Therapeutic exercise and orthopedic manual therapy for impingement syndrome: a systematic review
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CRD summary
This review assessed the effectiveness of therapeutic exercise and manual therapy for shoulder impingement syndrome (SIS). The authors concluded that there are insufficient data from well-conducted trials to support the use of these therapies, and highlighted the need for a validated outcome measure and standardised definition of SIS. These conclusions are likely to be reliable.

Authors' objectives
To determine the effectiveness of therapeutic exercise (TE) and orthopedic manual therapy (MT) in treating shoulder impingement syndrome (SIS).

Searching
MEDLINE, the Cochrane Database of Systematic Reviews, PEDro, TRIP and CINAHL were searched using the terms listed in the review. The authors appear to have searched the databases from their date of inception until October 2002. The reference lists of eligible studies were screened for relevant literature.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion.

Specific interventions included in the review
Studies with either TE or MT administered or supervised by a physiotherapist were eligible if TE or MT was reported as the main intervention. Methods associated with physiotherapy (e.g. thermotherapy, cryotherapy, electrotherapy, massage and transverse friction) were also eligible if TE or MT was considered of primary interest. The studies used a wide variety of comparator treatments; further details were presented.

Participants included in the review
Studies of patients with SIS, rotator cuff tendonitis, tendinosis, or bursitis were eligible. Patients with shoulder pain were eligible if the study included a significant number of patients with SIS. Where stated, the patients in the included studies were aged from 18 to 66 years. Symptom duration ranged from 1 month to over 12 months.

Outcomes assessed in the review
There were no specific inclusion criteria relating to the outcomes. The review focused mainly on pain, range of motion, strength and functional outcomes. In the included studies, the duration of follow-up ranged from 3 weeks to 30 months.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The studies were assessed for validity using quality criteria of the Cochrane Musculoskeletal Injuries Group. The following methodological items were assessed: treatment allocation process; intention-to-treat analysis; blinding of the outcome assessment, participants and treatment providers; baseline differences; consideration for cointerventions; definition of inclusion and exclusion criteria, interventions, and outcomes; clinical relevance of outcome measures; and the quality or duration of follow-up. The maximum quality score was 24 points. Two reviewers independently assessed the studies and resolved any differences through consensus. A Spearman correlation coefficient was calculated to
determine the inter-observer reliability.

**Data extraction**
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. Study details such as intervention, outcome measure, treatment effect, follow-up period and quality score were extracted and tabulated.

**Methods of synthesis**
How were the studies combined?
The studies were combined in a narrative according to the comparator therapies and methodological quality.

How were differences between studies investigated?
Differences between the studies in terms of methodological quality, outcome measures, inclusion criteria and duration of follow-up were discussed.

**Results of the review**
Seven RCTs (eight publications; n=511) were included.

The average inter-observer agreement coefficient was 0.79 plus or minus 0.20. The mean quality score was 13.9 (range: 9 to 16).

Therapeutic exercise was found to be significantly more effective than placebo (n=125) or no treatment (n=66) at reducing pain and self-perceived symptoms in 2 studies. Manual therapy was found to be significantly more effective at reducing pain and in increasing strength and function, compared with exercise alone, in 3 studies (n=238). Three of the above studies had the highest methodological score (16 points).

Three studies with low methodological scores found other interventions to be more effective than TE or MT at reducing pain, and in increasing strength and function in patients with SIS; such interventions including corticosteroid injections (n=172) and open anterior acromioplasty (n=39). One of these studies found no difference between therapeutic exercise supervised by a physiotherapist and a self-training programme carried out at home (n=43).

**Authors' conclusions**
There were insufficient data from well-conducted trials to support the use of therapeutic exercise or manual therapy in the treatment of SIS.

**CRD commentary**
The review provided a structured question, specifying the intervention and patient population of interest. Several databases were searched to identify published literature. No attempt was made to identify unpublished literature, which might have introduced publication bias into the findings. The methods used to select the studies and extract the data were not described; hence, the possibility of selection bias and reviewer error cannot be assessed. However, two reviewers applied a comprehensive checklist to assess the validity of the included studies, thus reducing the potential for bias and error.

Given the variability among studies, a narrative synthesis was appropriate. In summarising the studies, the authors took account of their methodological quality. The authors' conclusions are likely to be reliable.

**Implications of the review for practice and research**
Practice: The authors did not state any implications for practice.

Research: The authors stated that an explicit definition of SIS needs to be utilised and a validated outcome measure
needs developing.

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.