Outcomes after cheilectomy with phalangeal dorsiflexory osteotomy for hallux rigidus: a systematic review
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CRD summary
The evidence supported the idea that cheilectomy with phalangeal dorsiflexory osteotomy reduced pain and improved patient satisfaction and yielded low levels of need for revision surgery at least one year after the intervention. Concerns about the quality of the evidence and the review mean that the conclusions and recommendations for future practice appear insufficiently cautious and may not be reliable.

Authors' objectives
To evaluate the efficacy and safety of cheilectomy with phalangeal dorsiflexory osteotomy for hallux rigidus.

Searching
Twelve databases including EMBASE, The Cochrane Library, DARE and NHS EED were searched up to March 2010. Studies were considered for eligibility regardless of their publication status. Google search engine and podiatric foot and ankle surgery and orthopaedic surgery annual society meetings proceedings were searched for additional studies.

Study selection
Studies were eligible if they involved consecutively enrolled patients who underwent isolated cheilectomy with phalangeal dorsiflexory osteotomy. Patients had to be evaluated at a mean follow-up of 12 months and include details of complications that required surgical intervention. Studies had to report some form of data analysis.

Mean weighted patient age was 53 years (range 43 to 58). Where stated, patients had hallux rigidus grade I, II or III. Most patients were classed as grade II but different grading systems were used. Outcome measurement tools and details of the procedure varied. Most studies always performed phalangeal dorsiflexory osteotomy every time a cheilectomy was undertaken. Four studies reported correcting the hallux abductus interphalangeus concomitantly with dorsal wedge osteotomy.

One reviewer selected the studies.

Assessment of study quality
The author did not state that he assessed study quality.

Data extraction
Means and standard deviations, counts and percentage were extracted from each study by one reviewer.

Methods of synthesis
For dichotomous data, total number of events were added across studies to calculate overall percentages. For continuous data, weighted mean differences appeared to be calculated to compare baseline and follow-up data; the statistical methods used were unclear.

Results of the review
Ten studies (11 publications) were included. Mean weighted follow-up was 51.1 months (range 14 to 82 months). Most feet (374 feet out of an initial 395) were included at follow-up. Seven studies were classed as retrospective, two were classed as "prospective longitudinal" (definition not provided) and one was classed as prospective and comparative. The author stated that overall study quality was poor.

Pain was relieved or improved in 149 out of 167 (89.2%) procedures (four studies) and 167 out of 217 (77%) of patients related being satisfied or very satisfied with their outcomes (five studies). Eighteen (4.8%) procedures were reported to require surgical revision.
Dorsiflexion range of motion of the first metatarsal-phalangeal joint increased 9° from a weighted mean of 20.3° preoperatively to 29.3° following surgery (five studies).

Plantarflexion range of motion of the first metatarsal-phalangeal joint decreased 4.8° from a weighted mean of 31.7° preoperatively to 26.9° after the intervention (three studies).

American Orthopaedic Foot and Ankle Society Hallux Metatarsophalangeal-Interphalangeal Scoring Scale increased 39.6 points from a weighted mean of 44.8 preoperatively to 84.4 after surgery (four studies).

Weighted mean shortening of the hallux was 3.9mm and the weighted mean reduction of the hallux abductus interphalangeus angle was 5.5° (two studies).

Further data on complications were reported.

**Authors' conclusions**
The evidence supported the idea that cheilectomy with phalangeal dorsiflexory osteotomy demonstrated pain reduction and improved patient satisfaction with a low overall incidence of the need for revision surgery; this was maintained at least one year after surgery.

**CRD commentary**
The review question was supported by broad but clear selection criteria. A large number of published and unpublished sources were consulted. There were no language and date restrictions. Only one reviewer selected studies and extracted data so reviewer error and bias could not be ruled out. There was no formal quality assessment of the evidence. Only one study was classed as comparative, which suggested that the studies were at high risk of bias. Poor reporting made it unclear whether appropriate methods were used to synthesise data. The author reported multiple differences between the studies so it was unclear how appropriate it was to make comparisons across the studies. The author stated that concomitant interventions may have confounded the results of some studies.

Given multiple limitations in the evidence and in the conduct of the review, the conclusions and recommendations for future practice appear insufficiently cautious and may not be reliable.

**Implications of the review for practice and research**
**Practice:** The author stated that cheilectomy with phalangeal dorsiflexory osteotomy should be considered a first-line surgical treatment for hallux rigidus.

**Research:** The author stated a need for methodologically sound prospective cohort studies to focused on use of cheilectomy with phalangeal dorsiflexory osteotomy for specific grades of hallux rigidus. He stated that it would be beneficial to prospectively compare subjective and objective outcomes and compare the need for surgical revision after cheilectomy with phalangeal dorsiflexion osteotomy with cheilectomy alone. He suggested that prospective comparison of cheilectomy with phalangeal dorsiflexion osteotomy with Valenti arthroplasty and autogenous soft tissue interpositional arthroplasty, especially for grade II and III hallux rigidus, would be beneficial.

**Funding**
None reported.

**Bibliographic details**

**PubMedID**
20619694

**DOI**
10.1053/j.jfas.2010.05.006

**Original Paper URL**
Database of Abstracts of Reviews of Effects (DARE)
Indexing Status
Subject indexing assigned by NLM

MeSH
Hallux Rigidus /classification /surgery; Humans; Metatarsophalangeal Joint /surgery; Osteotomy /methods; Patient Satisfaction; Range of Motion, Articular; Reoperation /statistics & numerical data; Toe Phalanges /surgery; Treatment Outcome

AccessionNumber
12011000516

Date bibliographic record published
16/02/2011

Date abstract record published
17/07/2013

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.