Biological knee reconstruction: a systematic review of combined meniscal allograft transplantation and cartilage repair or restoration

Harris JD, Cavo M, Brophy R, Siston R, Flanigan D

CRD summary
This review concluded that combined meniscal allograft transplantation and cartilage repair/restoration improved clinical outcomes to the same extent as either procedure performed in isolation. These conclusions largely reflect the findings but limitations of the review (such as lack of long-term data and diversity of the small evidence base) suggest that the conclusions should not be considered reliable.

Authors' objectives
To compare clinical outcomes following meniscal allograft transplantation (MAT) combined with cartilage repair/restoration versus either procedure performed in isolation.

Searching
MEDLINE, CINAHL, SPORTDiscus and the Cochrane Collaboration of Systematic Reviews were searched to February 2010 for studies published in English. Search terms were reported. Reference lists of retrieved articles were searched manually.

Study selection
Eligible studies reported clinical outcomes following MAT combined with cartilage repair/restoration. To be included, studies had to address symptomatic meniscus-deficient compartment(s) and full-thickness or nearly full-thickness ipsi-compartmental cartilage damage. Studies also had to report Level I, II, III, or IV evidence (according to the Oxford Centre for Evidence Based Medicine) and have a minimum of two years follow-up. Exclusion criteria were reported in the review paper.

The included studies were published between 2002 and 2009. Mean patient age ranged from 30 to 43 years; 53% to 76% of the patients in each study were men. Where reported, numbers and types of previous surgeries varied across studies, as did mean defect sizes and locations. Clinical outcome measures varied and included quality of life, Short Form 12 score, mental/physical component scores, and Knee Injury and Osteoarthritis Outcome scores. Just over half of the combined procedures were in the medial compartment; the rest were in the lateral compartment. Meniscal allografts were cryopreserved or fresh frozen. Cartilage repair/restoration procedures included autologous chondrocyte implantation, osteochondral allograft, osteochondral autograft transfer or microfracture. Five of the six studies reported various concurrent surgeries; 5% to 100% of the patients received these.

Multiple reviewers selected studies for inclusion in the review; any discrepancies were resolved by the senior reviewer.

Assessment of study quality
Risks of selection, performance, transfer and detection biases were assessed.

The authors did not report which criteria they used to assess these risks of bias and did not report how many reviewers performed the assessment.

Data extraction
Data on clinical outcomes following combined procedures were extracted and compared with historical outcomes for each procedure performed in isolation. Data on historical outcomes were extracted from mid- and long-term follow-up studies obtained from other reviews.

The authors did not state how many reviewers extracted these data.

Methods of synthesis
Narrative synthesis.

Results of the review

Six Level IV case series studies were included in the review (reported as 131 patients in the characteristics table, range seven to 38 per study). Evidence of selection (six studies), performance (six studies) and detection biases (four studies) was found. Mean length of follow-up was 36 months.

In four of the six studies (94 patients), improvements in outcomes were observed but there were no differences between the combined procedure and each procedure performed in isolation. The other two studies (37 patients) demonstrated greater improvements in outcomes with the procedures performed in isolation compared with the combined procedure.

Two of the six studies (59 patients) compared medial compartment versus lateral compartment combined procedures and found no differences in outcomes. The overall failure rate for the combined procedure was 12%; most failures in the combined procedure were due to failure of the MAT. Half of all combined procedure patients needed at least one surgery following the index procedure (prior to follow-up).

Further results were reported in the review paper.

Authors’ conclusions

Combined MAT and cartilage repair/restoration improved clinical outcomes to the same extent as either procedure performed in isolation. Despite low complication and failure rates, there was a high rate of subsequent surgery following the combined procedure.

CRD commentary

The review question and inclusion criteria were well defined. The broad inclusion criterion for clinical outcomes seemed appropriate given the diverse nature of the small evidence base. Relevant databases were searched. The restriction to studies published in English meant that studies may have been missed. Efforts were made to minimise the risk of reviewer error and/or bias during study selection; it was unclear whether the same efforts were taken during the quality assessment and data extraction processes.

The domains of quality assessed seemed relevant to the studies included but details of the assessment criteria were not reported and this made it difficult to ascertain the validity of the assessments. Reporting of other aspects of the review was of limited detail (e.g., selection of historical control studies and their quality) or demonstrated discrepancies across different parts of the paper (e.g., number of participants who underwent combined procedures). The narrative method of synthesis was suitable because of the differences between the small number of included studies. However the indirect comparisons of combined procedures to historical controls (procedures performed in isolation) were not as reliable as direct comparisons. There was a lack of long-term data.

The authors’ conclusions largely reflect the findings presented but limitations of the review methods and reporting (such as the lack of long-term data and the diversity of the small evidence base) mean that these conclusions should not be considered reliable.

Implications of the review for practice and research

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

Research: The authors stated that research was needed to investigate the role of mechanical axis alignment in the redistribution of compartmental stress after MAT or cartilage repair/restoration.

Funding

Not stated.

Bibliographic details

This is a systematic review that meets the criteria for inclusion on DARE.