Clinical effectiveness of knee rehabilitation techniques and implications for a self-care treatment model

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CRD summary
This review of the effectiveness of knee rehabilitation interventions concluded that most of the existing evidence focused on exercise and showed positive outcomes overall. The authors' conclusion reflects the evidence but may not be reliable due to some limitations in review methods.

Authors' objectives
To evaluate the clinical effectiveness of knee rehabilitation techniques categorised according to the International Classification of Functioning and Disability (ICF) domains in patients with knee conditions including osteoarthritis, patellofemoral joint pain, acute ligament injuries and postoperative rehabilitation

Searching
MEDLINE, CINAHL, AMED, EMBASE and The Cochrane Library were searched for studies published in English between 1996 and January 2010. Search terms were reported.

Study selection
Randomised controlled trials, clinical trials, comparative studies and pre- and post- test designs of interventions for rehabilitation after knee pathology or surgery that reported use of activities and participation, measured with knee-specific patient-rated tools, were eligible for inclusion. Studies of pharmacological, surgical, bracing, orthotic and acupuncture treatments; extra-articular knee pathology or pathology secondary to other conditions; inpatient settings; or of a single treatment session were excluded.

Included studies evaluated open and closed kinetic chain strength training, strength training, multi-component exercise training, water and land-based exercises, functional rehabilitation programmes, other exercise-based rehabilitation programmes, mixed modality physiotherapy, manual therapy, electrotherapy and taping. The conditions of the participants varied and included: osteoarthritis, patellofemoral joint pain, anterior cruciate ligament reconstruction and total knee replacement. A wide range of outcome measures were reported and these are summarised in a table in the paper.

The authors did not report how many reviewers selected the studies.

Assessment of study quality
Study quality was assessed using a 14-item questionnaire compiled from the Critical Appraisal Skills Programme Tool, CONSORT statement and the tool from the Cochrane Bone Joint and Muscle Trauma Group. The maximum possible score was 28. Any study that scored below 50% was excluded. One reviewer performed the assessment and it was checked by a second reviewer.

Data extraction
Details of study design, interventions and outcomes were extracted; outcomes were grouped into body functions and structure, activities and participation according to the ICF domain. The frequency of use of each type of outcome was calculated. The authors did not report how many reviewers performed the data extraction.

Methods of synthesis
Results were presented as a narrative, grouped by intervention.

Results of the review
Forty-two studies were included; 30 evaluated exercise interventions (1,765 participants), six evaluated mixed modality physiotherapy (546 participants) and six evaluated manual therapy, electrotherapy and taping (399 participants). The studies had some flaws: lack of a no-treatment control group; a control intervention that was too similar to the
intervention under evaluation; lack of randomisation and blinding; small sample sizes; high drop-out rates and lack of long-term follow-up.

**Exercise (30 studies)**

Quality scores ranged from 14 to 24 out of 28. One study found increased laxity after the early implementation of open kinetic chain exercise after hamstring anterior cruciate ligament and four studies found that these exercise are safe following patella tendon bone anterior cruciate ligament reconstruction. Strengthening exercises showed improvements in outcomes for all ICF domains, especially eccentric training which showed statistically significant improvements in two studies. Multi-component exercise programmes showed improvements in patients with osteoarthritis, and land and water based exercises were equally effective in osteoarthritis and after total knee replacement. A walking and targeting foot exercise programme showed significant improvements in body function and structures, and activities in patients with osteoarthritis. A functional rehabilitation programme did not show any benefits over standard care in patients after total knee replacement.

**Mixed modality physiotherapy (six studies)**

The quality of these studies was considered good with scores of between 17 and 19 out of 28. Mixed modality physiotherapy regimes were found to be more effective than general quadriceps strengthening, no-treatment control or placebo for body function and structures and activities outcomes in patellofemoral joint pain (three studies). No benefits were seen in three other studies of other knee conditions.

**Manual therapy, electrotherapy and taping (six studies)**

Quality scores ranged between 15 and 21 out of 28. Short-term benefits of manual therapy for patients with patellofemoral joint pain and osteoarthritis were shown for body function and structures, and activities. Short-term functional improvements for patients with anterior cruciate ligament reconstruction using electrical muscle stimulation combined with closed kinetic chain exercises were also shown but there were no long-term benefits. Patellofemoral joint taping was shown to significantly reduce osteoarthritic pain.

**Authors' conclusions**

Most evidence evaluating the effectiveness of knee rehabilitation interventions focused on exercise and showed positive outcomes overall.

**CRD commentary**

This review had a clear research question and specified some inclusion criteria, but not in enough detail to enable independent researchers to repeat the review. Five databases were searched but the search was limited by language and no attempts were made to locate unpublished research which increased the chance of language and publication bias. Study quality was assessed by one person and checked by a second but it was unclear if the study selection and data extraction were performed in the same way so the risk of mistakes could not be ruled out. The narrative synthesis was appropriate given the differences between the studies and the quality of the evidence was discussed, but there was a lack of evidence for some outcomes.

The authors' conclusion reflects the evidence but may not be reliable due to some limitations in review methods.

**Implications of the review for practice and research**

**Practice:** The authors stated that it was difficult to give specific exercise recommendations because of the range of exercise programmes with different goals and outcomes.

**Research:** The authors stated that further research is needed to develop the content and delivery modes of exercise, which defines standard care and includes appropriate participation outcome measures.

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