CRD summary
This review evaluated the effectiveness of physiotherapy to manage adult complex regional pain syndrome type one (CRPS-1). The authors' concluded that graded motor imagery should be used to reduce pain in adult CRPS-1 patients. The review was based on a few small studies and had some methodological limitations and uncertainties, so the authors' conclusions should be interpreted with caution.

Authors' objectives
To critically review the evidence on the effectiveness of physiotherapy to manage adult complex regional pain syndrome type one (CRPS-1).

Searching
MEDLINE, EMBASE, CINAHL, Web of Science, The Cochrane Library, Trip and PEDro databases and The Joanna Briggs Institute website were searched between 1987 to September 2007 for articles in English. Search terms were reported. Proceedings of 11th World Conference on Pain, reference lists of textbooks on pain and reference lists of relevant articles were handsearched.

Study selection
Randomised controlled trials, non-randomised trials and case series that studied the outcome of physiotherapy alone or in combination with other medical or psychological therapies in adult patients (over 18 years) were eligible for inclusion. Studies had to provide diagnostic criteria based on clinical presentation.

The included studies were mostly conducted in patients with CRPS-1 of the upper or lower limb. The physiotherapy intervention included education, range of motion, stretching exercises, motor imagery program and pain adapted sensorimotor treatment. Control groups in the comparative studies included social work, standard medical care, standard physiotherapy and ongoing medical management.

Outcome measures and measurements varied greatly across studies. Pain was the most frequently measured variable, although a range of assessment methods were used. Other outcome variables included active range of motion, grip strength and swelling. Mean age of patients in the studies, where reported, ranged from 33 to 53 years. Average duration of symptoms ranged from 3.6 months to 36 months.

The authors did not state how many reviewers undertook the selection process.

Assessment of study quality
Study validity was assessed using the Critical Review Form – Quantitative Studies, which considered 16 quality factors. Each study was given a score for each factor of either 0 (did not fulfill criteria) or 1 (fulfilled criteria completely). Scores were added together to give an overall score between 0 and 16. Studies were then graded as: poor (<9), fair (9 to 10), good (11 to 12), very good (13 to 14) or excellent (15 to 16).

Two authors independently undertook quality assessment. Disagreements were resolved through discussion.

Data extraction
Data on the effectiveness of the physiotherapy treatment were extracted and the mean and 95% confidence intervals (CI) for between-group differences were calculated for all comparative studies. Mean change and 95% CI between pre- and post-treatment were calculated for case series. Data were grouped into three domains: abnormalities of body function and structure; activity limitation; and participation restriction. Data on quality of life and cost-effectiveness
Two authors independently undertook data extraction.

**Methods of synthesis**
A narrative synthesis was undertaken with studies grouped according to study type. A pain reduction of more than 20% was considered clinically worthwhile.

**Results of the review**
Eleven studies were included in the review: five RCTs (n=259 patients); one comparative study (n=8 patients); and five case series (n=113 patients). Sample sizes ranged from six to 135 participants. Study quality ranged from 2 to 13 out of 16. Seven studies scored good to very good (11 to 13 out of 16).

**Randomised controlled trials**: Graded motor imagery was statistically more effective than usual physiotherapy plus medical management in two studies (n=64 patients) in terms of pain intensity up to six months. Graded motor imagery was found to reduce swelling in the fingers to a greater extent than usual physiotherapy plus medical management in one study (n=13 patients). Physiotherapy plus medical management was found to be statistically more effective than occupational therapy and medical management and than social work and medical management in terms of pain, impairment sum scores and temperature scores (one study, n=135 patients).

**Non-randomised studies**: Sensorimotor treatment statistically reduced pain and increased tactile discrimination in terms of pre- and post-treatment mean change (one study, n=6 patients). Graded exposure in vivo significantly reduced pain-related fear and pain disability in one study in terms of pre- and post-treatment (n=8 patients). There was no evidence to support the effectiveness of stress loading exercise (one study, n=52 patients).

**Authors’ conclusions**
Graded motor imagery should be used to reduce pain in adult CRPS-1 patients.

**CRD commentary**
Inclusion criteria for the review were broadly defined and several relevant databases were searched. However, the search strategy may have been prone to both language and publication bias as the search was restricted to published English-language studies. It was unclear how many reviewers performed study selection and so it was not possible to exclude error and bias in study selection. Two reviewers extracted data independently, which reduced risks of error and bias. A good amount of detail of individual studies was included within tables, which aided interpretation of results. Study quality was assessed using a 16-point checklist that was undertaken independently by two reviewers, which was likely to give a good indication of study quality. A narrative synthesis was undertaken as the included studies were deemed too heterogeneous; this appeared appropriate. However, few studies compared the same interventions and most of the included studies had fewer than 50 participants, thus each intervention often had evidence from only one or two small studies. Given the limitations of such evidence, the authors’ conclusions have to be interpreted with caution.

**Implications of the review for practice and research**
**Practice**: The authors stated that the results of this review should be used to update CRPS-1 physiotherapy guidelines.

**Research**: The authors stated that robust RCTs of graded exposure in vivo and interdisciplinary outpatient programs should be designed. Further research would be strengthened by use of the modified research diagnostic criteria for CRPS-1, consensus about outcome measurement and by adoption of the CONSORT statement checklist and data flows.

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