



# Systematic review

## Physiotherapeutic interventions before and after surgery for degenerative lumbar conditions: a systematic review

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### Abstract

**Background** Physiotherapeutic management of patients immediately following lumbar spinal surgery is common. However, there is considerable variability in the interventions provided.

**Objectives** To assess the effect of peri-operative physiotherapeutic intervention in adults undergoing surgery for the management of degenerative lumbar conditions.

**Data sources** The Cochrane Library, Medline, Embase, CINAHL and PEDro were searched from inception to August 2012.

**Study selection** Randomised controlled trials investigating physiotherapeutic interventions prior to and immediately following surgery for degenerative lumbar conditions were included.

**Data extraction and synthesis** Two reviewers extracted data independently using a standardised form. Risk of bias was assessed using a modified version of the Cochrane Collaboration tool. The quality of evidence was assessed using the GRADE approach, and the treatment effect size was calculated where comparable outcome measures were used across multiple trials.

**Results** Four studies were included. There is very-low-quality evidence that pre- and post-operative exercise in addition to standard physiotherapeutic care may reduce pain, time taken to achieve post-operative functional milestones, and post-operative time off work. Results from one study indicated that there is no clear benefit or risk of harm from performing either prone or side-lying transfers.

**Conclusion and implications of key findings** Very-low-quality evidence suggests that physiotherapy may improve pain and function following lumbar surgery. Due to low numbers of included studies and variation in the interventions assessed, the current evidence provides limited guidance for physiotherapeutic practice. Further research is required to determine the effectiveness of physiotherapeutic interventions in this population.

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**Keywords:** Systematic review; Physiotherapy; Rehabilitation; Spinal fusion; Discectomy; Laminectomy

### Introduction

Low back pain is the most common cause of disability globally [1]. In Australia, up to 80% of people experience low back pain at some point in their lifetime [2], with approximately 14% experiencing pain for 6 months or longer [3]. Where conservative management of degenerative lumbar conditions including lumbar disc disease, spinal stenosis and spondylolisthesis is not successful in managing pain

and reducing disability, surgery may be recommended. The rate of spinal fusion surgery in Australia increased by 175% between 1997 and 2006 [4]. A similar increase of 111% was demonstrated in the USA between 1998 and 2008, with an associated 3.3-fold increase in total hospital charges and a 7.9-fold increase in total expenses [5].

In the inpatient setting, physiotherapeutic intervention following lumbar surgery is aimed at both facilitating safe discharge from hospital and promoting post-operative functional recovery. A survey of UK physiotherapists working with patients following lumbar disc surgery [6] found that the majority of patients received post-operative physiotherapy, starting on the day after surgery. There was considerable variability in the interventions provided, and

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five main themes of treatment were identified: mobilising patients; spinal range of motion exercises; stability exercises; neural mobility exercises; and advice and education. This variability in post-operative management of spinal patients has also been demonstrated amongst UK spinal surgeons, with inconsistencies in patient mobilisation, restrictions, advice and rehabilitation [7]. Williamson *et al.* [6] reported that the most common component of physiotherapeutic intervention was to mobilise patients to ensure safe discharge. While this survey was targeted at physiotherapeutic management following lumbar disc surgery, it would be expected that physiotherapeutic intervention following surgery for the management of degenerative lumbar spinal stenosis and spondylolisthesis would have a similar focus of achieving functional goals to ensure safe discharge.

There is a lack of published information regarding the standard provision of physiotherapy prior to lumbar surgery. There is evidence that physiotherapeutic intervention in the form of exercise, advice and education occurs prior to joint replacement surgery [8], cardiac surgery [9] and thoracic surgery [10], and it is likely that pre-operative physiotherapy forms part of routine care prior to lumbar surgery in many hospitals.

Variability in the provision of outpatient physiotherapeutic intervention following lumbar disc surgery has also been demonstrated, with less than half of the centres surveyed routinely referring patients on to outpatient services [6]. As a result, intervention provided by the inpatient physiotherapist, including mobility and functional task training, exercise prescription, and advice and education, may play a significant role in aiding patients' return to work and normal activity, in turn reducing the financial impact of surgery and improving quality of life.

To the authors' knowledge, no systematic reviews evaluating the effects of physiotherapeutic management of patients undergoing lumbar surgery, specific to the pre- or post-operative inpatient setting, have been published to date. A review of the evidence for physiotherapeutic management of patients undergoing spinal surgery is required to guide practice in the peri-operative inpatient setting. It is intended that this information will assist in the design of effective physiotherapy programmes, assist in the selection of patients who may benefit from a specific intervention, and identify interventions that may lead to adverse events. In the current environment of increasing budgetary and resourcing constraints, combined with the need for all health interventions to have a strong evidence base, this information will assist physiotherapists and health management to allocate resources to patient populations that will gain the greatest benefit.

### Objectives

The aim of this review was to assess the effect of physiotherapeutic intervention in adults undergoing surgery for the management of degenerative lumbar conditions. The research questions underpinning this review were:

1. Does peri-operative physiotherapy for patients undergoing lumbar spine surgery improve outcomes in the immediate post-operative period?
2. What specific physiotherapeutic interventions have been studied?

All interventions performed by a physiotherapist either pre-operatively (where the intervention was directly relevant to the surgery) or post-operatively in the inpatient setting were considered.

### Materials and methods

This review included randomised controlled trials and pseudo (quasi) randomised controlled trials of patients who had undergone surgery for degenerative lumbar conditions and were aged  $\geq 18$  years. There were no restrictions on type or duration of pre-operative symptoms, or type of surgery. Trials that included surgery for the management of lumbar fractures, tumours, synovial cysts and scoliosis/defect correction were excluded.

Pre-operative interventions in the inpatient or outpatient setting were included where the intervention was directly relevant to the surgery. All interventions performed post-operatively by a physiotherapist in the acute inpatient setting were included where: (1) the intervention was restricted to the inpatient setting alone – ongoing outcome measurement could occur in the outpatient or community setting; or (2) the intervention continued from the inpatient into the outpatient or community setting, but results from the inpatient phase could be analysed independently. Outcome measurement must have occurred either on discharge from hospital or prior to the commencement of any outpatient or community input.

Measures that assessed change in pain and other symptoms, back-specific and general functional status, and quality of life were included in this review. Patient satisfaction with treatment and adverse events were also reported [11].

### Search methods

The search strategy recommended by the Editorial Board of the Cochrane Back Review Group [11] was used, with additional search terms for physiotherapeutic intervention, spinal pathology and spinal surgery (available, on request, from corresponding author). The following databases were searched from inception to the end of August 2012: the Cochrane Library, Medline, Embase, CINAHL and the Physiotherapy Evidence Database (PEDro).

Studies not written in English were excluded. Reference lists of included studies were screened for relevant studies.

### Data collection and analysis

Two reviewers (SJG, JAM) completed each stage of study selection and data extraction independently. Any

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