

Title: Managing Acromio-clavicular Joint Pain - A Scoping Review

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Keywords: acromioclavicular joint, pain, distal clavicular excision, arthroscopic surgery, corticosteroid injection

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ABSTRACT

Background: Shoulder pain secondary to acromioclavicular joint pain is a common presentation in primary and secondary care, but often poorly managed due to uncertainty about optimal treatment strategies. Osteoarthritis is the commonest cause. While acromioclavicular pain can be treated non-operatively and operatively, there appears to be no consensus on the best practice pathway of care for these patients with variations in treatment being common place. The objective of this paper was to conduct a scoping review of the current published evidence for the management of isolated acromioclavicular pain (excluding acromioclavicular joint dislocation).

Methods: A comprehensive search strategy was utilised in multiple medical databases to identify level 1 and 2 randomised controlled trials, non-randomised controlled trials and systematic reviews for appraisal.

Results: Four systematic reviews and two randomised controlled trials were identified. No direct studies have compared the benefits or risks of conservative versus surgical management in a controlled environment.

Discussion: High level studies on treatment modalities for acromioclavicular joint pain are limited. As such, there remains little evidence to support one intervention or treatment over another, making it difficult to develop any evidenced based patient pathways of care for this condition.

Level of evidence: 2A

Key-words: acromioclavicular joint, pain, distal clavicular excision, arthroscopic surgery, corticosteroid injection

INTRODUCTION

Acromioclavicular joint (ACJ) pain is a common cause of shoulder pain in adults. The incidence of ACJ pain is reported to be between 0.5 to 2.9/1000/year in primary care^[1, 2]. Injuries are a common precipitating cause, occurring through direct impact on the joint or a fall on an outstretched arm. Arthritis is the main cause of pain, and it develops as a consequence of constant stress on the joint, often in people who perform repeated overhead lifting activities^[3]. Arthritis is often associated with distal clavicular osteolysis^[4, 5]. Damage to the ACJ can be synchronous with damage to the supraspinatus tendon and osteophytes from the arthritic joint may contribute to subacromial impingement exacerbating and producing further shoulder pain. Patients usually localize their pain to the AC Joint. The most sensitive tests for ACJ pain are acromioclavicular point tenderness and the Paxinos test (reported as 96% and 79% respectively) but both carry low specificity^[6]. Bone scans have been used in selected cases to confirm damage at the ACJ^[6], but plain radiography and MRI are usually investigations of choice.

Despite its prevalence in primary and secondary care, the management of ACJ pain seems to be highly variable with uncertainty as to whether surgical or non-operative management is effective. As such management of ACJ pain seems to be determined by the degree of pain and disability. Non-operative management is usually considered first, with activity modification, physical therapy modalities, oral analgesics and injections of corticosteroid and local anaesthetic all being options. It is suggested that injections can provide good pain relief and be a helpful diagnostic test, but seem to be ineffective as a long term therapy^[7].

Surgical treatments involve distal clavicular excision (DCE) which was initially performed as an open procedure, first described in 1941^[8]. However, the procedure is now commonly performed arthroscopically^[9]. The procedure aims to produce a ‘gap’ between acromion and clavicle and involves resecting bone mainly from the distal end of the clavicle without compromising joint stability. The arthroscopic approach is believed to result in minimal trauma and quicker rehabilitation.

With the growing need to develop evidenced based patient pathways for many common joint conditions, we aimed to conduct a scoping review evaluating the quality of published literature and the efficacy of surgical and non-operative (conservative) treatments for adults with AC joint pain.

MATERIALS AND METHODS

Data Sources

Systematic reviews, level 1 and 2 randomised controlled trials (RCT) and controlled non-randomised trials (CNT) were identified by searching Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, Medline, Embase, NHS Evidence, Database of Abstracts of Reviews of Effects, National Guideline Clearing House, DARE and Health Technology Assessments. Studies were limited to those published in the English language without any date restrictions. The key words utilized for the search included acromioclavicular, acromioclavicular joint, acromioclavicular pain, decompression, excision, reconstruction, debridement, open, arthroscopic, physiotherapy, injection, painkiller, analgesia.

Quality Appraisal

Two authors (SC and LB) independently assessed the titles and abstracts of all retrieved searches to determine their relevance and eligibility for inclusion. Any discrepancies were discussed and resolved by a third independent author (JR).

The quality of the included studies was evaluated using the validated consolidation of standards of reporting trials (CONSORT)^[10] tool. The identified systematic reviews were appraised using the assessment of multiple systematic reviews (AMSTAR)^[11] tool. Both validated assessment tools utilise questionnaires that facilitate critical evaluation of the methodology, quality and strength of evidence and conclusions. Kappa statistics were used to assess inter-rater agreement.

Study Selection and Eligibility Criteria

Inclusion criteria consisted of articles evaluating the management of ACJ pain secondary to OA, arthrosis or distal clavicle osteolysis. Non-operative (conservative) treatments considered in this review included analgesics, physiotherapy, injections and immobilisation in a sling. This review includes consideration of the following surgical management options for ACJ pain as either a single or combined procedure: open acromioclavicular joint reconstruction, arthroscopic acromioclavicular joint reconstruction, open excision, arthroscopic excision and arthroscopic debridement. Studies were excluded if they considered patients with ACJ dislocations.

All outcome measures used were documented and included the Oxford Shoulder Score, Constant-Murley Score, Disabilities of the Arm, Shoulder and Hand (DASH), Oxford Instability Score, American Shoulder and Elbow Surgeons Score (ASES), Western Ontario Shoulder Instability Index (WOSI)^[12], Darrow score for acromioclavicular separation^[13], Hospital for Special Surgery (HSS) shoulder assessment^[14], Loyola, Neer shoulder score^[15], Athletic shoulder scoring system (ATH score), the Simple Shoulder Test (SST)^[16], Matsen^[17], Rowe Score for Instability^[18] and Single Assessment Numeric Evaluation (SANE)^[19].

RESULTS

The initial search only generated 226 references, which were reduced to 210 after removal of duplicated studies. Of these, 39 were excluded and 76 were inappropriately designed. The remaining 95 articles were assessed by two authors; only 4 systematic reviews and 5 primary studies were identified as having met the inclusion criteria. From the 5 primary studies, 3 were removed as they had been included in the systematic reviews. Details of the search and exclusion process are detailed in Figure 1. A summary of the characteristics of the identified reviews and studies are included in Table 1.

32 primary studies relevant to acromioclavicular joint pathology were included in the 4 systematic reviews published between 1998 and 2007. There was substantial overlap between two systematic reviews, with 22 studies appearing in both papers, the remaining 10 studies only appeared in a single review.

Quality assessment

The inter-rater agreement was good with a kappa value of 0.863 (SE of kappa 0.056, 95% CI 0.754 - 0.973). Apart from one Cochrane review, the other systematic reviews were of poor methodological quality as they only addressed a few of the AMSTAR criteria. The 4 reviews were predominantly based on lower level studies and therefore could not be classed as level I evidence. One study did not set clear inclusion or exclusion criteria and only one review included a list of excluded studies or addressed the issue of publication bias.

Therapeutic injections

Sabeti-Aschraf et al.^[20] conducted a small randomised trial of 20 patients to evaluate whether US guidance for the infiltration of the symptomatic ACJ improves outcomes when compared to the traditional palpation method. Outcome measures were recorded at one, two and three weeks post injection. There were significant improvements in all tested variables from baseline to the first and second week follow-up. By the third week ACJ pain and tenderness returned to baseline levels, but improvement in function was still significant. There were no significant differences between both groups with the authors proposing a poorer than expected result in the US guided group could be secondary to cartilage or meniscoid damage due to precise guidance of the needle into the joint.

In addition, Sabeti-Aschraf et al. [21] conducted a multi-centered controlled trial with 106 symptomatic arthritic ACJs to compare the efficacy of intra-articular and peri-articular joint injections. Outcomes were measured at one hour, one week and 3 weeks post-injection and recorded using the Constant-Murley score, cross-over arm test and visual analogue scale to assess pain on palpation and pain at night. Significant improvements in both groups were detected at all three stages from baseline. A significant improvement in pain in the intra-articular group was only identified on the cross-over arm test, however, no significant difference could be identified at any other stage or using any other outcome measure. This study was only utilized to assess the short-term improvements from steroid injections.

Buchbinder et al.^[22] (AMSTAR 11/11) examined the evidence for efficacy and safety of corticosteroid injections for the treatment of adults with shoulder pain. This Cochrane review was conducted following a peer reviewed a priori protocol and only included randomised or pseudo-randomised controlled trials. Two included studies addressed the management of a population with mixed diagnoses, which included

patients with ACJ pathology. One randomised trial^[23] demonstrated a significant benefit favouring steroid injections over physiotherapy and manipulation with respect to pain at the end of treatment. Patients had a range of diagnoses and the authors did not report the exact proportion of patients who had ACJ pathology. Another randomised trial^[24] comparing anatomical steroid injection to trigger or tender point injection, demonstrated significantly greater symptomatic relief with functional injections in participants with shoulder pain at one week. However, only 11 of the 92 patients in this study had a diagnosis of ACJ 'strain' and it is not clear which treatment groups these patients were assigned to. The authors of this review concluded that there is little evidence to either support or refute the efficacy of steroid injections for all forms of shoulder pain.

Peterson et al.^[25] (AMSTAR 5/11) performed a review of the literature to evaluate the level of evidence concerning the effectiveness of therapeutic joint injections into various peripheral joints. The review met 5 of the 11 AMSTAR criteria. The authors did not set out their inclusion and exclusion criteria or provide adequate details regarding their search strategy. While the search was focused primarily on level I and II evidence, lower level studies were considered in the absence of any other evidence.

Three prospective cohort studies investigating therapeutic injections for ACJ osteoarthritis/arthropathy were reviewed. There was approximately a 25% reduction in symptoms, lasting at least 12 months in a five-year follow-up study. Two studies reported an improvement in pain 15 minutes post injection, and improvements in pain and range of motion 2 weeks post injection; no longer-term follow-up was reported in these studies. The authors of this review concluded that larger sample sizes with longer follow-up is required to evaluate this form of treatment.

Open and Arthroscopic Distal Clavicle Excision

Rabalais et al.^[26] (AMSTAR 8/11) reviewed studies describing the surgical management of symptomatic ACJ pathology. The authors conclude that the literature supports surgical excision for ACJ osteoarthritis and osteolysis, however these recommendations were based on level III or level IV evidence consisting largely of retrospective case-series. Patients reported to have had ‘good’ or ‘excellent’ results in primary studies were grouped into the category of having a ‘satisfactory’ outcome. Six studies evaluating 146 patients receiving isolated arthroscopic DCE (distal clavicle excision) reported satisfactory outcomes in 92.5% (range, 85-100%) at a mean follow-up of 2.2 years^[27-32]. Three of these studies used the direct approach^[27-29] and three used the indirect approach^[30-32], however the authors did not compare the outcomes of the two arthroscopic techniques. The nine open DCE studies^[33-41] demonstrated greater variability with satisfactory outcomes ranging from 50 to 100% with a mean satisfaction of 76.3%. These studies included 189 patients over a mean follow up of 4.9 years (range 2.1-9 years).

There have been seven studies that have investigated outcomes of DCE (open or arthroscopic) with concomitant procedures^[9, 42-47]. These results need to be interpreted with caution as the surgeries were not limited solely to addressing the ACJ but involved concomitant procedures such as sub-acromial decompression and rotator-cuff repairs. 94% (range, 87-100%) of a total 212 patients reported good or excellent outcomes at an average follow-up of 3.2 years, demonstrating similar success rates to isolated arthroscopic DCE. Six studies reported poor outcomes in 23% of the 130 patients receiving open or arthroscopic DCE for post-traumatic aetiologies (fracture or low grade separations)^[29, 35-37, 40, 42]. While there was a trend

for poorer outcomes in this group, especially for grade II separations, results between studies were conflicting.

Pensak et al. (AMSTAR 6/11) performed a limited search for articles reporting on outcomes of distal clavicle excision for acromioclavicular joint arthritis or acromioclavicular osteolysis ^[48]. The majority of studies included were level IV case series, all of which were included in the previous surgical review by Rabalais et al who agreed with the conclusions of the previous paper. ^[26] and a further two RCTs were included. The authors concluded that the arthroscopic procedure, specifically through the direct approach, enabled a faster return to activities while obtaining similar long-term outcomes compared to the open procedure. Of the two RCTs, one study had compared open and indirect arthroscopic DCE in a group of 17 patients with ACJ pain non-responsive to conservative measures ^[49]. Earlier recovery and/or better outcomes were reported in the arthroscopic group, and a statistically significant improvement in the VAS pain score from baseline to one year was identified for only the arthroscopic group. The sample size was insufficiently powered and authors suggested that the identified trends could be attributed to the treatment of other intra-articular pathology (debridement of SLAP and rotator cuff tears) identified in 50% of the arthroscopic group. The other randomised study by Charron et al. compared direct and indirect arthroscopic approaches in 34 athletes with osteolysis or post-traumatic osteoarthritis ^[50]. Both groups had excellent outcomes, however the direct group had significantly higher functional scores at two and six weeks postoperatively, and these patients also had a significantly quicker return to sport.

DISCUSSION

This scoping review has critically evaluated studies published in English pertaining to operative and non-operative management of ACJ pain (excluding ACJ instability). Four systematic reviews were identified, 2 of which looked at operative treatments [26, 48] and 2 reviews focused on non-operative, injections into the ACJ [22, 25]. Generally the quality of the systematic reviews was good rather than high as three of the systematic reviews presented comprehensive literature reviews that identified relevant studies and key data. One of the reviews failed to identify clear inclusion and exclusion criteria[25]. The patient populations studied were not always clearly identified, and some bias was introduced by the fact that many patients with ACJ pathologies also had other concomitant shoulder pathologies such as rotator cuff tears, making it difficult to delineate the cause of shoulder pain and effectiveness of subsequent treatments. Quantitative analyses of the published literature could not be performed due to the heterogenous populations, presence of concomitant pathologies, variable treatment options and outcome measures used. There was no standardisation in the assessment parameters, assessment tools and there was wide variation in outcome scores used to assess functional outcome, making collation of data from different studies not possible. There is a need for assessment and consensus of outcome scores for ACJ pathology.

While the literature suggests that open and arthroscopic surgical excision for ACJ osteoarthritis and osteolysis can consistently result in pain relief and improved outcomes in the majority of patients, this review reveals a lack of primary evidence regarding treatments and treatment pathways for ACJ pain. At no point have arthroscopic surgery, open surgery, steroid injections and rehabilitation programmes been directly compared.

A number of reviews and studies did try to evaluate the effectiveness of steroid injections into the ACJ, through comparison with placebo treatments and physiotherapy [22-24]. The efficacy of steroid delivery was further evaluated by a small study which concluded that ultrasound guided injections did not improve pain compared to techniques reliant upon blind injections only^[20]. However, with only 20 subjects this study is underpowered. Furthermore, a larger suitably powered study evaluated the difference between peri-articular and intra-articular injections under image guidance and showed no significant difference in the majority of scores up to three weeks post-injection [21]. This study did not evaluate any long-term benefits of steroid injections. There is therefore no clear evidence that steroid injection is either effective or ineffective in treating ACJ pain and few studies report long-term outcomes. Similarly, there is no strong evidence comparing steroid treatment to physiotherapy.

CONCLUSIONS

Despite the prevalence of the AC Joint causing pain and disability, this up to date review of the management of ACJ pain highlights the need for further evidence comparing the efficacy of both operative (open and arthroscopic) and non-operative treatment modalities. This lack of useful literature on the management of ACJ pain, means we are currently destined to continue to treat this problem ‘traditionally’ with physiotherapy, ACJ steroid injection followed finally by surgery.

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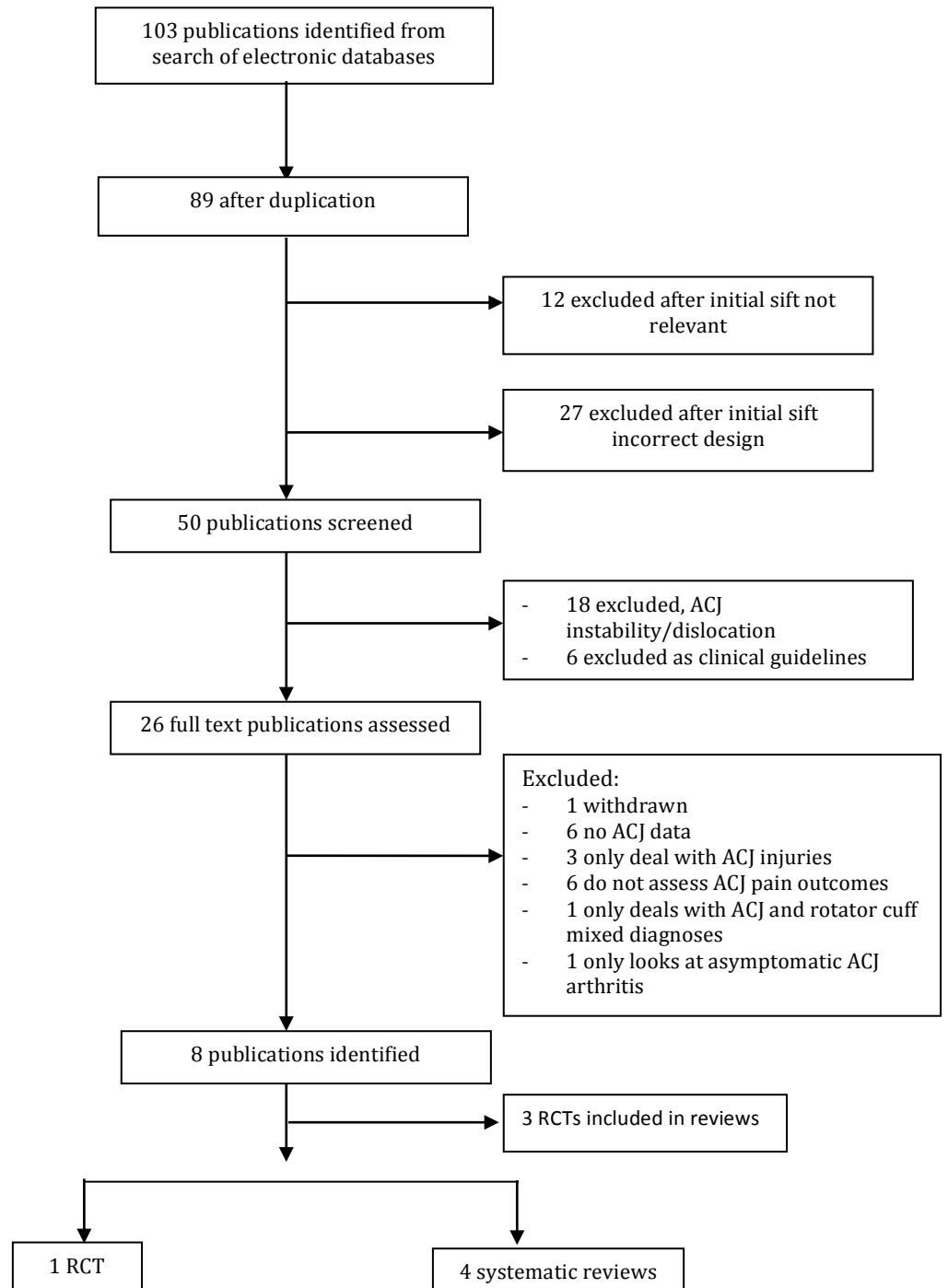
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FIGURES

Figure 1: Schematic Representation of Literature Review and Selection Process to Identify Relevant Studies and Reviews



TABLES

Table 1: Characteristics Of Studies Evaluating Management Options For ACJ Pathologies