Philadelphia Panel evidence-based clinical practice guidelines on selected rehabilitation interventions for knee pain

Philadelphia Panel

Authors' objectives
To improve appropriate use of rehabilitation interventions for knee pain through the development of evidence-based clinical practice guidelines.

Searching
MEDLINE, EMBASE, Current Contents, CINAHL and the Cochrane Controlled Trials Register were searched up to July 1, 2000; the start dates were not reported. PEDro and the registries of the Cochrane Rehabilitation and Related Therapies Field and the Cochrane Musculoskeletal Group were also searched. The references of the included studies were examined for relevant studies and content experts were contacted for additional studies. Inclusion was limited to articles published in full in English, French or Spanish.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs), non-randomised controlled clinical trials, case-control and cohort studies were eligible.

Specific interventions included in the review
Rehabilitation interventions for knee pain. The interventions included massage, thermal therapy (hot or cold packs), electrical stimulation, electromyographic feedback, transcutaneous electrical nerve stimulation (TENS), therapeutic ultrasound, therapeutic exercises, and combinations of these rehabilitation interventions. Concurrent treatments were allowed if they were given in the same way to the experimental and control groups.

Participants included in the review
Participants with knee conditions were eligible. The knee conditions included chondromalacia patellae (patellofemoral syndrome), postsurgical conditions, knee osteoarthritis and tendinitis. Postsurgery knee conditions included meniscectomy, total knee replacement, anterior cruciate ligament reconstruction and arthroscopic surgery. Rheumatoid arthritis was excluded.

Outcomes assessed in the review
The outcomes of interest were functional status, pain, ability to work, patient global assessment, patient satisfaction and quality of life.

How were decisions on the relevance of primary studies made?
Two reviewers independently appraised the titles and abstracts of the literature search, using a checklist with a priori defined selection criteria. Relevant studies were retrieved and the full articles were assessed for inclusion by two independent reviewers.

Assessment of study quality
Methodological quality was assessed using the Jadad 5-point validated scale. Randomisation and double-blinding were assigned two points each, while one point was given for the description of withdrawals (see Other Publications of Related Interest nos.1-2). Two reviewers independently performed the quality assessment. Any differences were resolved by consensus.

Data extraction
The data were extracted by two independent reviewers using predetermined data extraction forms. The data extracted included population characteristics, details of interventions, trial design, allocation concealment and outcomes. Any differences were resolved by consensus.

The data were analysed at three time points post-therapy: 1 month, 6 months and 12 months. If the outcomes were reported at different time intervals, the closest time was used. To calculate clinical improvement (defined as a 15% improvement relative to a control), the absolute benefit and the relative difference in the change from baseline were calculated. For dichotomous data, the relative percentage of improvement was calculated.

Methods of synthesis
How were the studies combined?
Continuous data were analysed using weighted mean differences (WMDs) between the treatment and control groups. Where an outcome was measured with different scales, the data were analysed with standardised mean differences (SMDs). Dichotomous data were analysed using relative risks. The data were combined using a fixed-effect model.

How were differences between studies investigated?
Different knee conditions were analysed separately. Chrondromalacia patellae, postsurgical conditions, osteoarthritis, and tendinitis were analysed separately. Heterogeneity was tested with the chi-squared statistic. When heterogeneity was significant, the data were combined using a random-effects model.

Results of the review
Twenty-nine articles were eligible for inclusion.

The quality of the included studies ranged from 0 to 4 points. The recommendations were graded by their level of evidence (I or II) and by the strength of evidence (A, B or C). Grade A recommendations indicated that a clinically important benefit was shown in one or more RCTs.

Patellofemoral pain syndrome.

Therapeutic ultrasound (1 RCT, n=29): there was no difference in pain between patients treated with therapeutic ultrasound and those treated with ice alone.

Postsurgery knee pain.

Post-operative exercises (1 RCT, n=20): there was no difference on the knee rating scale between the usual care and strengthening exercise groups at any time postsurgery.

Thermotherapy (1 RCT, n=45): there was no difference after 1 week of therapy between cold packs and no cold pack therapy on the McGill Pain Scale for range of motion (ROM) or strength.

TENS (1 RCT, n=90): there was no significant difference between TENS and placebo for pain, ROM or muscle force.

Knee osteoarthritis. Therapeutic exercises (4 RCTs, n=318): pain relief was greater with strengthening exercises relative to untreated controls in 3 RCTs (n=293; WMD not reported, p<0.05). Pain relief was 38% greater with strength exercises relative to placebo in one RCT (n=201). Patient-assessed global disease activity was improved relative to control in 2 RCTs (n=268; relative risk not reported). There was no difference in functional status compared with controls in 3 RCTs. Compared with control, one RCT showed a benefit in function in patients doing repeated leg raises.

Thermotherapy (1 RCT, n=50): there was no evidence of benefit in patients who received ice massage compared with placebo.

Therapeutic ultrasound (1 RCT, n=74): less pain was reported in the therapeutic ultrasound group than the placebo group after 4 weeks of therapy, but the difference was not significant. There was no difference between the groups at 3 months.
TENS (7 RCTs, n=184): 3 RCTs (n=87) demonstrated a significant difference in the number of patients with pain improvement, relative to a control, after 1 month of therapy. Pain measured on the visual analogue scale was statistically significantly improved relative to placebo (5 RCTs; SMD not reported, p<0.05). Two RCTs demonstrated significant improvements in patient-assessed overall improvement, relative to placebo, at 1 month. One RCT demonstrated significant improvements in patient-assessed overall improvement, relative to placebo, at 3 months.

Electrical stimulation (1 RCT, n=30): no clinically important benefit was demonstrated in the patterned neuromuscular electrical stimulation group in comparison with the placebo stimulation group.

Tendinitis.

Massage (1 RCT, n=20): pain while running was not different between the group receiving massage and the group receiving no treatment.

Authors’ conclusions
This process has resulted in two clear recommendations of clinical benefit of TENS and exercise for knee osteoarthritis. There is currently a lack of evidence regarding whether to include or exclude the use of thermotherapy, therapeutic massage, electromyographic biofeedback, therapeutic ultrasound, electrical stimulation, and combined rehabilitation interventions in the daily practice of physical rehabilitation for knee pain.

CRD commentary
Overall, the methodological quality of this systematic review was good. The authors posed a suitable review question, and the inclusion and exclusion criteria were well reported. The search was comprehensive, although some important studies may have been missed by restricting inclusion by language and by not searching for unpublished studies. The authors did not explore the possibility of publication bias in a funnel plot. The study selection, data extraction and quality assessment were appropriately carried out by two reviewers independently. Although a quality assessment was undertaken using a validated scale, the results did not appear to have been used particularly well. The authors chose to base clinical recommendations on a hierarchy of evidence.

The authors used an appropriate method to pool the studies. However, where forest plots were presented, the WMDs and SMDs were not reported in the diagrams or in the text. Heterogeneity was explored using the chi-squared test and, when found, the data were recalculated using a random-effects model. The authors could have explored the differences between the studies in more detail.

The authors’ conclusions follow from the results presented, but should be viewed with caution due to the stated methodological limitations.

Implications of the review for practice and research
Practice: The authors outlined the following guidelines for clinical practice.

Patellofemoral pain syndrome: there is poor evidence to include or exclude therapeutic ultrasound alone as an intervention for knee pain.

Postsurgery knee pain: there is poor evidence to include or exclude post-operative exercises alone, cryotherapy (as an adjunct intervention), and TENS alone as interventions after knee surgery.

Knee osteoarthritis: there is good evidence to include strengthening, stretching and functional exercises alone, and TENS alone as interventions for knee osteoarthritis pain. There is poor evidence to include or exclude ice massage alone, therapeutic ultrasound alone, and electrical stimulation alone as interventions for knee osteoarthritis pain.

Tendinitis: there is poor evidence to include or exclude deep friction massage alone as an intervention for iliotibial band syndrome.
Research: The authors stated that ‘an enormous research effort is needed to conduct RCTs for almost every rehabilitation intervention for knee pain. This situation is critical compared with the growing knee research area. There is a pressing need for further work on other rehabilitation interventions for knee pain... Furthermore, these trials need to use standardised and validated outcomes, describe the intervention and it characteristics, and consider evaluating subgroups of particular interest’.

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