The diagnosis of meniscus tears: the role of MRI and clinical examination

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CRD summary
This review compared the accuracy of magnetic resonance imaging (MRI) with clinical examination and concluded that experienced examiners are able to identify patients with surgically treatable meniscus lesions with equal or better reliability than MRI. The authors' conclusions are unlikely to be reliable given the limitations of the included studies and the inadequate analysis carried out in the review.

Authors' objectives
To determine whether magnetic resonance imaging (MRI) should be used routinely for diagnosing meniscal tears before referring patients for arthroscopy.

Searching
PubMed and the Cochrane Library were searched for studies reported in English; the search terms were reported. In addition, manual searches using the references of original review articles were undertaken.

Study selection
Study designs of evaluations included in the review
Studies using a prospective diagnostic cohort design and that included at least 40 patients were eligible for inclusion. The included studies were prospective cohort and retrospective studies.

Specific interventions included in the review
Studies evaluating MRI and clinical examination were eligible for inclusion. Studies evaluating MRI were required to report the magnetic field strength (Tesla), number of sequences obtained and criteria for a positive diagnosis. The included studies of clinical examinations used McMurray’s and Apley’s tests at 5 degrees flex, and Thessaly’s test at 5 or 20 degrees flex.

Reference standard test against which the new test was compared
The authors stated that studies in which all patients received the reference standard were eligible for inclusion. The included studies used arthroscopy as the reference standard.

Participants included in the review
Studies of consecutive patients were eligible for inclusion. The included studies involved adolescents and adults with suspected lateral or medial meniscal tears. Some patients had anterior cruciate ligament deficiency and others osteoarthritis.

Outcomes assessed in the review
Studies reporting the total number of tears and sufficient data to calculate sensitivity and specificity separately for medial and lateral meniscal tears were eligible for inclusion.

How were decisions on the relevance of primary studies made?
Two reviewers independently screened studies for relevance, with any disagreements resolved through discussion with a third reviewer.

Assessment of study quality
The authors did not state how the validity assessment was performed. The studies were assessed for selection, measurement and confounding bias, with those indicating significant bias being excluded. Studies indicating significant verification bias (as defined in the review) were also excluded.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data
Methods of synthesis
How were the studies combined?
The studies were summarised in a narrative synthesis and in tables.

How were differences between studies investigated?
The studies were grouped according to the results (favoured use of MRI before arthroscopy, or concluded that routine MRI unnecessary) and specific physical examination manoeuvres were assessed.

Results of the review
Thirty-two studies were included, but only the results for 26 were included in the primary analysis (n=3,386). The remaining 6 studies dealt primarily with adolescents, patients with osteoarthritis, features of clinical history, or the post-operative patient.

Five studies favoured the use of MRI before arthroscopy, while seven deemed routine MRI unnecessary. Those favouring MRI reported a sensitivity ranging from 84 to 100%, with a reported specificity ranging from 63 to 90%. For clinical examination, the sensitivity ranged from 77 to 100% and the specificity from 6 to 62%. These studies suffered from a number of methodological limitations, including failure to define criteria for a positive clinical diagnosis.

Results for the 7 studies that deemed MRI unnecessary reported a sensitivity/specificity/accuracy ranging from 55 to 100% for clinical examination and from 35 (lateral) to 100% for MRI examination. The studies that found MRI to be unnecessary generally involved diagnoses made by careful examination by an experienced orthopaedist.

Five studies using McMurray's, Apley's, Ege's or Thessaly's test at 5 degrees flex indicated high specificity and low sensitivity. By comparison, the Thessaly's test at 20 degrees flex indicated high sensitivity and specificity. Joint line test results had higher sensitivity but lower specificity (4 studies).

Studies involving patients with acute injuries, patients with recurrent pain after a previous meniscal repair or partial meniscectomy, and studies involving adolescents, post-operative patients, patients with osteoarthritis, and features of clinical history were mentioned in the review.

Authors' conclusions
Experienced examiners are able to identify patients with surgically treatable meniscus lesions with equal or better reliability than MRI.

CRD commentary
The review question was not stated clearly, and the inclusion criteria were poorly defined and do not appear to have been applied consistently. Relevant literature searches were conducted using appropriate sources, but the search dates were unclear. Searches were restricted to studies reported in English, which might have introduced language bias. There were no specific attempts to locate unpublished studies, so the review may be subject to publication bias. Although some aspects of validity were discussed and appear to have been used as a basis for inclusion in the review, a formal quality assessment was not conducted. Details of the methods used to extract the data were not provided, thus the potential for reviewer error and bias cannot be ruled out.

The synthesis of results was confusing and based on the study authors’ conclusions rather than the study results. A more appropriate analysis would have considered the overall accuracy of MRI and clinical examination and looked at statistical methods of comparing the accuracy of clinical examination and MRI based on within-study comparisons; an appropriate investigation of heterogeneity could then have been carried out. There was very little information on the included studies, especially on the participants, so the generalisability of the findings is unclear. Given the limitations of this review, the authors’ conclusions are unlikely to be reliable.
Implications of the review for practice and research
Practice: The authors stated that composite examinations perform better than specific manoeuvres in diagnosing meniscal injuries of the knee. MRI should only be used as an additional tool for clinician decision-making.

Research: The authors stated that future studies should investigate the value of meniscal tests, the significance of positive and negative findings, and the most pertinent clinical history that could aid clinical judgement and decision-making.

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Other publications of related interest
This additional published commentary may also be of interest.
Yelland M. Review: clinical examination is often as accurate as magnetic resonance imaging for diagnosing meniscal tears. Evid Based Med 2007;12:151.

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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.