Percutaneous and minimum incision metatarsal osteotomies: a systematic review

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CRD summary
The author concluded that percutaneous surgical treatment of hallux valgus may result in structural realignment, patient satisfaction and safety comparable to open approaches, but further research was needed. In light of potential for error and bias in the review process and the poor quality and small number of available studies, the author's conclusions should be treated with caution.

Authors' objectives
To assess the efficacy and safety of percutaneous and minimum incision surgery in the treatment of hallux valgus and deformities of the lower metatarsus.

Searching
American College of Physicians Journal Club, CINAHL, The Cochrane Library, Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Database of Systematic Reviews, Cochrane Methodology Register, DARE, EMBASE, MEDLINE, HTA Database, NHS EED and MEDLINE in process and other non-indexed citations were searched from inception to December 2008. Search terms were reported. Websites, abstracts, posters and proceedings from eight relevant societies were searched. Relevant textbooks were searched. A search was made through the Google website. The search was not restricted by language or publication status.

Study selection
Prospective studies that evaluated the efficacy and safety of percutaneous forefoot surgery or minimum incision surgery in patients with hallux valgus or deformities of the lower metatarsus were eligible for inclusion. Treatment efficacy was defined as a stable lasting realignment of the first metatarsophalangeal joint or lesser metatarsus. Treatment safety was defined as prevalence of surgical complications that were equal to or less than the prevalence of complications in open surgeries. Patient satisfaction measures were eligible for inclusion. In order to be eligible for inclusion, studies needed to enrol patients consecutively and have an average follow up of at least 12 months.

Included studies assessed New-Akin percutaneous surgical treatment and New-Isham-Akin percutaneous operations. Participants' mean preoperative metatarsal angle ranged from 12.0 to 12.9, mean preoperative hallux abductus angle ranged from 24.9 to 28.3 and mean distal metatarsal articular angle (where stated) ranged from 12.4 to 15.7. Mean age of participants ranged from 47 to 50.3 years. Most patients (86% to 100%) were female. None of the participants were medically compromised (such as with diabetes mellitus or peripheral neuropathy with a history of cutaneous compromise). Mean follow-up ranged from 12.1 months to 29 months.

Study selection was performed by one reviewer.

Assessment of study quality
There was no formal assessment of study quality; levels of evidence were reported. Levels of evidence were assigned by one reviewer.

Data extraction
Data extraction was carried out by one reviewer.

Methods of synthesis
Studies were combined in a narrative synthesis.

Results of the review
Three prospective case-series studies were included for the review (n=184 participants and n=190 feet).

Efficacy. Percutaneous surgical treatment significantly altered the hallux abductus angle, intermetatarsal angle 1-2 and...
distal metatarsal angle measurements compared to pre-treatment levels in all three studies. Both studies that used the first Metatarsal-Phalangeal Joint Scoring System reported significant differences following percutaneous surgical intervention compared to pre-treatment levels.

**Safety:** Complications across all three studies appeared to be comparable.

**Authors' conclusions**

Percutaneous surgical treatment of hallux valgus may have resulted in structural realignment and patient satisfaction and safety comparable to that found in open approaches. Further research was needed, particularly in patients who were medically compromised.

**CRD commentary**

The review addressed a clear question with well-defined inclusion criteria. A thorough search was conducted and suitable steps were taken to minimise risks of language and publication biases. The review process was conducted by one reviewer; therefore, reviewer error and bias could not be ruled out. The methodological quality of included studies was not formally evaluated; however, quality of the included studies appeared poor and thereby undermines the reliability of the findings. Most participants were female and it was unclear to what extent the findings were generalisable to males. The decision to combine the studies in a narrative synthesis was appropriate. In light of potential for error and bias in the review process and the poor quality and small number of available studies, the author’s conclusions should be treated with caution.

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

**Practice:** The author did not state any recommendations for practice.

**Research:** The author stated that further methodologically sound prospective cohort studies and RCTs were needed, particularly in medically compromised patients.

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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.