Effectiveness and safety of endoscopic versus open carpal tunnel decompression
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CRD summary
The authors concluded that endoscopic carpal tunnel release and open carpal tunnel release produced similar relief of symptoms, but endoscopic surgery was safer, and had better recovery of function and earlier return to work. In light of important bias identified in several key trials, the authors’ conclusions should not be considered reliable.

Authors' objectives
To compare the effectiveness and safety of open versus endoscopic surgery for carpal tunnel syndrome.

Searching
PubMed, EMBASE, and Cochrane Central Register of Controlled Trials (CENTRAL) were searched in December 2012, for relevant studies. Search terms were reported.

Study selection
Randomised controlled trials (RCTs) that compared open carpal tunnel release and endoscopic carpal tunnel release (single-portal or two-portal technique) for patients with carpal tunnel syndrome were eligible for inclusion. Trials had to report either effectiveness or safety for both procedures. The primary outcome was the recovery of function (grip strength and pinch strength in three months). Secondary outcomes were measurement of relief of symptoms before or after three months, time until return to work, reoperation rate, and complications. Trials of patients with a clinical diagnosis of carpal tunnel syndrome associated with conditions such as pregnancy or hypothyroidism, as well as those of the intervention with standard open release without other instruments and modified incision, were excluded.

The included trials were conducted in North America, Europe, Iran or India. No specific details of the populations or interventions were provided.

Two reviewers independently selected trials for inclusion.

Assessment of study quality
Trial quality was evaluated using the Cochrane risk of bias tool which assessed randomisation, allocation concealment, blinding, incomplete outcome data and selective reporting.

The authors did not report how many reviewers assessed the trial quality.

Data extraction
The data were extracted to calculate risk ratios and mean differences, with their 95% confidence intervals. Two reviewers independently extracted trial data. Disagreements were resolved by discussion.

Methods of synthesis
Pooled risk ratios and mean differences, with their 95% confidence intervals, were calculated using a fixed-effect model, where there was no evidence of heterogeneity; otherwise a random-effects model was used. Heterogeneity was assessed using $\chi^2$ and $I^2$. A $\chi^2$ probability of less than 0.1 or an $I^2$ of over 50% was considered evidence of heterogeneity.

Results of the review
Fifteen RCTs with a total of 1,395 patients (1,596 hands) were included in the review. The authors stated that, four trials were rated as high quality, five were rated as moderate quality, and six were rated as low quality (mostly due to a lack of blinding in outcome assessment). Four trials reported adequate methods of allocation concealment, and five reported intention-to-treat analyses. Outcome assessor blinding was used in five trials. Follow-up ranged from 12 to 260 weeks; all but one trial had a follow-up of 12 to 52 weeks.

Meta-analyses showed that endoscopic surgery resulted in better recovery of pinch strength (MD 0.83kg, 95% CI 0.31
to 1.35; $I^2=0$; two RCTs), earlier return to work (MD -8.21 days, 95% CI -9.79 to -6.63; $I^2=41$%; four RCTs) and fewer wound problems (RR 0.34, 95% CI 0.12 to 0.96; $I^2=0$; seven RCTs). There were more reversible nerve problems (RR 2.90, 95% CI 1.14 to 7.36; $I^2=0$; seven RCTs) than with open surgery.

The meta-analyses showed no statistically significant differences between the treatments for irreversible nerve damage, reflex sympathetic dystrophy, relief of symptoms (pain and paraesthesia), recovery of grip strength and reoperation rate.

**Authors' conclusions**
The meta-analysis demonstrated that endoscopic and open carpal tunnel release produced similar relief of symptoms, but endoscopic surgery resulted in better recovery of function and earlier return to work, and was safer.

**CRD commentary**
The review question was clear and the inclusion criteria were reported. Efforts were made to find published and unpublished trials. Suitable methods to reduce reviewer error and bias were used for some stages of the review, but it was unclear if they were used for quality assessment.

Appropriate methods were used to pool the data and assess heterogeneity. The risk of bias was assessed, but the results were rarely used to inform the review conclusions (for example, sensitivity analyses were not performed). This casts some doubt on the reliability of the pooled results, since many trials had potentially important bias.

In light of the important bias identified in several key trials, and the generally small samples, the authors' conclusions should not be considered reliable.

**Implications of the review for practice and research**
The authors did not state any implications for practice and research.

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