

**Jiang N, Lin QR, et al. Surgical versus nonsurgical treatment of displaced intra-articular calcaneal fracture: a meta-analysis of current evidence base. Int Orthop. 2012;36(8):1615-22.**

Design: Systematic reviews of controlled clinical trials

Purpose of study: to compare the effectiveness of surgical versus nonsurgical treatment of displaced intra-articular calcaneal fractures

PICOS:

- Patient population: Displaced intra-articular calcaneal fractures
- Intervention: Surgical treatment of any description
- Comparison: Nonsurgical treatment of any description
- Outcomes: anatomical and functional outcomes
  - o Böhler angle
  - o Calcaneal height
  - o Calcaneal width
  - o Difficulties wearing shoes after treatment
  - o Failure to resume pre-injury work after treatment
  - o Number of patients with residual pain after treatment
  - o Complications after treatment
- Study types: Both randomized and non-randomized trials, with sensitivity analysis to separate the pooled results from randomized trials for three outcomes: not resuming work, residual pain, and complications

Study selection:

- Databases were MEDLINE, the Cochrane Library, Google Scholar, and BIOSIS from 1980 through December 2011
- Two authors independently rated articles for inclusion and assessed study quality with the Jadad scale, which awards points for randomization, blinding, description of withdrawals and dropouts, clear description of inclusion/exclusion criteria, descriptions of adverse events, and appropriate statistical analysis

Results:

- 142 articles were screened, 17 studies were assessed, and 10 trials with a total of 891 patients were included: 6 RCTs and 4 nonrandomized clinical trials
- Pooled results for anatomical outcomes supported surgical intervention: the surgical patients had greater Böhler angles, greater calcaneal height, and more stable calcaneal width

- Two of the three pooled studies were nonrandomized; the single RCT in the meta-analysis did not show statistically significant differences in Böhler angle or calcaneal height, and did not measure calcaneal width
- Four RCTs pooled outcome data from 167 patients for problems wearing shoes, and the results favored surgical treatment; the relative risk of problems was 0.42 with a 95% confidence interval from 0.26 to 0.68
- Failure to resume work was pooled from 6 studies, 3 randomized and 3 nonrandomized
  - The pooled relative risk of not resuming work was 0.59 for the six trials combined
  - The pooled relative risk for the three randomized trials was 0.46 with confidence intervals from 0.27 to 0.81
- Pooled relative risks of residual pain from 2 nonrandomized and 3 randomized trials were not significantly different between surgical and nonsurgical treatment
- Pooled incidence of complications from 6 trials showed a relative risk of complications of 1.51 in surgically treated compared to nonsurgically treated patients, and when the analysis was restricted to 3 RCTs, the relative risk was 1.47 with a 95% confidence interval from 1.06 to 2.04

Authors' conclusions:

- Anatomical restoration of the calcaneus is likely to be more successful with operative than with nonoperative treatment of displaced calcaneal fractures
- Surgically treated patients had a greater likelihood of returning to work than nonsurgically treated patients, but Buckley 2002 reported that RTW is not likely to occur when the patient has a heavy workload
- Complications are more frequent with surgically treated than with nonsurgically treated fractures, but this may be due to the fact that most of the included surgical trials entailed open operations; there are some potential benefits of lowering complication rates with percutaneous operations, for which randomized trials have not yet been done
- Many of the pooled results were susceptible to bias due to the inclusion of nonrandomized trials, but sensitivity analysis from randomized trials did suggest that surgery led to better functional outcomes

Comments:

- Although the individual components of the Jadad scale for rating RCTs were not reported, two of the included RCTs which were pooled to show return to work probably lacked adequate control of bias, with Jadad scores of only 2 on the 8 point scale; the third trial had a score of 5.5 which is likely to mean a good RCT

- The single high quality RCT in Figure 6 does show a higher rate of RTW in the surgical group, which could qualify it as yielding “some evidence” from one adequate RCT
- Five of the six studies in Figure 6 did show that the point estimates for RTW favored surgically treated fractures, and this is the outcome of greatest relevance to a WC guideline
- Buckley 2002 had considerable discussion of differences between Workers’ Compensation patients, but did not report return to work for heavy and light workloads, or for return to work in surgical and nonsurgical patients, which represents a missed opportunity to estimate these effects, since this was the only RCT with a large enough sample size to permit such an analysis
- The rates of complication were fairly low in most of the trials in Figure 8, except for Buckley 2002, suggesting that the definitions of “complication” differ between trials
  - It is unclear how the authors compiled the numbers for complications in Buckley 2002, where there were 57 complications in 208 surgical and 42 complications in 218 nonsurgical patients; these numbers are not reported as such in the text of the article

Assessment: An adequate meta-analysis which supports some evidence that in the setting of displaced intra-articular calcaneal fractures, return to work is more likely with surgical than with nonsurgical treatment, but that a heavy workload makes return to work less likely than with a light or moderate workload

Reference:

Buckley R, Tough S, et al. Operative compared with nonoperative treatment of displaced intra-articular calcaneal fractures: a prospective, randomized, controlled multicenter trial. *JBJS Am* 84-A:1733–1744, 2002.