Comparison of unicompartmental knee arthroplasty and total knee arthroplasty in the treatment of unicompartmental osteoarthritis: a meta-analysis


CRD summary
This review compared clinical outcomes of unicompartmental knee arthroplasty with total knee arthroplasty in the treatment of unicompartmental knee osteoarthritis and concluded that unicompartmental knee arthroplasty provided better postoperative function and had fewer complications than total knee arthroplasty. Uncertainty about the review process and the poor quality of included studies mean that the authors’ conclusions should be interpreted with caution.

Authors' objectives
To compare the clinical outcomes of unicompartmental knee arthroplasty (UKA) with total knee arthroplasty (TKA) in the treatment of unicompartmental knee osteoarthritis

Searching
The authors searched PubMed, The Cochrane Library, EMBASE, CMD and China Hospital Knowledge Database and Google search engine for relevant articles published from inception to August 2009. Search terms were reported. The bibliographies of retrieved papers were searched for further relevant studies.

Study selection
Eligible studies were randomised controlled trials (RCTs) of patients who underwent surgery for unicompartmental knee osteoarthritis. Eligible trials compared unicompartmental knee arthroplasty with total knee arthroplasty and reported pertinent outcome data including revisions, complications, postoperative range of motion and postoperative knee score. Well designed quasi-RCTs were eligible.

Average age ranged from 61 to 71 years. The proportion of males ranged from 14% to 60%. Unicompartmental knee arthroplasty techniques included St Georg Sledge, Brigham, Miller-Galante, Oxford, UC-Plus. Total knee arthroplasty techniques included kinematic cruciate retraining, press-fit condylar and vanguard cruciate retraining.

The number of reviewers who performed the study selection was not stated.

Assessment of study quality
The review reported study quality details of randomisation, allocation concealment and blinding.

The number of reviewers who performed the quality assessment was not reported.

Data extraction
Two reviewers independently extracted risk ratios (RRs) with 95% confidence intervals (CIs) and mean differences with 95% CIs for meta-analysis. Authors were contacted where insufficient data were reported in the papers. Disagreements were resolved by discussion and consensus.

Methods of synthesis
The authors pooled outcomes (RRs with 95% CIs and mean differences with 95% CIs) using either random-effects or fixed-effect models depending on the statistical significance of $\chi^2$ tests to assess statistical heterogeneity (the authors used $p<0.05$ rather than the more common and conservative $p<0.1$). Clinical heterogeneity was assessed by comparison of study characteristics. It appeared that studies were not pooled where significant clinical heterogeneity was present; if studies did not have significant clinical and statistical heterogeneity they were pooled using random-effects models; otherwise they were pooled using fixed-effect models. Publication bias was not assessed as there were too few trials.

Results of the review
Seven studies (n=700 knees, range 46 to 230 knees) were included in the meta-analysis. Follow-up ranged from 0.5 years to 15 years. Four studies reported adequate allocation concealment. Two studies reported adequate randomisation. One study reported adequate blinding.

Based on five studies where follow-up was five years or less (610 knees), the authors estimated there was a statistically significantly increased risk of revision in the total knee arthroplasty compared with the unicompartmental knee arthroplasty groups (RR 3.47, 95% CI 1.23 to 9.77, I^2=0%, fixed-effect model). In the two studies (148 knees) with follow-up of more than five years, there was no statistically significant difference in the risk of revision between groups.

Based on five studies (546 knees), risk of complications was lower in unicompartmental than in total knee arthroplasty groups (RR 0.20, 95% CI 0.08 to 0.52, I^2=0%, fixed-effect model).

Based on five studies (n=586 knees), total knee arthroplasty groups had a statistically significantly increased range of motion compared with unicompartmental knee arthroplasty groups (WMD 6.43, 95% CI 3.46 to 9.40, I^2=70%, random-effects model).

Based on four studies (452 knees) there were no statistically significant differences in Knee Society Scores in the two groups (I^2=65%, fixed-effect and random-effects models).

**Authors' conclusions**
Unicompartmental knee arthroplasty provided better postoperative function and had fewer complications than total knee arthroplasty. There were more revisions following unicompartmental knee arthroplasty in patients followed up for five years or less, but the difference was not significant in patients with longer-term follow up.

**CRD commentary**
The search was thorough in terms of the number of sources searched. No language restrictions were reported. Study selection criteria were adequately stated. Sufficient study details were reported to identify sources of clinical heterogeneity. Data were extracted in duplicate, which reduced risks of reviewer error and bias; this was not reported for study selection. Some quality assessment details were reported, but the quality assessment process was not reported. The effect of using knees rather than people as the unit of observation was unclear and may have introduced bias to the results. An appropriate method of synthesis was used. The results were clearly reported.

Uncertainty about the review process and poor quality of the included studies mean that the authors' conclusions should be interpreted with caution.

**Implications of the review for practice and research**
Research: The authors stated that further research and improved methods were needed to better assess unicompartmental and total knee arthroplasty in treating unicompartmental knee osteoarthritis.

Practice: The authors did not state any implications for practice.

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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.