Early mobilization of operatively fixed ankle fractures: a systematic review

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CRD summary
The authors concluded that it was difficult to conclude whether early motion was better or worse overall than cast immobilization. Early motion may result in quicker return to work and cast immobilization may result in fewer complications. The authors' conclusions may not be reliable given the potential for publication bias and poor reporting of statistical methods.

Authors' objectives
To determine the effectiveness of early mobilization of operatively treated ankle fractures on functional outcomes.

Searching
MEDLINE, EMBASE and The Cochrane Library (to 2008) were searched for papers published in English. Search terms were reported. Reference lists of all identified papers were handsearched. Experts in the field were contacted.

Study selection
Randomised (or pseudo-randomised) controlled trials that compared immobilization for six to eight weeks against early motion of the ankle joint in patients with any type of operatively treated ankle fractures were eligible for inclusion. Only studies where patients in the early motion group spent at least half of the initial study period free to dorsiflex and plantarflex the ankle joint, and where the immobilization group spent the whole of the initial study period in a non-removable cast were included. Exclusion criteria were studies: that enrolled conservatively treated fractures; involved children (except those that included a very small percentage of younger adolescents); that assessed other ankle injuries (such as ligament injuries, pilon fractures); and where comparison groups were treated differently (after the initial phase and with respect to weight bearing). Outcomes considered were: functional outcomes; range of motion; time for return to work; and complications (such as wound infections).

Most of the included studies reported all types of operatively treated ankle fractures. The initial study phase was six weeks in all studies. Patient ages ranged from 14 to 71 years. All of the comparison groups used casts. Casts used were either plaster of Paris or fiberglass casts. Types of early motion were varied and included: foot free; orthosis; removable DonJoy; hinge brace; removable Aircast; air stirrup; and removable cast. Olerud and Molander Score was the most commonly used outcome score.

The authors did not state how many reviewers assessed studies for inclusion.

Assessment of study quality
Quality was assessed independently by two reviewers using a modified CONSORT statement checklist. Key criteria assessed included: power of study; randomisation; allocation concealment; blinding of patients; baseline patient characteristics; and intention-to-treat analysis. Each criteria was rated as yes, no or unclear; no summary score was produced. Disagreements were resolved by a third reviewer.

Data extraction
Data on injury patterns, treatment protocols, weight-bearing status and outcome measures were independently extracted by two reviewers. The authors did not state how any disagreements were resolved.

Methods of synthesis
For comparable outcomes, results were combined using meta-analysis (details on methods used not reported); otherwise, results were reported narratively.

Results of the review
Nine studies were included (n=550 patients, range 14 to 71). Randomisation was reported as adequate in only two
studies. Allocation concealment was reported as: adequate in two studies; inadequate in two and; unclear in five studies. Power calculation, blinding of patients and intention-to-treat analysis were not done in all the studies.

**Functional scores:** At six weeks, functional scores (Olerud and Molander or Mazur) were significantly higher in the early motion group compared with the cast group ($p=0.001$; four studies). There were no statistically significant differences in scores between early motion and cast groups at one year (seven studies), 1.5 years (one study) and two years (two studies).

**Range of motion:** Range of motion was significantly higher in the early motion groups at nine to 12 weeks ($p<0.001$, dorsiflexion $p<0.00001$, plantarflexion $p<0.00001$; three studies). No difference in range of motion was found at one year (two studies).

**Return to work:** Time to return to work was significantly shorter in the early motion group ($p<0.00001$, three studies).

**Wound infections:** Rate of wound infection was significantly higher in the early motion group ($p=0.002$; nine studies). No difference in rate of deep vein thrombosis (DVT) was found between early motion and cast groups (three studies).

**Authors’ conclusions**
The authors concluded that it was difficult to conclude whether early motion was better or worse overall than cast immobilization. Available evidence suggested that early motion of the ankle joint may be beneficial in a young fit patient who needed to return to work and that cast immobilization may be beneficial in a patient with poor skin or who was at risk of infection.

**CRD commentary**
The review question was clearly stated. Three relevant databases were searched. Only publications in English were included and the search for unpublished studies was limited; therefore, the possibility of language and publication biases could not be excluded. Data extraction and validity assessment were done in duplicate, which reduced risks of error and bias; it was unclear whether similar efforts were used in study selection. Study quality was assessed using appropriate criteria and the results used to inform interpretation of available evidence. The appropriateness of meta-analysis was unclear as details of the methods used were not reported. The conclusions reflected the results of the included studies. Given a number of weaknesses (potential for publication bias and poor reporting of statistical methods), the authors conclusions may not be reliable.

**Implications of the review for practice and research**
**Practice:** The authors stated that the decision for management of operatively treated ankle fractures should involve a clinical judgement that would depend on each individual patient. Individualised decisions should aim for a balance between early motion to achieve improved short term function/earlier return to work and cast immobilization to reduce postoperative complications.

**Research:** The authors stated that further well-conducted randomised controlled trials (with larger sample sizes and adequate reporting) to compare the effects of early motion and cast treatment after operative fixation of ankle fractures were warranted.

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