Do exercises improve outcome following fixation of ankle fractures: a systematic review

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CRD summary
This review assessed the effectiveness of mobilisation exercises in improving outcomes following open reduction and internal fixation of ankle fractures. The authors tentatively concluded, on the basis of limited evidence, that post-operative ankle exercises may provide some short-term benefit although this does not seem to be maintained longer term. The authors’ conclusions may have overstated the potential benefits of post-operative exercises and, as such, should be considered with caution.

Authors' objectives
To review the effectiveness of mobilisation exercises in improving outcomes following open reduction and internal fixation of ankle fractures.

Searching
AMED, British Nursing Index, CINAHL, EMBASE, MEDLINE, PEDro, PubMed and the Cochrane CENTRAL Register were searched from inception to December 2005; the search terms were reported. In addition, two specialist journals were searched and all references of relevant papers were screened. Only papers published in English were included.

Study selection
This review considered controlled clinical trials assessing the impact of post-operative ankle exercises after open reduction and internal fixation of ankle fractures. Details of the intervention varied between the included studies, as did the timing of exercise initiation. The populations included in this review received a variety of surgical procedures and ranged in age from 15 to 78 years. The included studies were prospective randomised controlled trials (RCTs), retrospective RCTs and observational studies. Control groups were required to have not been prescribed exercises; all of the included control groups conformed to this. Outcome measures were not specified as an inclusion requirement; the included studies reported a variety of outcomes such as X-rays, range of movement and functional assessments. Only papers published in English were eligible.

Two independent reviewers assessed each paper for inclusion, and any disagreements were resolved by discussion to reach consensus.

Assessment of study quality
The validity assessment was carried out using the PEDro scale, which evaluates randomised trials on 11 variables.

Two independent reviewers carried out the validity assessment, and any disagreements were resolved by discussion to reach consensus.

Data extraction
The authors reported extracting the main outcomes and results from each study but provided no further details.

Two independent reviewers extracted the data, and any disagreements were resolved by discussion to reach consensus.

Methods of synthesis
A narrative synthesis was carried out as a result of the wide heterogeneity amongst the outcome measures of the included studies. The results were grouped according to similar outcome topics.

Results of the review
This review included 15 studies (n=870): one observational study (n=47) and 14 RCTs (n=823).
Overall, the methodological quality was poor with the highest PEDro score being 6 out of 11. Only 2 studies used blinded assessors, and of the eleven reported as using randomisation only five used concealed allocation. None of the original analyses were performed on an intention-to-treat basis.

Functional scoring systems: 10 studies used a total of six function-based scales to assess the impact of exercise. Three studies reported better scores after 6 weeks for the exercise group, but not at 6 months post-operation, while the remainder found no significant differences between the groups.

Swelling: 5 papers measured swelling. Of these, one found a significant benefit in the exercise group, one did not report the results and the remaining three found no significant benefit.

Strength: 5 studies measured strength via circumference measurements of the calf, isokinetic testing machine or manual muscle testing. Four studies reported no benefit of exercise while one did not report their results.

Pain: 4 papers reported pain (via a visual analogue scale or other assessment method), one of which found a significant benefit of exercise over the control condition, although this was not maintained at the 1-year post-operation follow-up. Three studies found no significant difference between the groups.

Range of movement: 12 articles reported range of movement as an outcome and used various measurements. No results were available from one paper, five found no significant benefit of exercise, and six reported significantly improved dorsal and/or plantar flexion in the exercise groups.

Complications: 11 papers assessed post-operative complications by time of weight-bearing, the most common of which was wound complication. Five studies did not report differences between the intervention and control groups, one reported more wound infection in the early-weight bearing group, and two reported individual cases of wound infection in their exercise groups.

Other outcomes reported in this paper included radiological analysis, bone mineral content, return to work or activity and patient satisfaction.

**Authors’ conclusions**

On the basis of limited evidence, early post-operative ankle exercises may provide some short-term benefit compared with immobilisation, although this does not seem to be maintained in the longer term. Further trials are required.

**CRD commentary**

This review addressed a relatively clear question with appropriate search strategies. The inclusion criteria were clear, if somewhat broad, which resulted in substantial heterogeneity in terms of the outcome measures included, population and intervention. The exclusion of unpublished and non-English language papers might have resulted in the omission of relevant studies. The review process was clear and transparent, and was therefore likely to have minimised bias during the various stages. While an appropriate validity assessment was carried out, the better quality evidence was not clearly identifiable in the results and synthesis section, making it difficult to assess which findings could be considered more robust. The lack of quantitative results reported for the primary studies also contributes to this problem. The narrative synthesis seems appropriate given the information provided on the included studies, although no distinctions were drawn between studies of different fracture types or different exercise interventions. The authors’ conclusions appear to overstate the potential benefits of post-operative exercises and, as such, should be viewed with caution.

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

Practice: The authors did not state any implications for practice.

Research: The authors stated that larger RCTs with longer term follow-up are required to assess the potential benefits of early post-operative ankle exercises following open reduction and internal fixation of ankle fractures.

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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.