Low-Field Magnetic Resonance Imaging for Musculoskeletal Imaging

March 2023
Key Messages

- We found no studies about the clinical utility of low-field MRI systems for adults requiring musculoskeletal imaging.
- We found no studies about the cost-effectiveness of low-field MRI systems for adults requiring musculoskeletal imaging.
- We found no evidence-based guidelines for the use of low-field MRI systems for adults requiring musculoskeletal imaging.
- We identified other references on this topic that may be of interest, which are listed in the appendix.

Research Questions

1. What is the clinical utility of low-field MRI systems for the adults requiring musculoskeletal imaging?
2. What is the cost-effectiveness of low-field MRI systems for adults requiring musculoskeletal imaging?
3. What are the evidence-based guidelines for the use of low-field MRI systems for adults requiring musculoskeletal imaging?

Methods

Literature Search Methods
An information specialist conducted a literature search on key resources including MEDLINE, the Cochrane Database of Systematic Reviews, the International HTA Database, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search approach was customized to retrieve a limited set of results, balancing comprehensiveness with relevancy. The search strategy comprised both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. Search concepts were developed based on the elements of the research questions and selection criteria. The main search concept was low-field MRI systems. Comments, newspaper articles, editorials, and letters were excluded. The search was completed on March 21, 2023, and limited to English-language documents published since January 1, 2018. Internet links were provided, where available.

Selection Criteria and Summary Methods
One reviewer screened literature search results (titles and abstracts) and selected publications according to the inclusion criteria presented in Table 1. Full texts of study publications were not reviewed. The Overall Summary of Findings was based on information available in the abstracts of selected publications. Open access full-text versions of evidence-based guidelines were reviewed when available, and relevant recommendations were summarized.
Table 1: Selection Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
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<tr>
<td>Population</td>
<td>Adults (any age) requiring MRI for musculoskeletal extremity imaging</td>
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<td>Intervention</td>
<td>Low-field MRI (&lt; 1.0 T)</td>
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<td>Comparator</td>
<td>Q1 and Q2: High field MRI (&gt; 1.0 T), X-ray systems</td>
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<td>Q3: Not applicable</td>
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<td>Outcomes</td>
<td>Q1: Clinical utility (e.g., time to treatment, diagnostic accuracy, morbidity, incidence of disease, mortality, quality of life)</td>
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<td>Q2: Cost-effectiveness (e.g., cost per quality-adjusted life-year gained, incremental cost-effectiveness ratio)</td>
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<td>Q3: Recommendations regarding best practices for the use of low-field MRI systems for musculoskeletal imaging (e.g., appropriate use, patient populations)</td>
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<td>Study designs</td>
<td>Health technology assessments, systematic reviews, randomized controlled trials, nonrandomized studies, economic evaluations, evidence-based guidelines</td>
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Results

No relevant health technology assessments, systematic reviews, randomized controlled trials, nonrandomized studies, or economic evaluations were identified regarding the clinical utility and cost-effectiveness of low-field MRI systems for adults requiring musculoskeletal imaging. Additionally, no evidence-based guidelines for the use of low-field MRI systems for adults requiring musculoskeletal imaging were identified.

References of potential interest that did not meet the inclusion criteria are provided in Appendix 1.

Overall Summary of Findings

No relevant literature was found regarding the clinical utility and cost-effectiveness of low-field MRIs for adults requiring musculoskeletal imaging. Additionally, no relevant evidence-based guidelines for the use of low-field MRI systems for adults requiring musculoskeletal imaging were found; therefore, no summary can be provided.
References

Health Technology Assessments
No literature identified.

Systematic Reviews
No literature identified.

Randomized Controlled Trials
No literature identified.

Non-Randomized Studies
No literature identified.

Economic Evaluations
No literature identified.

Guidelines and Recommendations
No literature identified.
Appendix 1: References of Potential Interest

Systematic Reviews
Unclear Population Age

Non-Randomized Studies
Alternative Outcomes

Alternative Population
Breit HC, Vossenrich J, Hofmann V, et al. Image quality of lumbar spine imaging at 0.55T low-field MRI is comparable to conventional 1.5T MRI - initial observations in healthy volunteers. Acad Radiol. 2023;23:23. PubMed

Alternative Comparator

Review Articles

Additional References
Clinical Policy Bulletin