Total knee arthroplasty after high tibial osteotomy: a systematic review

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CRD summary
This review concluded that osteotomy did not appear to compromise subsequent total knee arthroplasty. However, the overall low quality of evidence precluded solid clinical conclusions. The authors’ conclusions appear to be supported by the evidence.

Authors' objectives
To assess the effects of high tibial osteotomy on clinical outcomes of subsequent total knee arthroplasty.

Searching
MEDLINE and EMBASE databases were searched up to September 2007. Reference lists of identified studies were checked manually for additional published studies. Search terms were reported.

Study selection
Observational studies (concurrent cohort, historical cohort, controlled before-and-after and case-control studies) that included patients who had total knee arthroplasty performed after prior high tibial osteotomy were selected for review. Only full-text papers written in English, German or Dutch were eligible. Methodological quality was used as an additional criterion for study inclusion: studies that fulfilled 50% or more validity criteria on both tools were selected for the review.

The surgical techniques used for osteotomy varied between studies: four studies used lateral closing wedge technique; one study used valgus dome osteotomy; and another four studies described combined techniques or did not report the procedure used. Median delay in the total knee arthroplasty following osteotomy was seven years (range: 4.8 to 9.7). In most studies, average age at total knee arthroplasty was over 60 years (eight studies). Between 89% and 100% of patients were diagnosed with knee osteoarthritis. The proportion of women in each group ranged from 31% to 87%. Average follow-up after total knee replacement was three years (range: 3.1 to 12.6).

Two reviewers assessed studies for inclusion. Any disagreements were resolved through discussion.

Assessment of study quality
Critical appraisal of observational studies tool (Deek) and methodological index for non-randomised studies (MINORS) form were used for validity assessment.

Two reviewers independently assessed study quality. Any disagreements were resolved via consensus.

Data extraction
Data on intervention (operation time, lateral ligamental release, tuberosity osteotomy, tibial component insert) and clinical outcome measures (such as postoperative knee range of motion, clinical knee scores) and adverse events (such as aseptic loosening and infection) were extracted.

Two reviewers independently extracted data using a pre-tested standardised form. Disagreements were resolved via consensus.

Methods of synthesis
The results were synthesised narratively.

Results of the review
Nine (n=691) concurrent cohort studies were included in this review. Mean quality score was 7.6 (range: 6 to 9) on
All studies reported postoperative pain and functional outcomes. Two studies reported significantly less postoperative knee motion (median 10°, range: 4° to 14°) in patients who had prior osteotomy. Prolonged operation times (median 26 minutes) were noted for patients who received total knee arthroplasty after prior osteotomy (four studies).

No significant differences were found in occurrence of adverse events of aseptic loosening, deep infection or other additional interventions (eight studies), patellar loosening (seven studies) and staged patellar resurfacing due to persistent patellofemoral symptoms (one study) between the two patient groups.

Authors’ conclusions
Osteotomy did not compromise subsequent knee replacement. However, the low quality of evidence precluded solid clinical conclusions.

CRD commentary
The review question was clear and supported by defined inclusion criteria. The literature search appeared adequate. However, no apparent attempts were made to identify unpublished studies and only full-text articles were eligible for this review. As a result, some relevant unpublished studies may have been missed. The authors did not assess the risk of publication bias formally. The restriction to English, German or Dutch studies may have introduced language bias. Study selection, validity assessment and data extraction were done by two reviewers independently, which minimised bias and errors during the review process. Given the heterogeneous nature of included studies, narrative synthesis was appropriate. The conclusions of this review appear to be supported by the evidence presented.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.
Research: Knee arthroplasty register data or multicentre high-quality observational studies were required to produce better quality evidence.

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