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## High-energy extracorporeal shock-wave therapy for treating chronic calcific tendinitis of the shoulder: a systematic review

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### CRD summary

The authors concluded that high-energy extracorporeal shock-wave therapy improved pain and function in chronic calcific shoulder tendinitis. The conclusion reflects the evidence presented and is likely to be reliable

### Authors' objectives

To assess the efficacy of extracorporeal shock-wave therapy (ESWT) in patients with calcific or noncalcific tendinitis of the shoulder.

### Searching

MEDLINE, Cochrane CENTRAL, EMBASE, Web of Science and Google Scholar were searched from inception to November 2013. Search terms were reported. No language restrictions were imposed. Review articles, manuscripts and journal supplements were handsearched for additional studies.

### Study selection

Randomised controlled trials (RCTs) of ESWT in people with calcific or noncalcific shoulder tendinitis were eligible. Trials could compare different energy levels of ESWT with each other or placebo, or compare ESWT with other treatments. Outcomes of interest included shoulder pain and function and resolution of calcification (for calcific tendinitis). High energy ESWT was defined as energy flux density (EFD)  $\geq 0.28$  mJ/mm<sup>2</sup> and low energy as EFD  $< 0.28$  mJ/mm<sup>2</sup>.

Average age of participants in included trials was 51 years (range 47 to 56) and average percentage of women was 58% (range 39 to 76). Fourteen different ESWT devices were used. EFD varied from 0.06 to 0.55 mJ/mm<sup>2</sup>, the number of pulses from 1,000 to 3,000 and the number of sessions from one to five at intervals from one to six weeks. Analgesic/anaesthetic regimens varied.

Three independent reviewers selected studies for inclusion.

### Assessment of study quality

Study quality was assessed based on randomisation, allocation concealment, blinding, use of intention-to-treat analysis, withdrawals and similarity of groups at baseline.

Three independent reviewers assessed quality.

### Data extraction

Three independent reviewers extracted data for the review. Effect sizes for pain and function outcomes were expressed as Hedges' g (standardised mean difference corrected for small sample size).

### Methods of synthesis

A narrative synthesis was presented. Effect sizes for different groups of trials were summarised in forest plots. Meta-analysis was not performed.

### Results of the review

Twenty-eight RCTs (1,745 participants) were included: 20 trials compared different ESWT energy levels with placebo and eight compared ESWT with other treatments. Twenty-one trials investigated calcific tendinitis. Study quality was generally low.

Calcific tendinitis ESWT versus placebo (seven trials): ESWT reduced shoulder pain or improved function significantly compared with placebo. High-energy ESWT was significantly better than placebo for both outcomes; results for low-

energy ESWT were only statistically significant for function.

Calcific tendinitis high- versus low-energy ESWT (eight trials): High-energy ESWT was superior to low-energy in most trials for function but not for pain. High-energy ESWT seemed to be more efficient than low-energy for reducing calcification.

Calcific tendinitis ESWT versus other treatments: Single trials suggested that ESWT was as effective as exercise or radiation therapy and more effective than transcutaneous electrical nerve stimulation. Other results were reported.

Non-calcific tendinitis trials: One of three trials that compared low-energy ESWT with placebo found a significant improvement with ESWT and two found no difference in pain and functional outcomes. One RCT compared high-and low-energy ESWT and found no difference in outcomes.

Adverse events: Patients who received high-energy ESWT reported more adverse events than those who received low-energy ESWT or placebo. No serious adverse events occurred in any of the trials.

### **Authors' conclusions**

High-energy ESWT is effective for improving pain and function in chronic calcific shoulder tendinitis.

### **CRD commentary**

The review question and inclusion criteria were clear. The search covered various relevant sources. There was no explicit effort to locate unpublished studies. Study selection, quality assessment and data extraction were undertaken by multiple reviewers, which minimised risks of errors and bias affecting the review process. Quality assessment used appropriate criteria and the results were used in the analysis.

The authors' decision not to perform a meta-analysis was reasonable in view of the clinical heterogeneity of the included studies. The conclusion that high-energy ESWT improved pain and function compared with placebo was based on a small number of trials but the consistency and size of the observed effect suggests that the conclusion is likely to be reliable.

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

Practice: The authors stated that ESWT may be under-utilised in current practice.

Research: The authors stated that further controlled studies were required to define the most effective dosing parameters and administration technique for ESWT.

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