Graded activity and graded exposure for persistent nonspecific low back pain: a systematic review

Macedo LG, Smeets RJ, Maher CG, Latimer J, McAuley JH

CRD summary
The authors concluded that graded activity was slightly more effective than minimal intervention, but not more effective than other forms of exercise in short-term and intermediate-term treatment of persistent non-specific low back pain. Limited evidence suggested that graded exposure was as effective as minimal treatment or graded activity. This generally well-conducted review reflects the limited evidence available.

Authors' objectives
To assess the effectiveness of graded activity and graded exposure interventions for the treatment of persistent non-specific low back pain.

Searching
MEDLINE, CINAHL, PsycINFO, PEDro and EMBASE were searched, with no language restrictions, up to February 2009. Citations were traced using the Web of Knowledge. The International Clinical Trials Registry (World Health Organisation) and the Cochrane Central Register of Controlled Trials were also searched. Search terms were reported. Reference lists of relevant articles and previous reviews were searched manually. Experts were contacted to identify grey literature and articles in press.

Study selection
Randomised controlled trials (RCTs) and quasi-RCTs were eligible for inclusion if they compared the effectiveness of graded activity or graded exposure interventions (as defined in the review) versus placebo, no treatment, or another active treatment or persistent (more than six weeks in duration or recurrent) non-specific low back pain (with or without leg pain). Other active treatments could include the addition of graded activity or graded exposure to another intervention. The outcomes of interest were pain, disability, global perceived effect, recurrence, and return to work.

In included trials, patients were aged between 18 and 80 years and were recruited using various sources (where reported). The duration of non-specific low back pain ranged from at least six weeks to at least six months. Graded activity was compared with minimal intervention (usual care, waiting list, sham exercise, advice to stay active, or care by a general practitioner), another form of exercise (motor control, high-intensity back school, general physical therapy exercises, active physical treatment, or physical therapy according to guidelines), and graded exposure. Interventions were provided by physical therapists, psychologists, and social workers. Outcomes were measured using various questionnaires.

Two reviewers screened studies for inclusion and any disagreements were referred to a third reviewer.

Assessment of study quality
Two reviewers assessed trial quality according to the PEDro scale, with trials receiving a score between zero and 10. Discrepancies were referred to a third reviewer.

Data extraction
Two reviewers independently extracted or calculated mean scores and standard deviations (SDs) for short-term (under three months after randomisation), intermediate-term (three months up to 12 months) and long-term follow-up (12 months or more after randomisation). Scores for pain, disability, and global perceived effect were converted to a scale from zero to 100. Where more than one outcome measure was used to assess pain, disability and work status, the measure reported as the primary outcome measure was used. Primary authors were contacted for further information, where necessary.

Methods of synthesis
A fixed-effect model (or random-effects model where there was evidence of statistical heterogeneity) was used to combine trials and calculate weighted mean differences (WMDs). Results were presented by outcome and follow-up duration. Heterogeneity was assessed using $I^2$.

**Results of the review**

Fifteen trials were included in the review (n=1,654 patients, range six to 299); 13 were RCTs (one factorial design) and two were cross-over trials. The median quality score was 6 (range 3 to 9). Patients were blinded in only one trial. Twelve trials were comparable at baseline. Ten trials had concealed allocation, intention-to-treat analysis, and adequate follow-up.

**Graded activity versus minimal intervention** (seven RCTs): Small but significant benefits were reported for graded activity on pain (WMD -6.2 points, 95% CI -9.4 to -3.0; six trials) and disability (WMD -6.5 points, 95% CI -10.1 to -3.0; six RCTs) in the short term. Similar benefits were reported graded activity on pain ((WMD -5.5 points, 95% CI -9.9 to -1.0; four trials) and disability (WMD -3.9 points, 95% CI -7.4 to -0.4; four RCTs) in the intermediate term. No significant benefits were seen in the long term for pain and disability. No differences were found in the short term for global perceived effect.

**Graded activity versus other forms of exercise** (six RCTs): There were no statistically significant differences for pain, disability, or global perceived effect in the short, intermediate or long term.

**Graded exposure versus graded activity** (two RCTs, two cross-over trials): There were no statistically significant differences for pain and disability in the short term (two RCTs).

**Graded exposure versus minimal intervention** (two RCTs): There were no statistically significant differences for pain or disability in the short term.

Findings for return to work were reported in the review.

**Authors’ conclusions**

The available evidence suggested that graded activity was slightly more effective than minimal intervention, but not more effective than other forms of exercise on pain, disability, and global perceived effect in the short and intermediate term in patients with persistent non-specific low back pain. The limited evidence suggested that graded exposure was as effective as minimal treatment or graded activity.

**CRD commentary**

The review question and supporting inclusion criteria were clearly stated. A comprehensive literature search was undertaken with no language restrictions. However, publication bias was not formally assessed. Each stage of the review process was performed in duplicate, reducing the possibility for reviewer error and bias.

Trial quality was assessed using previously published criteria, but the quality was generally low; this was acknowledged by the authors. The authors also acknowledged the heterogeneity among trials; there was evidence of some statistical heterogeneity, as a random-effects model was used for some comparisons. Therefore, it was unclear whether pooling of the trials was appropriate. Sample sizes were small for some trials; comparisons of graded exposure included only a small number of trials.

This was a generally well-conducted review and the authors’ conclusions appear to reflect the available evidence.

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

**Practice**: The authors stated that the statistically significant effect sizes were small and may not be clinically meaningful.

**Research**: The authors stated that higher quality trials are needed to assess return to work and compensation, particularly in patients with greater fear behaviours. Cost-effectiveness studies are also required.
Funding
One author had a PhD scholarship funded by the University of Sydney and the Australian Government. Two authors had research fellowships funded by Australia's National Health, Medical Research Council and the Australian Research Council.

Bibliographic details

PubMedID
20395306

DOI

Original Paper URL
http://ptjournal.apta.org/content/90/6/860.abstract

Indexing Status
Subject indexing assigned by NLM

MeSH
Exercise Therapy /methods; Humans; Low Back Pain /rehabilitation; Outcome and Process Assessment (Health Care); Physical Therapy Modalities; Randomized Controlled Trials as Topic

AccessionNumber
12010005412

Date bibliographic record published
23/02/2011

Date abstract record published
14/09/2011

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.