Update for Chapter 16: Are corticosteroid injections as effective as physiotherapy for the treatment of a painful shoulder?

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Introduction
In this review we systematically summarize the available evidence on the effectiveness of physiotherapy and corticosteroid injections for shoulder pain. The review is an update of Chapter 16 of Evidence-based Sports Medicine.[1]

Methods
Search strategy
Relevant trial reports were identified in MEDLINE, EMBASE, and the Cochrane Databases. For the update of this review the search was extended to include the period January 2001 to October 2003, using the same keywords and selection criteria.

Quality assessment
The internal validity of each trial was scored by two reviewers independently, using the validity criteria of the Amsterdam-Maastricht Consensus List for Quality Assessment.[2] The number of positively scored validity items was denoted as the validity score.

Data extraction and analysis
Details on selection criteria, interventions, outcome assessment, adverse reactions, and results were extracted for each trial. Pooled estimates of outcome were computed for trials that showed sufficient homogeneity with respect to interventions and outcome measures using a random-effects model.[3] Data concerning general improvement of symptoms were used to compute success rates for each study group. The differences in success rates between study groups were computed, together with the 95% confidence intervals (CI). Subsequently, the number needed to treat (NNT) was computed. For outcomes evaluated on a continuous or interval scale standardized mean differences (SMD) were computed.[4]

Results
The updated search resulted in the identification of 154 additional papers. 143 abstracts were excluded for the following reasons: no randomisation (n=31); irrelevant diagnosis (e.g. hemiplegic shoulder pain or fracture) (n=74); irrelevant intervention (e.g. anaesthesia during surgery) (n=21); no contrast for injections or physiotherapy (n=13); data for shoulder pain not presented separately (n=2); or no full report (n=2). A total of 11 papers were retrieved. Five RCTs were excluded upon reading the full paper as the comparison turned out to be of no relevance to the review.[5-9] Finally, six RCTs were added to the review (Table I).[10-15]
Methodological quality
The median validity score of the newly identified trials was 5.5 points. Three trials were of relatively good quality.[10-12]. The study sizes were generally small; only one trial compared study groups of at least 100 patients, and was designed with sufficient power to detect clinically relevant differences.[11]

Effectiveness of corticosteroid injection compared to “placebo”
A total of 15 trials (including two new RCTs) compared the effectiveness of corticosteroid injection to a treatment considered to be of little or no effectiveness. In nine trials a significantly better outcome was reported for corticosteroids. Information about treatment success was available for 12 trials. There was considerable statistical heterogeneity across trials. As explained in the previous edition of this review one trial seemed to be an outlier, and was excluded from the analysis. For the remaining 11 trials the pooled estimate for short-term difference in success rate was 30% in favour of corticosteroids (95% CI 17 to 44%, NNT = 3). Statistical heterogeneity could not fully be explained by differences across trials regarding quality of methods, diagnosis, type of steroid, or duration of symptoms. There was wide variation in the definition of a treatment success, which may partly explain persisting heterogeneity.

Only four trials presented sufficient data for improvement of pain or functional disability. The pooled estimates were statistically significant in favour of corticosteroids for both pain (SMD=0.71, 95% CI: 0.42 to 1.01) and disability (SMD=0.45, 95% CI: 0.07 to 0.83).

Effectiveness of physiotherapy (exercises and mobilisations)
Three newly indentified RCTs compared the effects of physiotherapy with saline injection [10], no treatment [14] or home exercises [15]. Significant effects on pain and function were found for a home exercise programme in construction workers with shoulder impingement syndrome.[14]. A quantitative analysis of the total set of seven trials was not possible due to clinical heterogeneity, and insufficient data presentation. The trials already included in the review provided some evidence that exercise treatment was more effective than placebo or a waiting list control. Furthermore, the addition of passive mobilisations seemed to be more effective than treatment consisting of exercises only.

Effectiveness of corticosteroid injections versus physiotherapy
Three newly identified trials [10,11,13] directly compared the effects of corticosteroid injection and physiotherapy, adding to the four trials already selected for the review. The results are inconsistent; three out of seven trials (two of relatively good quality) reported significant differences in favour of corticosteroid injection. However, one large recently published trial [11] could not demonstrate significant or relevant differences between the two interventions. Statistical pooling was precluded by the heterogeneity of results. The differences in outcome may be explained by variation in characteristics of the study population, content of treatment, and definition of outcome measures.

Long-term effects
Most trials included only a short-term outcome assessment. Long-term follow-up measurements (at least six months) were described by two newly identified trials.[10,11] The positive short-term effects of corticosteroids reported by Carrette et al. did not persist after six months of follow-up.

Adverse reactions
Two newly identified trials included information about adverse reactions to corticosteroids.[12,13] Adverse reactions were generally mild, and mainly consisted of some pain and discomfort following the injection.[12] No adverse reactions were reported for physiotherapy.
Conclusions
Our updated search identified six relevant trials which were added to the 23 trials already included in the review. The evidence on the effectiveness of corticosteroid injections and physiotherapy for shoulder pain is summarized in Table II. The update confirms the evidence for positive short-term effects of corticosteroid injections compared to placebo. The pooled estimates for pain and success rate exceeded predefined thresholds for clinical relevance (SMD = 0.5 and NNT = 5).

Click here for Table 2

Our previous conclusions regarding the positive effects of corticosteroid injection compared to physiotherapy are weakened by the recent publication of a large trial in which no significant or relevant differences were found.
Research into the long-term effects of corticosteroid injections is still limited, but existing evidence indicates that beneficial effects do not persist after six months, with similar outcomes regardless of treatment.

References