

Systematic review

Rehabilitation following surgical repair of the rotator cuff: a systematic review



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Abstract

Background Surgery to repair rotator cuff (RC) tears is a commonly performed orthopaedic procedure with the aim of reducing pain and improving function. Surgery is followed by rehabilitation and recommendations for postoperative rehabilitation include; exercise therapy, continuous passive motion machines and aquatic therapy. Currently, there is uncertainty in the literature as to what constitutes best postsurgical rehabilitation.

Objective To systematically review postsurgical research investigations to provide clinical guidance regarding postsurgical management.

Data sources A keyword search of Medline, Cinahl, Amed, Embase and Cochrane databases from September 1993 to September 2013.

Study selection Reviewer assessment using inclusion and exclusion criteria of randomised controlled trials.

Data extraction Data pertaining to research design, intervention and subjects was extracted from included papers by one author. The data was grouped by reference to the objectives of the study and collated in themes.

Data synthesis Narrative synthesis of the data was used to describe the effects of the intervention. The methodological quality and risk of bias of the included studies was assessed using the standardised Physiotherapy Evidence Database scale. Eleven studies met the inclusion criteria. All the studies were of fair to good methodological quality. No one rehabilitation protocol was found to be superior to another. The findings of this review suggested that following RC repair, patients should expect improvement in pain, ROM and function.

Conclusion This review concludes that no single rehabilitation protocol is superior to another following RC repair. Studies with larger study populations and longer term follow up are required to investigate this further.

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Keywords: Rotator cuff; Repair; Surgery; Postoperative; Rehabilitation; Outcome

Introduction

Rotator cuff (RC) tears are considered to be one of the most common causes of pain and disability in the upper extremity [1]. There has been a substantial increase in the number of surgical procedures performed to treat this condition [2]. Colvin reported a 141% increase between 1996 and 2006 and imbedded within this figure a 600% increase in arthroscopic repairs and 34% in open repairs [2]. RC tears are typically diagnosed using a combination of clinical tests and imaging.

Exercise therapy provided by physiotherapists is typically considered as initial management with surgical repair being considered in recalcitrant cases or earlier following traumatic RC tears. Many clinical prognostic factors, including; age, gender, smoking, tendon quality, intensity and duration of symptoms, self-efficacy, health co-morbidities and level of education are factors that need to be considered to determine how patients are likely to respond to postsurgical treatment [3–5]. Various postoperative rehabilitation programmes have been advocated to guide postoperative rehabilitation all aiming to restore ROM, improve strength and function [6]. Considerable heterogeneity in description of postoperative rehabilitation protocols exists within the literature. Studies have included early loading exercises of the RC [7–13],

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Table 1
Summary of the inclusion and exclusion criteria for studies in this systematic review.

	Research design	Population	Age of study	Language	Intervention/outcome
Inclusion criteria	RCTs and Cochrane reviews as they provide the best evidence of a causal relationship between an intervention and an outcome.	Adult > 18 years old. Human studies with full or partial thickness rotator cuff repair of any size.	Past 20 years	English language only	Rehabilitation post rotator cuff repair detailed and a stated outcome measure.
Exclusion criteria	Non-RCT and review studies, e.g. case series, observational studies.	Animal studies. Children < 18 years old.	Studies over 20 years old.	Non-English written studies.	Postsurgical rehabilitation was not performed. An outcome measure was not stated.

the use of aquatic therapy [14], videotaped home exercise programmes [15], the use of continuous passive movement (CPM) [16–20] and, rehabilitation provided in in-patient and outpatient settings [21]. Differing outcome measures have been reported in the literature post RC repair including; pain scores, ROM and functional measures. Currently, there is ambiguity in the literature as to what constitutes the effective rehabilitation following RC repair [3,6,10,16,22]. The purpose of this systematic review was to provide guidance as to the most effective post RC surgery rehabilitation protocol and investigate factors that may influence outcome.

Methods

Data sources and search strategy

The literature search of databases was conducted in September 2013 and articles listed in Amed, Cinahl, Medline, Embase and The Cochrane Library were retrieved. It included articles that were published between September 1993 and September 2013. The terms used for the Amed search are detailed in Supplementary Fig. 1. In addition to online searches, manual reference searches for articles were conducted from relevant journals. Grey literature sources, an attempt to identify academic papers not formally published, as well as contacting the authors of previously published studies of relevance to determine if new data were available.

Supplementary Fig. 1 related to this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.physio.2015.08.003>.

Study selection

One reviewer (ST) applied the inclusion criteria (see Table 1) to select potentially relevant studies using both the title and abstracts of the references retrieved by the literature search. Another reviewer (CJ) performed an independent literature search and applied inclusion criteria to validate the search strategy and ensure its reliability. If there was uncertainty over the inclusion of studies from the title and abstract alone, clarity was sought from the full text article and/or another reviewer (JL).

Data extraction and synthesis

The primary researcher extracted and analysed data from selected RCT papers that met the inclusion criteria. The data were grouped to reflect the objectives of the study and collated into themes. The different rehabilitation protocols were described and analysed. The themes were then further sub-divided dependent on the type of RC surgery. Narrative synthesis of the data was used to describe the effects of the intervention. A quantitative analysis (or meta-analysis) of the studies was not possible as the outcome measures were not sufficiently homogenous.

Quality appraisal

One reviewer (ST) assessed the methodological quality and risk of bias of the included studies using the standardised PEDro scale. This tool has previously been validated to assess the quality of intervention type RCTs within physiotherapy practice [23]. The PEDro scale is a checklist composed of eleven items, each of which is scored yes or no, with one point gain for each affirmative response. The first question, which is used to investigate the internal validity, is not calculated in the total score, so the maximum score is ten points [10]. The following ranges were used to qualify the methodological quality: a score of 9 to 10 points was deemed to be an excellent-quality study; a score of 6 to 8 points a good-quality study; 4 to 5 points a fair-quality study and lower than 4 points was a poor-quality study [23]. Table 1 summarises the inclusion and exclusion criteria for studies in this systematic review.

Results

Study selection

Supplementary Fig. 2 presents the PRISMA [24] flowchart of the literature search. The initial search produced 255 articles. Of those, 172 articles were eliminated based on their titles and abstracts because they were non-related articles that did not meet the inclusion criteria or duplicates from different databases. The remaining 20 articles were

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