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## Exercise and chronic low back pain: what works?

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### CRD summary

This review investigated the type and quality of exercise interventions offered to patients with chronic low-back pain (CLBP). The authors concluded that exercise had a positive effect on CLBP patients, and these positive effects were generally well maintained at follow-up. The conclusions seem to follow logically from the well-reported evidence; however, unpublished studies might have been missed.

### Authors' objectives

To investigate the type and quality of exercise interventions offered to patients with chronic low-back pain (CLBP), and to identify characteristics essential to achieve and maintain successful results.

### Searching

MEDLINE, CINAHL, ProQuest, PEDro, ISI Web of Science, the Cochrane CENTRAL Register and PubMed were searched from 1990 to 2002 for studies in English and other languages; the search terms were reported. The reference lists of trials, review articles and meta-analyses were checked, and relevant journals were searched manually.

### Study selection

#### Study designs of evaluations included in the review

Only randomised controlled trials (RCTs) with at least 10 patients per treatment group were eligible for inclusion. Studies were excluded from the review if they used the alternate allocation method of randomisation, or were of a low methodological quality (see On What Criteria was the Validity of Primary Studies...).

#### Specific interventions included in the review

Studies using exercise, either alone or in combination, as the primary intervention were eligible for inclusion in the review.

#### Participants included in the review

Studies conducted with male or female patients aged 16 to 74 years were eligible for inclusion. Trials including patients with spondylosis or spondylolisthesis were eligible only if the degree of slip was two or less. Trials were ineligible if they included patients with fibromyalgia or patients with possible serious spinal pathology.

#### Outcomes assessed in the review

Studies were eligible for inclusion if they evaluated at least three of the five relevant outcomes: back-specific function, generic health status, pain, work disability and satisfaction with care or treatment outcome.

#### 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 authors used quality criteria scales designed in 1997 by van Tulder, as recommended by the Cochrane Collaboration Back Review Group for Spinal Disorders. After slight adaptation, 10 items assessed internal validity, six assessed descriptive quality and two assessed statistical validity, giving a maximum score of 18 points. Trials were considered to be of high quality if they met at least 70% of the total methodological criteria and attained an internal validity score of at least 6 out of 10. Medium-quality trials met at least 50% of the methodological criteria and had an internal validity score of at least 5 out of 10. Low-quality trials also met at least 50% of the methodological criteria but had an internal validity score of less than 5. Trials of low methodological quality were then excluded from the review. Two reviewers independently assessed the methodological quality of the studies. One was blinded to the authors,

institution and journal, and the other performed the literature search. Any disagreements were resolved by consensus with a third reviewer.

### **Data extraction**

The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Data were extracted on the type of exercise intervention, using the broad categories of strengthening/flexibility, aerobic/strengthening, aerobic, multimodal, hydrotherapy, and other exercise. The quality of the exercise intervention was also extracted using the American College of Sports Medicine guidelines for exercise dose. Information on the supervision, compliance and follow-up in each trial were also extracted, and the effectiveness of the intervention was collected. An intervention was considered to be positive if there was a significant difference ( $P < 0.05$ ) before and after treatment.

### **Methods of synthesis**

#### **How were the studies combined?**

Studies deemed to be of a high or medium methodological quality were combined in a narrative.

#### **How were differences between studies investigated?**

The studies were grouped according to the predominant exercise administered as the intervention and the type of strengthening exercise. The differences between the studies were also assessed through tabulation of the results. The results from those trials with low methodological quality were also taken into account, to determine whether trial quality correlated with treatment outcome.

### **Results of the review**

A total of 51 RCTs met the inclusion criteria and were scored for methodological quality. Of these, 21 were excluded because of low methodological quality and 14 were excluded for other reasons; these reasons were not reported, but are available from the authors. Therefore, a total of 16 RCTs with 1,730 participants were included in the review. The median sizes of the control and intervention groups were 42 and 43, respectively.

Exercise was found to have a positive impact in all of the 16 RCTs, and the positive effects were generally maintained at follow-up. Nine of these RCTs (56%) reported a positive difference between the treatment groups, while the remaining 7 RCTs (44%) reported no difference between treatment groups. It was noted that trials that used a waiting-list, advice or electrotherapy as a control group reported more positive effects between the treatment groups. Those trials reporting no differences between treatment groups more commonly used an exercise-based control group. Of the 21 trials of low methodological quality that were excluded, 17 (81%) reported positive effects between the treatment groups.

A total of 12 RCTs used predominantly strengthening exercise interventions, two thirds of which were of high exercise quality, and 10 of these 12 RCTs maintained positive results at follow-up. It was found that a wide variety of outcome measures were used in the trials. Supervision and adequate compliance were common. The main shortcomings of the RCTs were a lack of patient blinding, a lack of relevant outcome measures, unacceptable levels of drop-out (greater than 10%) and no intention-to-treat analysis.

### **Authors' conclusions**

Exercise had a positive effect on patients with CLBP, and these positive effects were generally well maintained at follow-up.

### **CRD commentary**

The review question was clear in terms of the intervention, study designs, patients and outcomes of interest. Several

relevant electronic databases, reference lists and journals were searched. The search strategies were reported and no language restrictions were applied. However, unpublished studies were not sought and the potential for publication bias was not evaluated. It was not reported how the studies were selected for inclusion in the review or how the data extraction was performed; this means that errors and reviewer bias may be present. Adequate details of the individual studies were presented.

A thorough assessment of the quality of the included studies was performed. The conclusions were based on the studies deemed to be of high or medium methodological quality; a narrative synthesis of these studies was presented, which seemed appropriate given the nature of the data. The authors' conclusions seem to follow logically from the evidence presented, although there was a potential for publication bias.

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

**Practice:** The authors did not state any implications for practice.

**Research:** More high-quality trials, using more appropriate outcome measures, are needed to assess the role of supervision and follow-up.

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