

REVIEW ARTICLE (META-ANALYSIS)

Physiotherapy Commenced Within the First Four Weeks Post—Spinal Surgery Is Safe and Effective: A Systematic Review and Meta-Analysis



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Abstract

Objectives: To determine whether physiotherapy commenced within the first 4 weeks post—spinal surgery is safe and effective.

Data Sources: Electronic databases CINAHL, MEDLINE, AMED, PubMed, Embase, and PEDro were searched from the earliest date possible through May 2015. An additional trial was identified through reference list scanning.

Study Selection: Controlled trials evaluating comprehensive physiotherapy rehabilitation commenced within 4 weeks postoperatively compared with a control group receiving no physiotherapy, standard postoperative care, rest, less active physiotherapy, or sham physiotherapy after spinal surgery of a musculoskeletal etiology. Two reviewers independently applied inclusion and exclusion criteria, with disagreements discussed until consensus could be reached. Searching identified 3162 potentially relevant articles, of which 4 trials with 250 participants met the inclusion criteria.

Data Extraction: Data were extracted using a predefined data extraction form. Methodological quality of trials was assessed independently by 2 reviewers using the Downs and Black checklist. Pooled analyses were performed using a random-effects model with inverse variance methods to calculate risk differences and 95% confidence intervals (CIs) (dichotomous outcomes), and standardized mean differences (SMDs) and 95% CIs (continuous outcomes).

Data Synthesis: When compared with no or sham physiotherapy, early comprehensive physiotherapy did not increase the risk of adverse events (risk difference, $-.01$; 95% CI, $-.07$ to $.05$; $I^2=0\%$). In addition, there is moderate-quality evidence demonstrating a reduction in pain by a moderate and significant amount at 12 weeks (SMD = $-.38$; 95% CI, $-.66$ to $-.10$; $I^2=0\%$) and at 12+ months (SMD = $-.30$; 95% CI, $-.59$ to $-.02$; $I^2=0\%$).

Conclusions: Early comprehensive physiotherapy commenced within the first 4 weeks post—spinal surgery does not increase the potential for an adverse event and leads to a moderate, statistically significant reduction in pain when compared with a control group.

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Back pain is an extremely common condition with 1 year incidence rates of up to 36% for any episode of low back pain.¹ Although between 54% and 90% of episodes of acute low back pain resolve within a year, recurrence rates can be high.¹ Low back pain is the primary cause of physical activity limitation and work absence throughout the world, resulting in high costs to individuals, communities, and health care organizations.²

A small subgroup of this population, less than 5%, is diagnosed with a disk herniation as the cause of their back pain and radiculopathy.³ Low back pain and radiculopathy can be treated with a

variety of modalities including conservative measures such as education and exercise delivered by a physiotherapist.⁴ Physiotherapists are involved in the promotion of health and fitness to reduce the risk or assist in the prevention of functional decline and disability in patients with impairments, and activity and participation restrictions.⁵ Interventions may include, but are not limited to, education, therapeutic exercise, and functional retraining.⁵

However, if conservative measures fail, spinal surgery may be required.⁶ Surgical techniques in the management of lumbar disk herniation have evolved from an open discectomy to a microdiscectomy.⁷ Microdiscectomy is considered the criterion standard of surgical management for confirmed disk herniation^{6,8,9} because it involves reduced muscular dissection, reduced

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operative time, smaller incisions, improved spinal stability, and quicker return-to-work rates.^{6,10,11} Reduced trauma to the tissues promotes early ambulation, reduced acute length of stay, and an early return to premorbid activities.¹² It is reported that 78% to 95% of patients will improve postsurgery, and an estimated 3% to 12% will have recurring symptoms.¹³ Many of those with recurring symptoms will require further surgery.¹³

Surgery has proven success rates in the early postoperative period; however, longer-term results are less positive.¹³ It is reported that 25% of patients have persistent postoperative symptoms after first-time spinal surgery for the management of disk protrusion.¹⁴ Persistent complaints can include pain, muscular deficits, reduced functional capacity, and work absence.¹⁵ Postoperative spinal stability is affected by reduced motor control, muscular atrophy, especially of the lumbar and abdominal muscles, and scar tissue.^{14,16,17} Physical functioning after surgery for a lumbar disk herniation is not always regained.¹⁸ Physiotherapy, exercise therapy, and dynamic lumbar stabilization exercises are a vital component to a person's restoration of function.¹⁸ Patients may achieve a greater recovery if dynamic stabilization exercises are incorporated into their postoperative management.^{6,14,16,18,19}

After spinal surgery, surgeons typically place restrictions for 6 weeks on the following activities: bending, twisting, sitting endurance, lifting, and driving. Typically, recommendations are provided to gradually return to premorbid levels of activities within the home and community.^{13,19} Some authors report that activity does not need to be restricted postoperatively,^{15,20} and removal of these restrictions may permit an earlier return to work with no increase in adverse events.²¹ Often, patients are not seen by outpatient physiotherapists until at least 4 to 6 weeks postsurgery. However, early physiotherapy can provide education, monitoring of compliance to postoperative precautions, progression of home exercise program to avoid deconditioning, behavioral monitoring for fear avoidance, and promotion of longer-term self-management including functional goal-setting. Early comprehensive physiotherapy rehabilitation achieves physical and functional improvements through education and participation in exercise, of which the latter is a core component in the promotion of self-management.²²

Currently, there are no definitive recommendations for the postoperative management of patients after spinal surgery regarding activity restriction,²¹ exercise therapy,^{6,15} or which patients should receive postoperative intervention.¹³ Therefore, patients may receive conflicting recommendations about postoperative restrictions and returning to activities. Early comprehensive physiotherapy may be beneficial to reinforce restrictions and safely guide a gradual return to premorbid household, leisure, and participation activities. Rehabilitation provides a supportive environment for patients to combat their fears regarding pain and functional behaviors,^{14,15} and improves short-term pain and disability.¹³

The literature largely recommends commencement of exercise programs 4 to 6 weeks post—spinal surgery to improve short-term outcomes.^{13,15,18,20} A recent Cochrane review¹³ reported low-quality evidence that exercise programs commenced 4 to 6 weeks postsurgery lead to faster improvements in pain and disability. This is in line with guidelines that physiotherapy should not commence

until after the surgeon review at 4 to 6 weeks, but it does not answer the clinical question of whether the early commencement of physiotherapy is safe and beneficial post—lumbar disk surgery. The Cochrane review included a subgroup that commenced early physiotherapy but was unable to complete meta-analyses. Therefore, the aim of this review is to determine whether early comprehensive physiotherapy rehabilitation commenced before 4 weeks post—spinal surgery is safe and effective, as measured by adverse events and pain, when compared with a control group.

Methods

This systematic review was conducted and reported with reference to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for high-quality reporting of systematic reviews and meta-analyses²³ and has been registered in the PROSPERO database (registration no. CRD 42014013462).

Identification and selection of trials

A search strategy was developed to identify articles relevant to physiotherapy and spinal surgery (appendix 1). From the earliest available date until May 2015, the following electronic databases were searched: CINAHL, MEDLINE, AMED, PubMed, Embase, and PEDro. Manual searching of the reference lists of included studies and previously published reviews was also conducted to ensure all relevant studies were located. No language restrictions were applied. Two reviewers (M.S., C.L.P) independently applied the inclusion and exclusion criteria to the titles and abstracts of all identified studies. Any studies that did not meet the criteria were excluded. Any disagreements were resolved through discussion between the 2 reviewers. If consensus could not be reached, a third reviewer was consulted. When there was uncertainty whether the study met the inclusion criteria, full-text copies were obtained for detailed examination. The 2 reviewers then performed second-stage screening with discussion to reach a consensus.

Inclusion criteria

The studies needed to be controlled trials involving adult participants (aged >18y) who received early comprehensive physiotherapy (commenced within the first 4wk postoperatively) after elective spinal surgery for pathology of a musculoskeletal etiology. Early comprehensive physiotherapy could be compared with a control group that received no physiotherapy, standard postoperative care, rest, less active physiotherapy, or sham physiotherapy. Physiotherapy, as described by the American Physical Therapy Association, refers to “health care professionals who maintain, restore, and improve movement, activity and health enabling an individual to have optimal functioning and quality of life.”^{5(p2)} For the purpose of this review, comprehensive physiotherapy rehabilitation consists of active rehabilitation techniques including a combination of education on the performance of daily functional tasks, functional weight-bearing exercise, cardiovascular endurance exercise, lower limb strengthening, and dynamic proximal stabilization. In comparison, standard postoperative physiotherapy consists of education and the facilitation of transfers and mobilization for safe discharge.

Exclusion criteria

Trials were excluded if physiotherapy was commenced at or later than 4 weeks postoperatively or if spinal surgery was indicated

List of abbreviations:

CI	confidence interval
DRI	Disability Rating Index
RMQ	Roland Morris Questionnaire
SMD	standardized mean difference

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