Supination-external rotation ankle fractures: stability a key issue
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CRD summary
This review of treatment for stable supination-external rotation ankle fractures concluded that there was adequate evidence that nonoperative treatment was appropriate for stable fractures and that surgery appeared best for unstable fractures. There were some limitations in the reporting of review methods and this conclusion seemed a little strong given limitations in the quality of the evidence.

Authors' objectives
To review the effects of internal fixation and non-operative treatment for stable supination-external rotation (SER) ankle fractures.

Searching
MEDLINE, EMBASE, CINAHL and The Cochrane Library databases and Google Scholar were searched without language restrictions to October 2008. Search terms were reported. Reference lists of studies were searched.

Study selection
Studies published in peer-reviewed journals and that reported on at least 10 closed SER ankle fractures in skeletally mature patients followed for more than one year were eligible for the review. Studies that reported fractures in specific patient populations (such as the elderly) were excluded as comorbidities could have affected the method of fracture treatment.

Fracture types and classifications varied and included Lauge-Hansen SER-II and IV and Orthopaedic Trauma Association 44-B. Interventions included variable types of open reduction and internal fixation or non-operative treatment. Outcome measures varied and included Short Form 36 visual analogue pain scale, Short Musculoskeletal Function Assessment questionnaire, arthritis, infections and patient satisfaction with treatment and outcome. Duration of follow-up ranged from one to 29 years.

Two reviewers screened abstracts for inclusion; it was unclear whether they also selected the full studies.

Assessment of study quality
Study quality was assessed with the Coleman Methodology Score. This covered sample size, length of follow-up, number of different fracture management methods used, study design, descriptions of the diagnosis and management methods, description of the rehabilitation protocol, outcome criteria, procedure of assessing outcomes, and the description of the subject selection process. Maximum possible score was 100.

Two reviewers assessed study quality independently. Disagreements were resolved by consensus.

Data extraction
Results for treatment outcomes and complications were extracted.

The authors did not report how many reviewers performed the data extraction.

Methods of synthesis
Results were reported in tables and a narrative synthesis.

Results of the review
Eleven studies were included (n=913): four retrospective and seven prospective studies; there were no randomised controlled trials. Mean quality score was 57.8 (range 34 to 81).
Three prospective long-term outcome studies reported on SER-II stable ankle fractures treated between 1950 and 1976 and found similar proportions of patients/ankles were symptom free for those treated operatively (30 of 34; 88.2%) and nonoperatively (148 of 178; 83.1%). Proportions with post-traumatic osteoarthritis were similar for nonoperative (five of 178, 2.8%) and operative treatment (one of 34; 2.9%).

Two later studies showed that after nonoperative treatment 42 of 67 (62.7%) ankles were asymptomatic and 33 of 67 (49.3%) had some osteoarthritis after a mean follow-up period of 19.4 years. Two studies reported post-traumatic osteoarthritis after operative treatment in 18 of 86 (20.9%) ankles after a mean of 5.5 years and 64 of 96 (66.7%) ankles were asymptomatic after a mean of 4.4 years.

Three studies measured general health and found that having a medial malleolus fracture, being female, being older, having a higher American Society of Anesthesiologists grade, smoking and having a lower educational level all had a negative influence on general health outcome, physical function and pain.

Injury of the syndesmosis was reported by two studies: one reported no injury and the other that two of 19 ankles had a syndesmosis injury. Complications were reported by five studies with 37 of 355 (10.4%) ankles affected; these included thromboembolic events, hardware failure, nonunions and infections. One patient died from a fatal pulmonary embolism.

**Authors' conclusions**
There was adequate evidence that nonoperative treatment was appropriate for stable SER ankle fractures. Unstable fractures appeared to be best treated surgically, but were still associated with symptoms and osteoarthritis.

**CRD commentary**
This review had a clear objective. There were no language restrictions. Only published studies were included, so the review was at risk of publication bias. Abstracts were screened for inclusion by two reviewers; it was not reported whether full studies were assessed in the same way and whether data extraction was carried out by more than one reviewer, so the risk of errors and bias could not be ruled out. Study quality was assessed by two reviewers independently using a tool designed for this clinical area, but only the total score was reported for each study. Results were reported narratively.

The authors' conclusion that there was adequate evidence seemed a little strong given that they also highlighted a lack of evidence from randomised controlled trials and stated that there was no strong evidence for the outcomes of SER ankle fractures.

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

**Practice:** The authors stated that nonoperative treatment appeared appropriate for stable SER ankle fractures and that surgery appeared to be best for unstable fractures.

**Research:** The authors stated that multicentre prospective studies were needed to evaluate factors that influenced general health outcomes. Future research should also assess the incidence of syndesmotic injuries and their impact on outcome, compare operative with nonoperative treatment and report results by fracture type.

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