Comparative effectiveness of nonoperative and operative treatments for rotator cuff tears
Seida JC, Schouten JR, Mousavi SS, Tjosvold L, Vandermeer B, Milne A, Bond K, Hartling L

CRD summary
The evidence was limited for most interventions on treatment of rotator cuff tear, which precluded conclusions on any single approach or for optimal overall management of the condition. Further high-quality research was needed. This was a well-conducted review and the authors' conclusions seem appropriate.

Authors' objectives
To assess the effectiveness of operative and non-operative interventions for the treatment of adults with rotator cuff tears.

Searching
MEDLINE, EMBASE, EBM Reviews, The Cochrane Library, AMED, CINAHL, SPORTDiscus, Academic Search Elite, Health Source, Science Citation Index Expanded, Scopus, and BIOSIS Previews were searched between 1990 and 2009 for articles published in English (and those published in French or German for nonoperative studies). Search terms were reported. United States Food and Drug Administration and Health Canada websites, conference proceedings from eight societies/associations, clinical trials registers and reference lists of relevant reviews were searched. Experts in the field were contacted.

Study selection
Controlled and prospective uncontrolled studies that compared any operative, postoperative rehabilitation or nonoperative interventions for treatment of adults (≥18 years) with partial- or full-thickness rotator cuff tears were eligible for inclusion. Eligible studies were required to include 10 or more participants with rotator cuff tears confirmed by imaging or intraoperative findings. Outcomes of interest were quality of life, disability/function, time to return to work/activities, pain, range of motion and strength. Minimum duration of follow-up for operative studies was 12 months.

Most studies were conducted in USA, Europe and Asia. Mean age of patients ranged from 41.2 to 80 years. Tears ranged from small to massive. Mean duration of symptoms, where reported, ranged from three months to 16.8 years. Included studies compared early versus late surgical repair, different operative treatments, technique and augmentation for rotator cuff repair and postoperative rehabilitation, different non-operative treatments and operative versus non-operative treatment.

Two reviewers independently screened studies for inclusion. Discrepancies were resolved by consensus or referral to a third reviewer. Non-English articles were assessed by one reviewer.

Assessment of study quality
Two reviewers independently assessed quality of randomised controlled trials (RCTs) and controlled clinical trials (CCTs) using the Cochrane Collaboration Risk of Bias tool. If one or more criteria were classed as having high risk of bias, the overall score was rated as high risk. Cohort studies were assessed using a modified Newcastle-Ottawa Quality Assessment Scale (maximum score was 8). Uncontrolled studies were assessed using a quality checklist developed by the University of Alberta Evidence-based Practice Centre. Discrepancies were resolved through consensus or referral to a third reviewer. Non-English studies were assessed by one reviewer.

Data extraction
One reviewer extracted or calculated means and standard deviations to compute mean differences and 95% confidence intervals (CIs) for continuous outcomes (such as function) and risk ratios (RRs) and 95% CIs for dichotomous outcomes (such as cuff integrity). Data were checked by a second reviewer and discrepancies were resolved through consensus or referral to a third reviewer.

Methods of synthesis
Where appropriate, mean differences and risk ratios and their 95% CIs were pooled using a random-effects model. Standardised mean differences (SMDs) were calculated for continuous outcomes measured using different scales; weighted mean differences (WMDs) were calculated for continuous outcomes measured using similar scales. Findings were grouped by treatment comparison and study design: randomised controlled trials (RCTs), controlled clinical trials (CCTs) and cohort studies. Statistical heterogeneity was assessed using the $I^2$ statistic. Where pooling was not appropriate, findings were presented as a narrative synthesis and in tables.

**Results of the review**
A total of 137 studies (n ranged from 12 to 224 ) were included in the review: 66 controlled/comparative studies (21 RCTs, six CCTs, 13 prospective cohort and 26 retrospective cohort studies) and 71 uncontrolled studies. Follow-up durations ranged from 56 days to 6.2 years. All RCTs and CCTs were assessed as having high risk of bias. Overall quality of cohort studies was moderate (scores between 3 and 8). Uncontrolled studies were generally of moderate quality (as reported in the review).

**Early versus late surgical repair (one RCT):** There were greater improvements in function in patients who received early versus delayed surgery. The level of statistical significance was not reported.

**Operative approaches (32 comparative studies, 58 uncontrolled studies):** Two retrospective cohort studies showed a statistically significant benefit from mini-open repairs. Patients returned to work or activity approximately one month earlier than patients who received open repair (mean difference 1.08 months, 95% CI 0.63 to 1.52). No other outcomes were statistically significant. There were no between-group differences in an RCT.

There was a statistically significantly greater improvement in function using open versus arthroscopic debridement (SMD 0.59, 95% CI 0.15 to 1.03; two CCTs and SMD 1.00, 95% CI 0.11 to 1.90; two retrospective cohort studies). There was evidence of significant statistical heterogeneity ($I^2=79\%$) among the retrospective cohort studies. One of the cohort studies showed a statistically significantly shorter time to maximum range of motion with arthroscopic debridement versus open repair (3.2 versus 6.8 months).

There were no statistically significant differences in outcomes between mini-open versus arthroscopic repair, open or mini-open versus arthroscopic repair. There were no statistically significant differences in function when arthroscopic repair versus arthroscopic repair plus acromioplasty or acromioplasty alone were compared. There were no statistically significant differences in five of seven studies that compared a range of different operative approaches.

**Rehabilitation studies (10 comparative and one uncontrolled study):** Three RCTs that compared continuous passive motion with physical therapy versus physical therapy alone showed no clinically important or statistically significant difference in function; one study showed evidence for earlier return to work with continuous passive motion plus physical therapy compared with physical therapy alone (12 versus 21 days). There were no statistically significant differences in outcomes for most of the other studies, which compared a range of different types of postoperative rehabilitation.

Evidence on operative techniques (15 comparative studies) and augmentations for operative repair (three comparative and five uncontrolled studies) was diverse and insufficient to draw conclusions. Evidence on non-operative interventions and comparisons between non-operative versus operative interventions was too limited to permit conclusions to be made regarding effectiveness. Complication rates were generally low (deemed not to be of clinical significance) or poorly reported for the different interventions.

**Authors’ conclusions**
Evidence was limited for most interventions for treatment of rotator cuff tear and this precluded conclusions on any single approach or for optimal overall management of the condition. Further high-quality research was needed to determine relative effectiveness of the treatment options.

**CRD commentary**
The review question and supporting criteria were well defined. A comprehensive search of the literature was undertaken, but as the search was restricted by language it was possible that language bias may have been introduced. Study quality was assessed with appropriate criteria and there was high risk of bias among the studies (acknowledged by the authors). The authors undertook each stage of the review in duplicate, which reduced potential for reviewer error.
and bias. The approach to analysis seemed appropriate; clinical and statistical heterogeneity and the poor quality of the evidence was taken into consideration. This was a well-conducted review and the authors’ conclusions seem suitably cautious.

**Implications of the review for practice and research**

**Practice:** The authors stated that there were differences among patients populations and they highlighted the potential for different outcome effects between findings from studies included in the review and those in clinical practice.

**Research:** The authors stated that well-conducted long-term studies were needed with consensus on chosen interventions and comparisons and on the important clinical and patient outcomes. Research needed to be reported in a consistent and comprehensive manner.

**Funding**

Agency for Healthcare Research and Quality (AHRQ), contract number 290-02-0023.

**Bibliographic details**


**Original Paper URL**


**Additional Data URL**


;http://www.annals.org/content/153/4/246.abstract

**Other publications of related interest**


**Indexing Status**

Subject indexing assigned by CRD

**MeSH**

Humans; Rotator Cuff /injuries; Shoulder Joint /injuries

**AccessionNumber**

12010005847

**Date bibliographic record published**

25/08/2010

**Date abstract record published**

01/09/2010

**Record Status**

This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.