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PEDro Systematic Review Update – The effectiveness of physiotherapy exercises in sub-acromial impingement syndrome.

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PEDro Systematic Review Update

This section features a recent systematic review which is indexed on PEDro, the Physiotherapy Evidence Database (www.pedro.org.au). PEDro is a free, web-based database of evidence relevant to physiotherapy.

Hanratty CE, McVeigh JG, Kerr DP, Basford JR, Finch MB, Pendleton A, Sim J. The effectiveness of physiotherapy exercises in subacromial impingement syndrome: a systematic review and meta-analysis. *Semin Arthritis Rheum.* 2012 Dec;42(3):297-316. doi: 10.1016/j.semarthrit.2012.03.015. Epub 2012 May 18.

Background

Sub-acromial impingement syndrome (SAIS) is thought to be the final pathological pathway for numerous pathologies of the shoulder and is used to describe a broad spectrum of symptoms rather than a single diagnosis^{1,2}. Physiotherapy management of SAIS most commonly involves exercise (e.g. strengthening, stretching, scapular stability exercises). The goal of a physiotherapy shoulder exercise program is to relieve pain, restore range of motion, improve strength and muscle coordination. While the use of exercise in the management of SAIS is common and widespread, little high quality evidence supports the administration of exercise alone³⁻⁵. The current review aimed to provide up to date evidence relevant to this question while avoiding some of the methodological limitations apparent in previous reviews.

Aims

The authors synthesised the best available evidence to determine the effectiveness of exercise in management of SAIS. A secondary aim was to provide guidelines for therapists as to the most effective mode, exercise parameters (frequency, intensity, duration) and progression of exercise interventions.

Searches and inclusion criteria

Ten biomedical databases were searched from their inception until August 2010 and reference lists of included articles searched. Randomised controlled trials published in English that evaluated the effectiveness of any mode of exercise in the management of stage I or II SAIS were included. The Cochrane Risk of Bias tool was used to assess the methodological quality of the included studies. Two separate analyses were performed. First, all eligible studies were included in a best evidence synthesis,

using a levels of evidence framework. Second, studies identified to be of high quality, defined as a score of $\geq 6/12$ and no significant individual flaws, were then included in a meta-analysis.

Main outcome measure

The primary outcome measures were pain, patient reported function, strength and quality of life.

Statistical methods

The findings from all included studies were summarised using best-evidence synthesis criteria. For the meta-analysis, random effects models were used to generate pooled standardised mean differences between groups.

Results

Sixteen studies (n=1,162 participants) were included in the review of which six were included in the meta-analysis. The range of risk of bias scores was 2 to 10, 12 studies had a low risk of bias ($\geq 6/12$) and 4 had a high risk of bias ($< 6/12$). The mean age of participants was 49.2 years and the mean duration of symptoms was 21.9 months. Exercise interventions included stretching/flexibility exercises, closed chain scapular exercises and range of movement exercises. Control interventions were varied and included manual therapy, cortisone injections, simple analgesia, placebo and electrotherapeutic modalities. There was substantial heterogeneity in how the outcomes of interest were measured in individual studies (e.g. eighteen outcome measures were used to evaluate pain) as well as exercise parameters (frequency, intensity, duration).

Best-evidence synthesis

There is strong evidence that exercise is effective at reducing pain at short term (6 to twelve weeks) and improving patient reported function at both short and long term follow up (> 12 weeks). There is moderate evidence to suggest that exercise is effective for improving strength and quality of life at short term. Exercises more frequently used in higher quality studies include scapular stability training, progressive rotator cuff strengthening (using pullies/theraband) and exercises conducted through range to 90 degrees abduction.

Meta-analysis

Compared to all other modalities exercise interventions were found to be effective in providing short term improvement in strength of the rotator cuff (SMD 0.45, 95% CI -0.75 to 0.15; $p=0.003$) and have a small effect in improving long term patient reported function (SMD -0.31, 95% CI -0.57 to 0.04; $p=0.02$). Exercise however was found to have no significant effect on short term pain, patient reported function or mental health function (component of quality of life measures).

Limitations/considerations

Strengths of this review include the use of the Cochrane Risk of Bias Assessment tool to appraise the quality of included studies and incorporation of risk of bias results in synthesis of the findings. The authors also conducted a comprehensive search and followed best-practice guidelines for review conduct as set down by the Cochrane and PRISMA. Limitations of this review include the small numbers of subjects in the included studies, the heterogeneity of interventions (control and exercise interventions) and the potential for language bias due to exclusive inclusion of English-language studies.

The findings of this review should be interpreted with some caution. Firstly, the results of the best-evidence synthesis and meta-analysis are based on a small number of studies, few of which are high quality. Secondly, there was a significant degree of heterogeneity in pooled estimates for short term pain ($I^2=87\%$) and patient reported function ($I^2=74\%$). Such high levels of heterogeneity suggests that pooling may not have been appropriate and providing individual study findings alone may be more informative. Finally, the significant heterogeneity in the outcome measures used highlights the need for standardisation of measurement in research and clinical practice.

Clinical implications

While not completely conclusive, current best evidence suggests physiotherapy exercises are effective in the management of patients with SAIS. This review highlights the potential of these treatments to improve pain, patient-reported function and strength of the rotator cuff. It is likely effective exercise programs should include scapular stability training, targeted rotator cuff strengthening and range of motion exercises. It is noted however there is a need for high quality studies to be conducted in patients with SAIS in order to confirm the estimates of effect, particularly for long term outcomes.

Contributorship ZAM and SJK selected the systematic review, interpreted the data, wrote the manuscript and are guarantors.

Competing interests none.

Provenance and peer review commissioned; not externally peer reviewed.

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