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[Intervention Review]

Electrotherapy modalities for adhesive capsulitis (frozen shoulder)

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ABSTRACT

Background

Adhesive capsulitis (also termed frozen shoulder) is a common condition characterised by spontaneous onset of pain, progressive restriction of movement of the shoulder and disability that restricts activities of daily living, work and leisure. Electrotherapy modalities, which aim to reduce pain and improve function via an increase in energy (electrical, sound, light, thermal) into the body, are often delivered as components of a physical therapy intervention. This review is one in a series of reviews which form an update of the Cochrane review 'Physiotherapy interventions for shoulder pain'.

Objectives

To synthesise the available evidence regarding the benefits and harms of electrotherapy modalities, delivered alone or in combination with other interventions, for the treatment of adhesive capsulitis.

Search methods

We searched CENTRAL, MEDLINE, EMBASE, CINAHL Plus and the ClinicalTrials.gov and World Health Organization (WHO) International Clinical Trials Registry Platform (ICTRP) clinical trials registries up to May 2014, unrestricted by language, and reviewed the reference lists of review articles and retrieved trials to identify any other potentially relevant trials.

Selection criteria

We included randomised controlled trials (RCTs) and controlled clinical trials using a quasi-randomised method of allocation that included adults with adhesive capsulitis and compared any electrotherapy modality to placebo, no treatment, a different electrotherapy modality, or any other intervention. The two main questions of the review focused on whether electrotherapy modalities are effective compared to placebo or no treatment, or if they are an effective adjunct to manual therapy or exercise (or both). The main outcomes of interest were participant-reported pain relief of 30% or greater, overall pain, function, global assessment of treatment success, active shoulder abduction, quality of life, and the number of participants experiencing any adverse event.

Data collection and analysis

Two review authors independently selected trials for inclusion, extracted the data, performed a risk of bias assessment, and assessed the quality of the body of evidence for the main outcomes using the GRADE approach.

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Main results

Nineteen trials (1249 participants) were included in the review. Four trials reported using an adequate method of allocation concealment and six trials blinded participants and personnel. Only two electrotherapy modalities (low-level laser therapy (LLLT) and pulsed electromagnetic field therapy (PEMF)) have been compared to placebo. No trial has compared an electrotherapy modality plus manual therapy and exercise to manual therapy and exercise alone. The two main questions of the review were investigated in nine trials.

Low quality evidence from one trial (40 participants) indicated that LLLT for six days may result in improvement at six days. Eighty per cent (16/20) of participants reported treatment success with LLLT compared with 10% (2/20) of participants receiving placebo (risk ratio (RR) 8.00, 95% confidence interval (CI) 2.11 to 30.34; absolute risk difference 70%, 95% CI 48% to 92%). No participants in either group reported adverse events.

We were uncertain whether PEMF for two weeks improved pain or function more than placebo at two weeks because of the very low quality evidence from one trial (32 participants). Seventy-five per cent (15/20) of participants reported pain relief of 30% or more with PEMF compared with 0% (0/12) of participants receiving placebo (RR 19.19, 95% CI 1.25 to 294.21; absolute risk difference 75%, 95% CI 53% to 97%). Fifty-five per cent (11/20) of participants reported total recovery of joint function with PEMF compared with 0% (0/12) of participants receiving placebo (RR 14.24, 95% CI 0.91 to 221.75; absolute risk difference 55%, 95% CI 31 to 79).

Moderate quality evidence from one trial (63 participants) indicated that LLLT plus exercise for eight weeks probably results in greater improvement when measured at the fourth week of treatment, but a similar number of adverse events, compared with placebo plus exercise. The mean pain score at four weeks was 51 points with placebo plus exercise, while with LLLT plus exercise the mean pain score was 32 points on a 100 point scale (mean difference (MD) 19 points, 95% CI 15 to 23; absolute risk difference 19%, 95% CI 15% to 23%). The mean function impairment score was 48 points with placebo plus exercise, while with LLLT plus exercise the mean function impairment score was 36 points on a 100 point scale (MD 12 points, 95% CI 6 to 18; absolute risk difference 12%, 95% CI 6 to 18). Mean active abduction was 70 degrees with placebo plus exercise, while with LLLT plus exercise mean active abduction was 79 degrees (MD 9 degrees, 95% CI 2 to 16; absolute risk difference 5%, 95% CI 1% to 9%). No participants in either group reported adverse events. LLLT's benefits on function were maintained at four months.

Based on very low quality evidence from six trials, we were uncertain whether therapeutic ultrasound, PEMF, continuous short wave diathermy, Iodex phonophoresis, a combination of Iodex iontophoresis with continuous short wave diathermy, or a combination of therapeutic ultrasound with transcutaneous electrical nerve stimulation (TENS) were effective adjuncts to exercise. Based on low or very low quality evidence from 12 trials, we were uncertain whether a diverse range of electrotherapy modalities (delivered alone or in combination with manual therapy, exercise, or other active interventions) were more or less effective than other active interventions (for example glucocorticoid injection).

Authors' conclusions

Based upon low quality evidence from one trial, LLLT for six days may be more effective than placebo in terms of global treatment success at six days. Based upon moderate quality evidence from one trial, LLLT plus exercise for eight weeks may be more effective than exercise alone in terms of pain up to four weeks, and function up to four months. It is unclear whether PEMF is more or less effective than placebo, or whether other electrotherapy modalities are an effective adjunct to exercise. Further high quality randomised controlled trials are needed to establish the benefits and harms of physical therapy interventions (that comprise electrotherapy modalities, manual therapy and exercise, and are reflective of clinical practice) compared to interventions with evidence of benefit (for example glucocorticoid injection or arthrographic joint distension).

PLAIN LANGUAGE SUMMARY

Electrotherapy modalities for adhesive capsulitis (frozen shoulder)

Background

Frozen shoulder is a common cause of shoulder pain and stiffness. The pain and stiffness can last up to two to three years before going away, and in the early stages it can be very painful.

Electrotherapy modalities (also known as electrophysical agents) are types of physical therapy that aim to reduce pain and improve function via an increase in energy (electrical, sound, light, thermal) into the body. Examples include therapeutic ultrasound, low-level laser therapy (LLLT), interferential current, transcutaneous electrical nerve stimulation (TENS), and pulsed electromagnetic field

therapy (PEMF). Electrotherapy modalities are delivered by various clinicians, including physiotherapists, chiropractors and osteopaths. In practice, patients with frozen shoulder seldom receive a single electrotherapy modality in isolation from other components of physical therapy treatment (for example manual therapy, exercise).

Study characteristics

This summary of an updated Cochrane review presents what we know from research about the benefits and harms of electrotherapy modalities in people with frozen shoulder. After searching for all relevant studies published up to May 2014, we included 19 trials (1249 participants). Of the included participants, 61% were women, the average age was 55 years, and the average duration of the condition was 5.5 months. The average duration of delivery of electrotherapy interventions was four weeks.

Key results - LLLT and exercise compared to placebo and exercise

Pain (higher scores mean worse pain)

People who received LLLT and exercise had less pain than people who had placebo plus exercise - pain was 19 points less (ranging from 15 to 23 points less) at the fourth week of treatment (19% absolute improvement, ranging from 15% to 23% improvement).

- People who had LLLT and exercise rated their pain score as 32 points on a scale of 0 to 100 points.
- People who had placebo and exercise rated their pain score as 51 points on a scale of 0 to 100 points.

Function impairment (higher scores mean worse function impairment)

People who received LLLT and exercise had less function impairment than people who had placebo and exercise - function impairment was 12 points less (ranging from 6 to 18 points less) at the fourth week of treatment (12% absolute improvement, ranging from 6% to 18% improvement).

- People who had LLLT and exercise rated their function impairment as 36 points on a scale of 0 to 100 points.
- People who had placebo and exercise rated their function impairment as 48 points on a scale of 0 to 100 points.

Active shoulder abduction (higher degrees of movement mean greater shoulder abduction)

People who received LLLT and exercise had greater active shoulder abduction than people who had placebo and exercise - active shoulder abduction was 9 degrees more (ranging from 2 to 16 degrees more) at the fourth week of treatment (5% absolute improvement, ranging from 1% to 9% improvement).

- People who had LLLT and exercise had active shoulder abduction of 79 degrees.
- People who had placebo and exercise had active shoulder abduction of 70 degrees.

Side effects

No person in either group reported any side effects.

Participant-reported pain relief of 30% or greater, global assessment of treatment success, and quality of life

These were not measured in this trial.

Quality of the evidence

There was low quality evidence that LLLT for six days may improve global assessment of treatment success more than placebo, when measured at six days. Further research is likely to change the estimate.

We are very uncertain about whether PEMF for two weeks improves pain or function any more than placebo because of the very low quality evidence from one trial.

There was moderate quality evidence that LLLT plus exercise for eight weeks may improve pain, up to four weeks, and function, up to four months, more than placebo plus exercise. Further research may change the estimate.

We are very uncertain about whether therapeutic ultrasound, PEMF, Iodex phonophoresis, continuous short wave diathermy, a combination of Iodex iontophoresis with continuous short wave diathermy, or a combination of therapeutic ultrasound with transcutaneous electrical nerve stimulation (TENS) are effective adjuncts to exercise.