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Is there a role for postoperative physiotherapy in degenerative cervical myelopathy? A systematic review

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Abstract

Objective: To review peer-reviewed literature relating to postoperative physiotherapy for degenerative cervical myelopathy (DCM), to determine efficacy in improving clinical outcome and recovery.

Data sources: MEDLINE, EMBASE, CENTRAL, PEDro, ISRCTN registry, WHO ICTRP and Clinicaltrials.gov. References and citations of relevant articles were searched.

Methods: A systematic search was conducted in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (PROSPERO CRD42016039511) from the origins of the databases till 15 February 2018. Included were all studies investigating physiotherapy as an intervention after surgical treatment of DCM to determine effect on clinical outcome and recovery. Study quality was determined using the Grades of Recommendation, Assessment, Development and Evaluation guidelines.

Results: In all, 300 records were identified through tailored systematic searches, after removing duplicates. After screening, only one investigated postoperative rehabilitation using physiotherapy for DCM; however, this was retrospective with no controls. This study suggested that rehabilitation including physiotherapy improved postoperative recovery. There are currently two registered trials investigating the use of postoperative physiotherapy for DCM.

Conclusions: The literature provides insufficient evidence to make any evidence-based recommendations regarding postoperative physiotherapy use in DCM.

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Introduction

Degenerative cervical myelopathy (DCM) is cervical spinal cord compression and dysfunction from spinal stenosis due to degeneration of the cervical spine (bone, joints, discs or ligaments). This includes cervical spondylotic myelopathy and ossification of the posterior longitudinal ligament. DCM is thought to be the leading cause of acquired spinal cord compromise.[1] As a degenerative pathology, its occurrence is associated with age, and therefore, its prevalence is expected to rise.[2] Symptoms are varied, ranging from mild pain to loss of digital dexterity, imbalance, frequent falls, incontinence and in some cases tetraplegia.

Physiotherapy is a standard of care following many neurological injuries including spinal cord injury as part of neurorehabilitation programmes.[3,4] It has been associated with improved functional outcomes in both acute and chronic spinal cord injury.[3,5–7] In DCM, it is used for non-operative management of mild cases and also to facilitate mobility and manage disability postoperatively.[8,9] Although a degree of functional recovery after surgical decompression is expected, this tends to be incomplete with patients retaining lifelong disabilities.[10–13] Physiotherapy may prove particularly beneficial in optimizing recovery when the cause of the spinal cord injury is removed by surgical decompression.[14]

In previous reviews of the literature on the surgical management of DCM, we identified much heterogeneity in the reporting of study design, sample characteristics and outcomes and proposed the development of a consensus minimum data set.[15,16] In this article, our primary objective was to review the evidence available for providing physiotherapy after surgical decompression in DCM. We also reviewed the surgical trials collated in our previous reviews to establish whether a standard for postoperative care exists.

Methods

Is there any evidence relating to postoperative physiotherapy in DCM?

A systematic search of MEDLINE [Ovid], EMBASE [Ovid], CENTRAL, PEDro, ISRCTN registry, World Health Organization (WHO) International Clinical Trials Registry Platform and Clinicaltrials.gov was conducted in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (PROSPERO CRD42016039511).[17] Databases were searched from their origin to 15 February 2018 using a tailored search strategy (Supplemental Material) for all studies investigating physiotherapy as an intervention after surgical treatment of DCM and concluding an effect on clinical outcome and recovery. Titles and abstracts were screened for relevance. References and citations of full-text articles were screened for additional eligible articles using Scopus. Two investigators (A.B. and B.M.D.) independently reviewed the full-text articles to apply the inclusion and exclusion criteria and came to agreement through discussion. Clinical studies of any design were included if participants suffering from DCM had undergone surgical decompression and were receiving postoperative physiotherapy. Articles were excluded if they were of non-English text, they contained no data on evaluation of the efficacy of postoperative physiotherapy or were studies of animals or cadavers. Study quality was determined using the Grades of Recommendation, Assessment, Development and Evaluation framework.[18]

Is there a standard for postoperative care in DCM surgical trials and does this include physiotherapy?

For our previous systematic review, a search of MEDLINE and EMBASE was completed using the

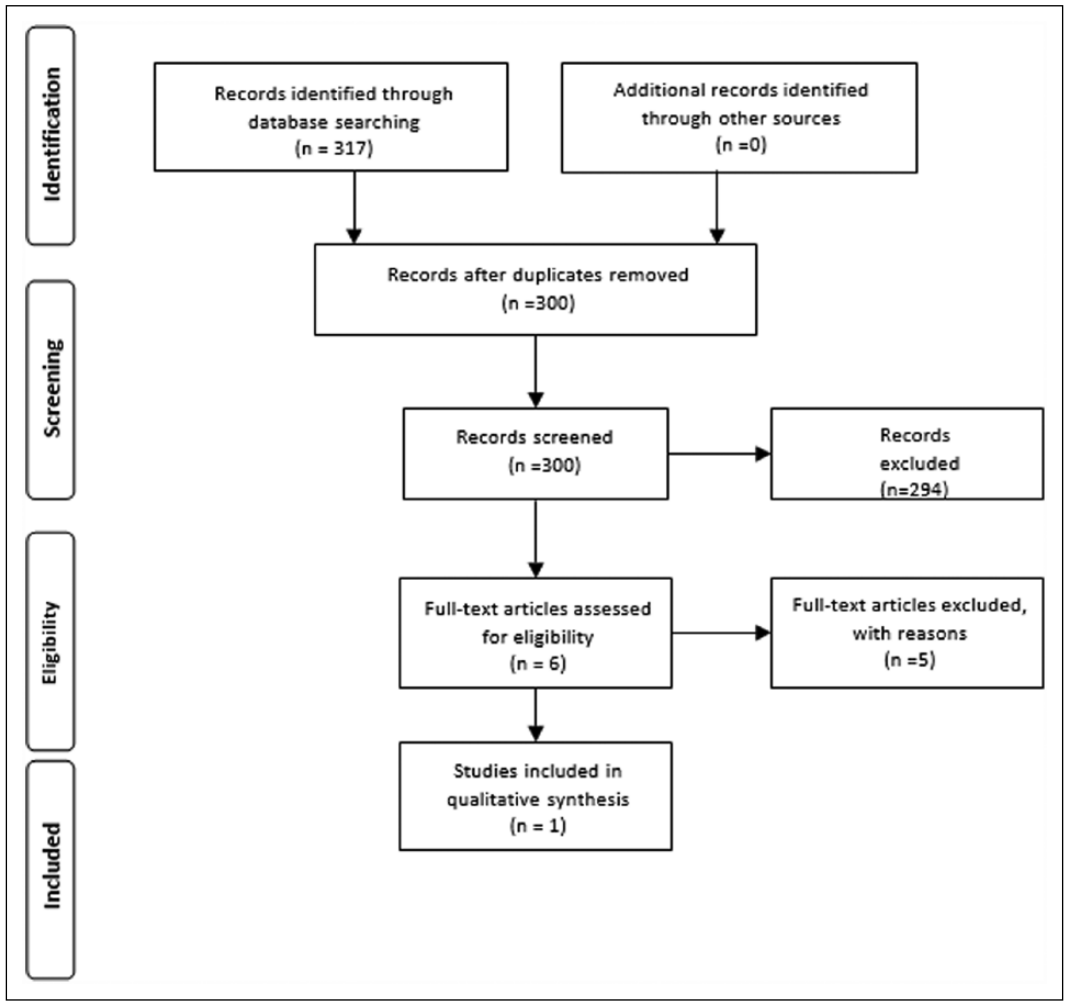

Figure 1. PRISMA flow diagram.[17]

search strategy ['Cervical'] AND ['Myelopathy']. Interventional studies, reported in English, exclusively concerning DCM were included to consider the reporting of baseline characteristics[16] and outcomes.[15] The included studies were re-examined for details of postoperative care, particularly postoperative physiotherapy. Data were extracted using a piloted extraction template.

Results

Is there any evidence relating to postoperative physiotherapy in DCM?

Of the 300 articles identified through our search after removing duplicates, 6 were shortlisted for full-text review based on abstract and title.[19–23] Although the study by Razack et al.[21] involved postoperative rehabilitation, there was no further information on what this meant and its efficacy was not commented on. Only one of the studies concluded the effect of postoperative physiotherapy on DCM clinical outcome and recovery.[23] The screening process is summarized in the PRISMA flowchart (Figure 1).

The included record was a retrospective study of 21 individuals with cervical spondylotic myelopathy who received surgical treatment and postoperative rehabilitation including physiotherapy. Outcome was assessed in terms of a disability classification, activities of daily living, mobility status

and the Medical Research Council grading of muscle power.[23] The study concluded that rehabilitation improved postoperative functional status. The study was deemed to be of low quality due to being a retrospective study with low sample size and no comparative group.

There are two registered randomized controlled trials on clinicaltrials.gov which are planning to investigate the efficacy of postoperative rehabilitation in DCM. One (NCT02842775) is currently in the early recruitment stage and will be assessing the effects of postoperative physiotherapy for balance control and the second (NCT03320759) is not currently recruiting but will assess the effects of postoperative occupational therapy.

Is there a standard for postoperative care in DCM surgical trials and does this include physiotherapy?

Of the 105 surgical trials identified in our previous systematic review, postoperative care was detailed in 32 (30%), largely relating to the use of cervical collars (28, 27%). 'Neck exercises' were reported by 6 (6%), but only one of these mentioned physiotherapy specifically.[24] Less common were surgical drains (2, 2%), courses of dexamethasone (4, 4%) and/or diuretics (2, 2%).

Discussion

Our systematic review of the literature found no studies evaluating the effectiveness of physiotherapy for DCM after surgical decompression. Only one study was identified, which claimed that postoperative rehabilitation improved functional status.[23] However, this was a retrospective study with no comparative controls. The study was therefore deemed of very low quality.[18]

It is apparent from our assessment of surgical trials in DCM that a standard for postoperative care does not exist.

Currently, physiotherapy use in DCM is weakly evidenced only in mild cases as part of non-operative management.[8,9] There have been no previous reviews of postoperative rehabilitation in DCM. While no evidence was found to support postoperative physiotherapy in DCM, promising data from other forms of spinal cord injury, both acute and chronic alongside the preclinical evidence, suggest this is worth exploring further.[3,5–7] The potential benefit of postoperative physiotherapy may not just be restricted to improvement in overall function. In a recent imaging study, the fat content of neck muscles in people with DCM was found to differ and its distribution related to pain scores.[25] This raises the possibility that physiotherapy may improve pain, an outcome highly valued by people with DCM.[15]

Commissioning of neurorehabilitation worldwide is challenged by its evidence base, and with the increasing financial demands on healthcare systems, further clinical investigation is required.[4] The unclear benefit or harm of postoperative physiotherapy must be clarified. Enhancing recovery postoperatively in DCM has been a relatively recent research focus but represents a major unmet clinical need.[10] This has led to both the CSM-PROTECT trial (NCT01257828) and the soon to start RECEDE-Myelopathy, both investigating the potential neurological benefits of a medical adjuvant to surgical decompression to enhance functional recovery. If these trials deliver results, it will further focus attention on standards of postoperative care.

Postoperative physiotherapy is frequently used in DCM; however, its underreporting in interventional trials, as identified here, has greatly limited any consideration of its clinical impact. The development of a standardized reporting process would support this area of research, both in terms of interventions and outcomes, to generate knowledge and inform future high-quality clinical trials of postoperative physiotherapy in DCM. A similar process is underway for acute spinal cord injury. This would be a natural extension to our aims of developing a consensus minimum data set for treatment studies in DCM.

While it is possible that some records may have been missed by the search strategy used, this risk has been mitigated by searching references and citations of relevant records captured and consulting experts in the field. The systematic review of surgical trials in DCM was limited to a period of

20 years, so will not capture potentially relevant studies outside this.[15,16] Although this will reduce the number of studies identified, arguably, it is the recent studies that are more relevant to current research practice.

In conclusion, we are unable to make an evidence-based recommendation for or against the use of postoperative physiotherapy in DCM, as there are no studies evaluating its effectiveness. Moreover, there is no standard for postoperative care in the surgical trials reviewed. With significant promise in the field of spinal cord injury, further research is required to determine whether there is a role for postoperative physiotherapy in DCM.

Clinical message

- There are no controlled studies evaluating whether physiotherapy causes benefit or harm after surgical decompression in patients with degenerative cervical myelopathy. Therefore, there is insufficient evidence to make recommendations regarding the use of physiotherapy in supporting postoperative recovery.

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Supplemental material

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