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Systematic review

The effectiveness of physiotherapy functional restoration for post-acute low back pain: A systematic review

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ABSTRACT

Background: The effectiveness of multidisciplinary treatment for post-acute (>6 weeks) low back pain (LBP) has been established. Physiotherapists have sufficient training to conduct less intensive functional restoration. The effectiveness of physiotherapy functional restoration (PFR) has not been evaluated using current systematic review methodology.
Objectives: To determine the effects of PFR for post-acute LBP.
Data sources: Electronic databases searched include: MEDLINE, EMBASE, CINAHL, PsycINFO, PEDro and Cochrane CENTRAL.
Trial eligibility criteria: Randomised controlled trials of physiotherapy treatment for post-acute LBP combining exercise and cognitive-behavioural intervention compared with other intervention, no intervention or placebo.
Trial appraisal and synthesis methods: Two authors independently extracted data. Risk of bias was assessed using the PEDro scale and overall quality of the body of evidence was assessed using GRADE (Grading of Recommendations, Assessment, Development and Evaluation). Treatment effect sizes and 95% confidence intervals were calculated for pain, function and sick leave.
Results: Sixteen trials were included. Heterogeneity prevented meta-analysis for most comparisons. Meta-analyses showed moderate to high quality evidence of significant but small effects favouring PFR compared with advice for intermediate term function and intermediate and long term pain. There was however low to moderate quality evidence that PFR was no more effective than a range of other treatment types. Heterogeneous trials frequently contributed to very low quality evidence.
Conclusions: Moderate to high quality evidence was found of small effects favouring PFR compared with advice. Preliminary evidence suggested PFR is not different to other treatment types. Further high quality research is required replicating existing trial protocols.

1. Introduction

The high prevalence (Walker et al., 2004) and burden (Dagenais et al., 2008) of low back pain (LBP) is well established. The condition is typically characterised by recurrent episodes of pain (Stanton et al., 2009), with most sufferers experiencing persistent problems at 12 months (Hestbaek et al., 2003). Most of the societal costs, estimated to be at least $US100 billion annually (Katz, 2006), are due to post-acute LBP (Maetzel and Li, 2002; Dagenais et al., 2008) which can be defined as pain of at least six weeks duration (Hartigan et al., 1996).

Psychosocial distress negatively impacts the course of LBP (Hayden et al., 2009) and the comorbidity of such distress and LBP ranges from 28% to 36% (von Korff et al., 2005; Leijon and Mulder, 2009; Australian Institute of Health and Welfare, 2010). Functional restoration addresses the physical, psychological and social dimensions of LBP (Poiraudeau et al., 2007) via "a multimodal pain management program that employs a comprehensive cognitive-behavioural treatment orientation to help patients better cope with, and manage their pain…while undergoing the sports medicine physical approach to correct functional deficits" (Mayer et al., 1985). Multidisciplinary functional restoration has demonstrated

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moderate effect sizes for the outcomes of pain, function and work status in post-acute LBP (Chou and Huffman, 2007; Poiraudeau et al., 2007; van Geen et al., 2007; Norlund et al., 2009) and is recommended for this population in clinical guidelines (Koes et al., 2010). However, multidisciplinary programs are perceived to be more expensive and less accessible compared with those provided by a single discipline (Karjalainen et al., 2001; van Geen et al., 2007; Gatchel and Mayer, 2008).

Physiotherapists are trained in the assessment and management of post-acute LBP using exercise and cognitive-behavioural strategies (Bekkering et al., 2003; van der Windt et al., 2008). There has been no systematic review published using current best practice methodology (Furlan et al., 2009) specifically evaluating the effectiveness of functional restoration provided by physiotherapists. Existing reviews have included trials of both physiotherapy and multidisciplinary interventions without separate evaluation (George, 2008; Macedo et al., 2010; Schaafsma et al., 2010). Another review (Bunzli et al., 2011) only included trials evaluating operant conditioning (a specific type of cognitive-behavioural approach) as provided by physiotherapists and did not use current systematic review methodology including the presentation of effect sizes. Therefore, the aim of this systematic review was to evaluate the effectiveness of physiotherapy functional restoration (PFR) for post-acute LBP using the GRADE (Grading of Recommendations, Assessment, Development and Evaluation) approach.

2. Methods

2.1. Data sources and searches

One reviewer (MR) performed a computerised search (Appendix A) for relevant trials. Searches were conducted to 31/12/2011 in MEDLINE (Ovid 1950-), EMBASE (Ovid 1980-), PsycINFO (Ovid 1806-), CINAHL (Ebsco 1982-), Cochrane Central Register of Controlled Trials (CENTRAL) and Physiotherapy Evidence Database (PEDro). Search terms for randomised controlled trials (RCT) and LBP were used as recommended by the Cochrane Back Review Group (2008), and experiential studies (Wong et al., 2006; Zhang et al., 2006). Cognitive-behavioural and exercise search terms were determined by the authors with guidance from a previous review (Schonstein et al., 2003). Bibliographies of related reviews and trials were searched for relevant studies. Grey literature was not searched.

2.2. Trial selection

Two reviewers (MR, SS) independently screened titles and abstracts. Full texts of all trials included by at least one reviewer were obtained and both reviewers (MR, SS) independently applied the exclusion criteria. A third reviewer (JF) was available to resolve any disagreements regarding eligibility and provided translation of German text. No other language translation was required. Full selection criteria are provided in Appendix D.

2.2.1. Participants

Trials with participants aged $\geq$18 years with LBP of $>$6 weeks duration were included. If a trial had a mixed sample, it was required to have $\geq$70% of participants experiencing LBP $>$6 weeks duration to be included. Trials were excluded where participants had diagnosed serious or non-mechanical pathologies.

2.2.2. Interventions

Only physiotherapy programs with both exercise and cognitive-behavioural components without invasive techniques or significant levels of passive intervention were included. Included trials either described a clear cognitive-behavioural approach (Henschke et al., 2010) or used the following terms: psychological, cognitive, behavioural, relaxation, operant, social, coping, respondent or counselling. Functional restoration requires at least moderate amounts of practitioner contact time (Poiraudeau et al., 2007), therefore trials were only included if they utilised at least 3 hours of total intervention time or a minimum of ten sessions.

2.2.3. Outcomes

Outcomes of interest included pain, function and sick leave (Deyo et al., 1998; Bombardier, 2000; Kent and Keating, 2008). Where a trial used multiple measures of pain, function or sick leave, the primary outcome measure was used (Macedo et al., 2010).

2.3. Data extraction and risk of bias assessment

Two reviewers (MR, SS) independently extracted and recorded data using a previously developed standardised computer spreadsheet (Hahne et al., 2010; Slater et al., 2012; Surkitt et al., 2012). Data extracted included trial setting, sample characteristics, interventions, comparisons, outcomes and adverse events. Missing data were either requested from the authors or calculated using the methods described in the Cochrane Handbook (Higgins et al., 2011).

Follow-up periods were categorised as short term (less than 3 months after randomisation), intermediate term (3 months up to 12 months), and long term (12 months or more) (van Tulder et al., 2003). Where a trial presented the same outcome more than once within a follow-up period, the earliest outcome was presented (Hayden et al., 2005), except for varying results in which case all outcomes were presented.

The reviewers independently assessed risk of bias using the PEDro Scale (Maher et al., 2003) (Table 1), shown to have sufficient validity (de Morton, 2009) and reliability (Maher et al., 2003). Trials that fulfilled $\geq$6 of 10 criteria were judged to have high methodological quality (Maher, 2000). Recommended criteria (Higgins et al., 2011) were used to evaluate clinical relevance including assessment of minimal clinically important difference (Table 1).

2.4. Data synthesis and analysis

Effect sizes were reported in line with suggested recommendations for systematic reviews (Higgins et al., 2011). Hedges adjusted-g standardised mean difference (SMD) (Hedges and Olkin, 1985) was used to calculate the treatment effect and 95% confidence interval (CI) for continuous outcomes. The SMD is the difference in mean outcome between groups divided by the pooled standard deviation (SD) of the outcome among participants (Higgins et al., 2011). Positive treatment effects for PFR were assigned positive SMD values, with 0.2, 0.5 and 0.8 representing small, moderate and large effect sizes respectively (Cohen, 1988). Relative risk (RR) and 95% CI were calculated for each dichotomous variable (Herbert, 2000) and standardised such that RR $>$1 indicated an increased risk of the event occurring in the PFR group relative to the comparison group. When unavailable, data were calculated from median values, mean change, graphical data, standard error (Hozo et al., 2005), baseline SD (Higgins et al., 2011) or from other trials within the review utilising the same outcome measure (Furlan et al., 2009).

Pooling of data in a meta-analysis using computer software Revman 5.1 (2011) was planned if $\geq$2 trials were evaluated as clinically homogenous (similar participant, intervention, outcome and comparison characteristics). When clinically homogenous trials were identified they were assessed for statistical heterogeneity (Higgins et al., 2011), which was considered likely if p-values of $<$0.1 were obtained on the χ^2 test or if the I^2 statistic was $>$25%