Physiotherapy, steroid injections, or rest for lateral epicondylosis: what the evidence suggests
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CRD summary
This review assessed the effectiveness of interventions for the clinical management of lateral epicondylosis. The authors concluded that relative rest does eventually improve functionality, but the use of early active interventions such as steroid injections and physiotherapy may help speed up the recovery process. However, caution is advised given the limitations in the review methods and the need for further research.

Authors' objectives
The primary aim of this review was to determine the effectiveness of interventions, including physiotherapy, steroid injections and relative rest, for the clinical management of lateral epicondylosis. A secondary aim was to assess whether the quality of research in this area had improved over time.

Searching
The authors searched MEDLINE via PubMed (1966 to November 2004), EMBASE (up to November 2004) and the Cochrane Controlled Trials Register (Issue 2, 2000); the search terms were reported. Other studies were identified from an Agency for Healthcare Research and Quality report on the 'Diagnosis and treatment of worker-related musculoskeletal disorders of the upper extremity' (published in 2002) and the reference lists of retrieved articles. Only publications in the English language were included.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) or clinical controlled trials (CCTs) were eligible for inclusion in the review.

Specific interventions included in the review
Studies assessing at least one intervention (e.g. physiotherapy, relative rest and steroidal injections) for the clinical management of epicondylosis, compared with a control group or a comparison group receiving minimal routine care such as ergonomic advice, vitamins or non-steroidal anti-inflammatory drugs (NSAIDs), were eligible for inclusion.

The interventions assessed in the included studies were: steroid injections (e.g. hydrocortisone, triamcinolone, betamethasone); steroid and anaesthetic injections (e.g. steroid and lidocaine, steroid and bupivacaine); rehabilitation and steroid injections; exercise and ultrasound with or without deep friction massage; ultrasound (e.g. continuous, pulsed); ultrasound and cyriax frictions; minimal intervention (reassurance, ergonomics and minimal activity suggested); manipulation of the wrist; physiotherapy (deep transverse massage and Mill's manoeuvre); relative rest; phonophoresis; and transcutaneous electrical stimulation. The control interventions included: placebo; sham injections; sham ultrasound; anaesthetic injections (e.g. procaine); NSAIDs; vitamin C placebo; rehabilitation and sham steroid injections; treatment used by general practitioner; ergonomic advice and NSAIDs; and traditional therapy (i.e. massage, exercise and ultrasound).

Participants included in the review
Studies assessing patients with lateral epicondylosis were eligible for inclusion. The studies reported in the review assessed numerous different patient populations, including patients from the general population, different clinics (i.e. rheumatology, primary care, physical therapy/medicine, university hospital out-patient, physiotherapy, orthopaedics, sports and sports injury clinics) and referrals from different health professionals (i.e. therapists and primary care physicians). Where stated, the mean age of the participants ranged from 38 to 47 years, all studies appeared to include patients who were at least 18 years old, and the proportion of females ranged from 19 to 57%. Symptom duration was often not stated, but was described as ranging from over 4 weeks to up to 1 year in those studies reporting relevant data.
Outcomes assessed in the review
The authors did not specify any inclusion criteria for the outcomes. A variety of outcomes and assessment methods were reported in the included studies. These outcomes were grouped into one or more of the following categories: pain, strength, flexibility or function. Some of the included studies used composite scores including outcomes from several of the categories.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
Validity was assessed according to Cochrane Collaboration guidelines, which uses 11 items for internal validity, 6 items for external validity and 2 items for statistical criteria.

The items assessed for interval validity were: appropriate method of randomisation; concealed treatment allocation; blinding of the care provider, patients and outcome assessor; cointerventions avoided or only comparable cointerventions allowed; acceptable adherence rate in all groups; relevant outcome measures used; known and acceptable drop-out rate; comparable timing of outcome assessment in all study groups; and the use of an intention-to-treat analysis. The items assessed for external validity were: eligibility criteria specified; similar baseline characteristics regarding important prognostic indicators in the study groups; clear reporting of intervention and control methods; adverse effects described; and short- and long-term follow-up of outcome measures available. The statistical criteria were sample size stated, and both point estimates and variability described for the primary outcome measures.

Only those trials meeting over 50% of the internal validity criteria (i.e. a score of at least 6 points) in the authors’ validity assessment were included in the analysis.

Two reviewers independently assessed the validity of the included studies; a third reviewer adjudicated in the event of a dispute. Studies were awarded a ‘quality score’, ranging from 0 (low) to 11 (high), based on the stated criteria.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
How were the studies combined?
The studies were combined in a narrative and grouped according to the type of study intervention (i.e. steroid injection, physiotherapy including exercise, physiotherapy including ultrasound, other physiotherapy modalities and relative rest).

How were differences between studies investigated?
Differences were evident from the data tables and also discussed within the text of the review. Differences in study quality according to the date of study publication were assessed using a Pearson product-moment correlation (p<0.05 considered statistically significant).

Results of the review
Thirty studies were included in the review: 7 confirmed RCTs, 17 possible RCTs and 6 CCTs. However, only 18 high-quality studies (with a quality score of 6 or more points) were included in the analyses: 7 confirmed RCTs (n=797), 10 suspected RCTs (n=595) and 1 CCT (n=120).

The quality scores awarded to each study varied between 2 and 9 (out of 11). Eighteen studies scored the 6 to 11 points required for inclusion in the main analysis. Common methodological problems encountered included small sample size, unclear methods of randomisation, poor reporting of intervention methods and study data, lack of a placebo comparison and the inclusion of mixed patient populations. More recent publications failed to show an increase in their quality scores in comparison with earlier publications (correlation, r=0.039, p=0.84), even after adjusting for journal quality.
Steroid injection.

Four out of 6 studies showed that in the short-term (less than 2 months) steroid injections were superior to anaesthetic injection (2 possible RCTs), physiotherapy (1 RCT) and placebo (1 RCT). The 2 remaining small studies suggested that there were no short-term benefits of steroid injections over sham injections (1 possible RCT) and NSAIDs (1 possible RCT). Three of the studies showed that in the long-term steroid injections were equivalent to anaesthetic injections (1 suspected RCT), physiotherapy and rest (1 RCT) and placebo (1 RCT). One study (possible RCT) suggested that the long-term effects of steroid injections were superior to sham injections, but only in terms of pain.

Physiotherapy including exercise.

One high-quality RCT suggested that, after 6 weeks, physiotherapy was inferior to steroid injections but superior to 'wait and see'. However, after 1 year, physiotherapy was superior to steroid injections but did not differ significantly from 'wait and see'.

Physiotherapy including ultrasound.

Two studies (1 RCT and 1 possible RCT) found no advantage of ultrasound over sham ultrasound. One possible RCT found an advantage over rest, but not sham ultrasound. Only one poorly reported possible RCT found ultrasound superior to sham ultrasound.

One very small RCT found no significant difference between ultrasound and phonophoresis.

Other physiotherapy modalities.

One small, short-term pilot RCT showed that manipulation was superior to multimodal physiotherapy. Two further RCTs showed that injection or ultrasound were superior to manipulation or massage in the short term.

Relative rest.

Three out of 5 studies showed that relative rest (e.g. with patients receiving treatments such as ergonomic advice, NSAIDs, or vitamin C) was inferior to steroid injections (2 RCTs), physiotherapy (1 RCT) and ultrasound (1 possible RCT) in the short term (less than 2 months). Two other studies showed that rest was equivalent to 'treatment as usual' (1 RCT) and steroid injection (1 possible RCT). Three of the 4 studies also assessing longer term outcomes showed that patients in all of the groups improved, and no overall difference was observed with respect to relative rest and steroid injections (2 RCTs), physiotherapy (1 RCT) and 'treatment as usual' (1 RCT); the fourth study (possible RCT) showed relative rest to be inferior to ultrasound, but it only assessed outcomes at 3 months.

Authors’ conclusions

In the short-term (i.e. less than 2 to 3 months), steroid injections appear to be the most effective intervention in comparison with relative rest for pain relief. However, active physiotherapy appears effective regardless of the timeframe and is more efficacious than steroid injections in the longer term, although after 1 year it does not appear to be significantly better than relative rest. Patients receiving relative rest do eventually improve, but the use of early active interventions such as steroid injections and exercise therapy may help to speed up functional recovery.

CRD commentary

This review was based on a clear but somewhat broad research question. The inclusion of a broad range of interventions, comparators, patient populations and outcome measures meant that the included studies were very heterogeneous, making synthesis difficult. The authors made appropriate attempts to locate published data, but relevant data might have been missed by the exclusion of non-English language publications and the absence of any specific attempts to locate unpublished material. The risk of publication bias was difficult to assess as the authors searched a previous systematic review, but it was unclear how comprehensive the former search strategy was with regard to
unpublished data. It was similarly difficult to assess the risk of errors and reporting and selection biases in the review, as the authors did not state how many reviewers selected the studies and extracted the data. However, the likelihood of errors and bias in the assessment of study quality was reduced by the involvement of more than one reviewer. The validity assessment was based on an extensive list of published criteria from the Cochrane Collaboration and was used as a threshold for study inclusion.

Given the number and heterogeneity of the studies included in the review, the authors’ use of a summary table and a narrative synthesis appears justified. The use of tables to summarise the data relating to steroid injections and relative rest were helpful given the large amount of data. Similar tabulated summaries of how many studies (including patient numbers, quality scores etc.) assessed the other different outcomes and their overall findings would also have been helpful. Overall, the reviewers’ conclusions appear to follow from the data presented, but some caution is advised given the limitations in the review methodology and study data. Further research using standardised outcomes, interventions and patients appears warranted for some of the interventions.

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

Practice: The authors stated that, for patients who need a more rapid return to work or their usual activities, practitioners can recommend one or two steroid injections for pain relief in the initial stages (first few weeks or months) and physiotherapy (including active exercise) at any stage.

Research: The authors stated that further high-quality research to compare the effects of passive and active (including active exercise) physiotherapy with control therapies (minimal or usual care) is required. Future researchers should ensure that they address the methodological problems found in previous studies, such as the use of small sample sizes, mixed populations of patients with differing symptoms, poor reporting and the lack of a placebo comparison group.

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