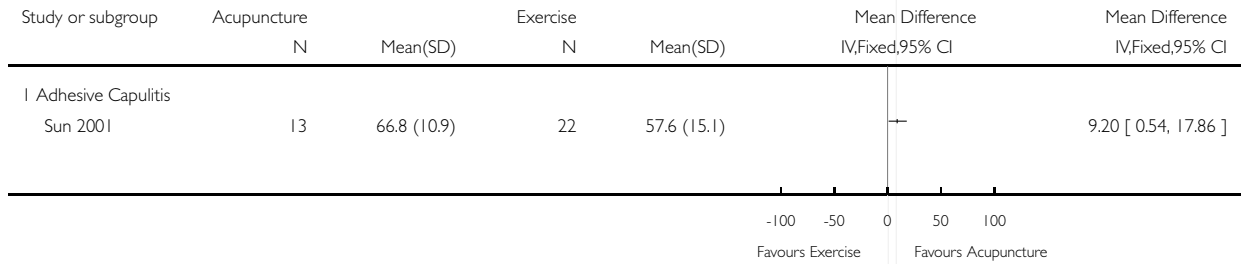


Analysis 7.1. Comparison 7 ACUPUNCTURE VERSUS EXERCISE, Outcome 1 Constant Shoulder Assessment (Pain, Range of Motion, Function) post intervention.

Review: Acupuncture for shoulder pain

Comparison: 7 ACUPUNCTURE VERSUS EXERCISE

Outcome: 1 Constant Shoulder Assessment (Pain, Range of Motion, Function) post intervention

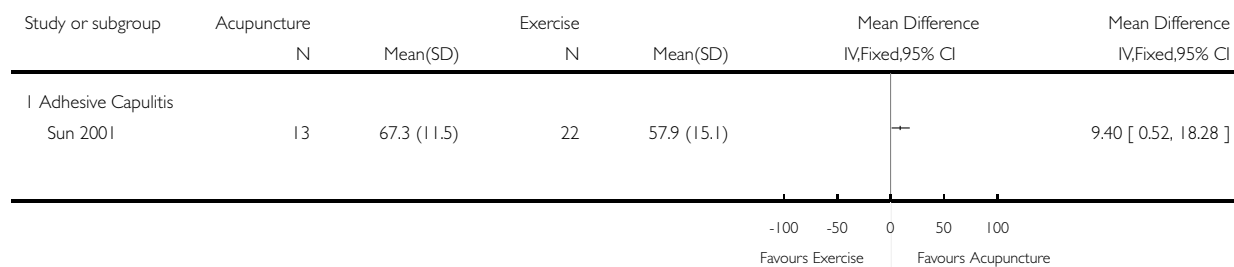


Analysis 7.2. Comparison 7 ACUPUNCTURE VERSUS EXERCISE, Outcome 2 Constant Shoulder Assessment (Pain, Range of Motion, Function) 20 weeks.

Review: Acupuncture for shoulder pain

Comparison: 7 ACUPUNCTURE VERSUS EXERCISE

Outcome: 2 Constant Shoulder Assessment (Pain, Range of Motion, Function) 20 weeks

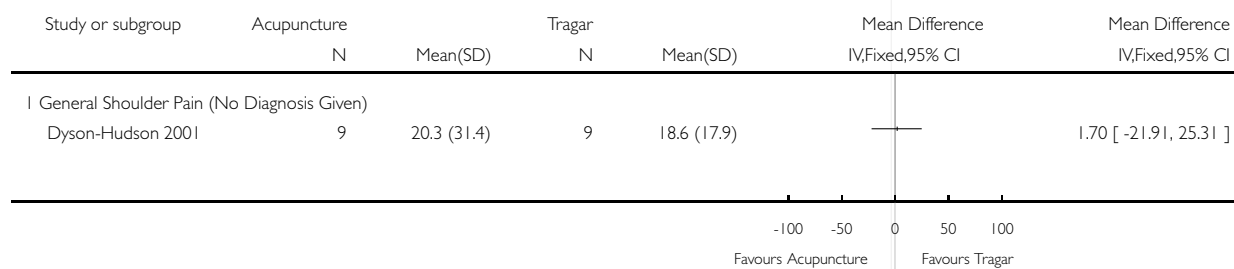


Analysis 8.1. Comparison 8 ACUPUNCTURE VERSUS TRAGAR, Outcome 1 Wheelchair Users Shoulder Pain Index (WUSPI) post intervention.

Review: Acupuncture for shoulder pain

Comparison: 8 ACUPUNCTURE VERSUS TRAGAR

Outcome: 1 Wheelchair Users Shoulder Pain Index (WUSPI) post intervention

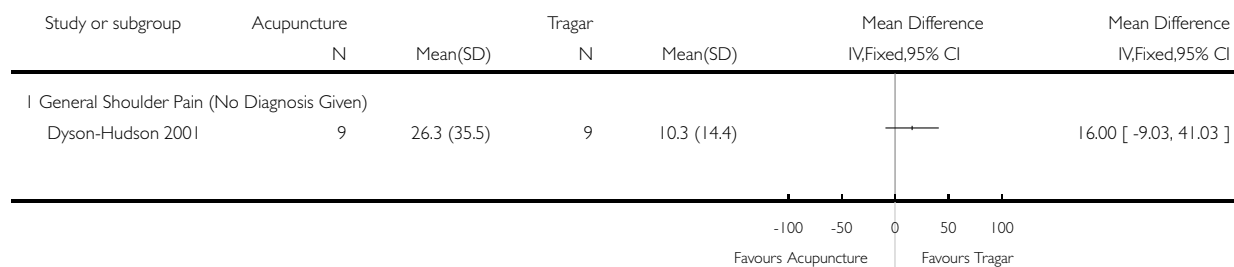


Analysis 8.2. Comparison 8 ACUPUNCTURE VERSUS TRAGAR, Outcome 2 Wheelchair Users Shoulder Pain Index (WUSPI) at 5 week follow-up.

Review: Acupuncture for shoulder pain

Comparison: 8 ACUPUNCTURE VERSUS TRAGAR

Outcome: 2 Wheelchair Users Shoulder Pain Index (WUSPI) at 5 week follow-up

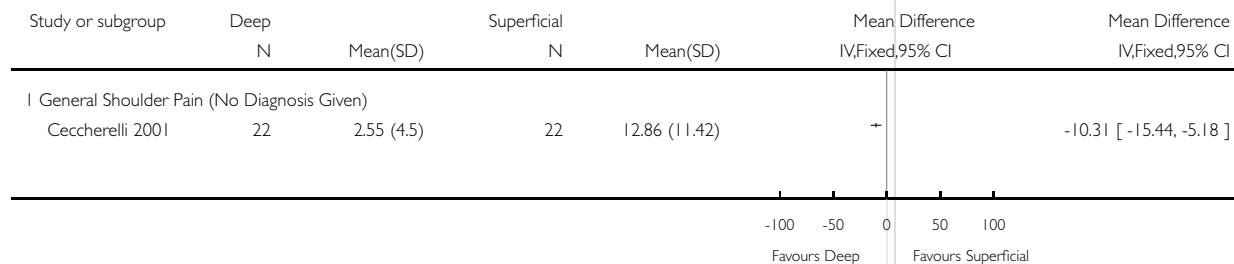


Analysis 9.1. Comparison 9 DEEP ACUPUNCTURE VERSUS SHALLOW ACUPUNCTURE, Outcome 1 McGill Pain Questionnaire Post Intervention.

Review: Acupuncture for shoulder pain

Comparison: 9 DEEP ACUPUNCTURE VERSUS SHALLOW ACUPUNCTURE

Outcome: 1 McGill Pain Questionnaire Post Intervention

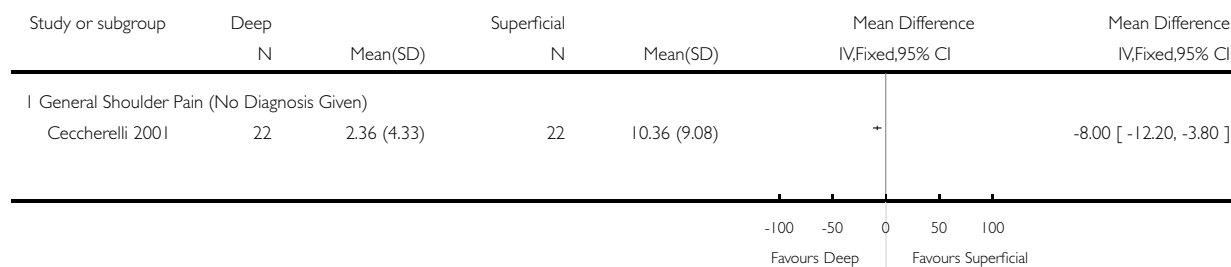


Analysis 9.2. Comparison 9 DEEP ACUPUNCTURE VERSUS SHALLOW ACUPUNCTURE, Outcome 2 McGill Pain Questionnaire 3 Months Follow-up.

Review: Acupuncture for shoulder pain

Comparison: 9 DEEP ACUPUNCTURE VERSUS SHALLOW ACUPUNCTURE

Outcome: 2 McGill Pain Questionnaire 3 Months Follow-up

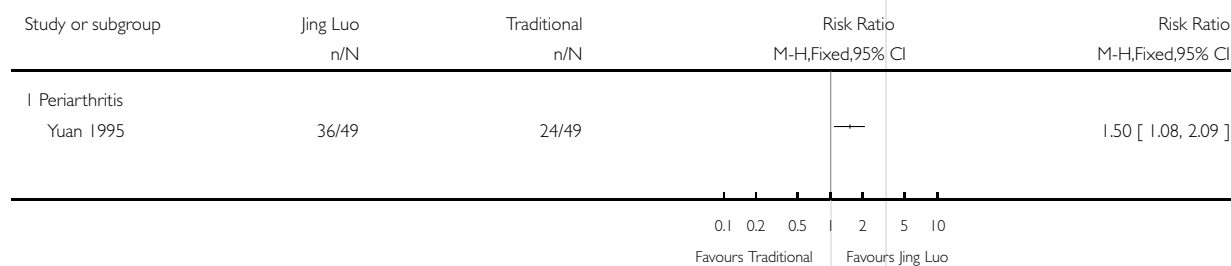


Analysis 10.1. Comparison 10 TRADITIONAL ACUPUNCTURE VERSUS JING LUO ACUPUNCTURE, Outcome 1 Recovery.

Review: Acupuncture for shoulder pain

Comparison: 10 TRADITIONAL ACUPUNCTURE VERSUS JING LUO ACUPUNCTURE

Outcome: 1 Recovery



WHAT'S NEW

Last assessed as up-to-date: 22 February 2005.

16 June 2008	Amended	Converted to new review format. A002-R
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HISTORY

Protocol first published: Issue 4, 1998

Review first published: Issue 2, 1999

23 February 2005	New citation required and conclusions have changed	Substantive amendment
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CONTRIBUTIONS OF AUTHORS

Sally Green and Rachelle Buchbinder modified and updated the protocol. Sally Green and Rachelle Buchbinder identified trials and extracted study results. Sally Green and Sarah Hetrick entered study details and results. All reviewers wrote and interpreted the review.

DECLARATIONS OF INTEREST

No author involved in this review has any known conflict of interest in regard to this review.

SOURCES OF SUPPORT

Internal sources

- Australasian Cochrane Centre, Monash University, Australia.

External sources

- No sources of support supplied

INDEX TERMS

Medical Subject Headings (MeSH)

*Acupuncture Therapy; Randomized Controlled Trials as Topic; Shoulder Pain [*therapy]

MeSH check words

Adult; Humans