Relationship between clinical and magnetic resonance imaging diagnoses and findings in degenerative and inflammatory temporomandibular joint diseases: a systematic literature review

Koh K, List T, Petersson A, Rohlin M

CRD summary
The authors concluded that available studies showed no clear evidence of a relationship between a clinical diagnosis and a magnetic resonance imaging diagnosis in degenerative and inflammatory temporomandibular joint diseases. A limited search and lack of information about the design and quality of the included studies made it difficult to determine the reliability of these conclusions.

Authors' objectives
To determine the relationship between clinical examination and magnetic resonance imaging (MRI) diagnoses and findings in temporomandibular joint diseases.

Searching
PubMed and Cochrane Database of Systematic Reviews were searched for studies published from 1988 to December 2007. The PubMed search was limited to studies in English. Reference lists of articles retrieved and relevant reviews were handsearched. Search terms were reported.

Study selection
Studies of degenerative or inflammatory temporomandibular joint diseases that described both clinical and MRI diagnoses or findings and reported the relationship between them were eligible for inclusion. Studies were required to report clinical signs and symptoms of temporomandibular joint disease (such as pain, tenderness on palpation, joint sounds and mouth opening capacity) and to report the criteria for their findings or diagnosis. Case reports and laboratory studies were excluded.

Most participants in the review presented with signs and/or symptoms of temporomandibular disorders (TMD) such as displacement, internal derangement, pain or joint sounds. Some studies included comparison groups who had differing symptoms or else were asymptomatic. Clinical examination methods, diagnostic criteria and classification systems for disc position varied across studies and were often poorly described. Only half the studies used the Research Diagnostic Criteria for temporomandibular disorders and some studies used their own classification system. MRI techniques appeared fairly uniform across studies: most used a combination of sagittal and coronal images. The review outcomes were diagnostic accuracy of clinical examination for temporomandibular joint disorders (using MRI results as the criterion standard) and also the relationship between specific clinical findings (such as pain) and MRI findings. A wide range of outcomes measures was used in the primary studies (for example, agreement in percentage, Kappa statistic, correlation, sensitivity, specificity and odds ratio).

Pairs of authors independently selected the studies.

Assessment of study quality
Study validity was assessed using a modified version of the QUADAS tool. The authors did not state how the assessment was performed.

Data extraction
Measures of correlation and/or diagnostic accuracy were extracted as reported in individual studies and presented in tables. Where possible, the authors calculated diagnostic odds ratios and predictive values from data available.

The authors did not state how many reviewers performed the data extraction.
Methods of synthesis
The studies were combined in a narrative synthesis grouped by review outcomes. The narrative was accompanied by tables describing study findings.

Results of the review
The authors reported that 23 studies were included in the review (n=2,495, range 30 to 242). Six studies included control groups and seven were consecutive series. Study quality was described as suboptimal, mainly due to poor reporting.

Relationships between clinical and MRI diagnoses and findings:
Overall there was no clear evidence of a relationship between clinical and MRI diagnoses (eight studies). Evidence of a relationship between clinical findings and MRI findings was inconsistent (15 studies).

Odds ratios and predictive values, using MRI as a criterion standard:
Among patients with symptomatic temporomandibular disorders, the odds ratio (OR) for disc displacement was 12.2 (one study). Among those with symptomatic temporomandibular disorders and pain, odds ratios ranged from 0.88 to 5.15 (three studies). Among patients with osteoarthritis, odds ratios for clinical diagnosis and negative predictive values were both high (OR 5.29 and 10.26, negative predictive value 92% and 94%; two studies). Among patients with pain, odds ratios for joint effusion ranged from 1.22 to 1.93 (four studies). Among patients with clinical pain, the odds of internal derangement or osteoarthritis ranged from 1.36 to 2.04 (five studies). The odds ratio for disc displacement without reduction among patients with provoked pain was 4.82 (one study). Among patients with crepitation the odds of disc displacement without reduction were 3.71 (one study).

Other findings were reported in the review.

Authors’ conclusions
Studies available at the time of the review showed no clear evidence of a relationship between clinical diagnosis and MRI diagnosis in degenerative and inflammatory temporomandibular joint diseases.

CRD commentary
The objectives and inclusion criteria of the review were wide and ill-defined, particularly with respect to study design and outcomes of interest. This resulted in the inclusion of a diverse range of studies, with some focused on diagnostic accuracy and others focused on correlations between a large number of variables. Only one database of primary studies was searched and the search was restricted by language, so some studies may have been missed. It appeared that no specific attempt was made to locate unpublished studies. Steps were taken to minimise the risk of reviewer bias and error by having more than one reviewer independently select studies; it was unclear whether such precautions applied to validity assessment and data extraction. An appropriate tool was used to assess the quality of the diagnostic accuracy studies, but the results of the assessment were not reported and it was unclear whether this tool was appropriate for the included studies with other designs. The authors noted that MRI may not be appropriate as a criterion standard. Few details were reported about the overall characteristics of the primary studies (such as design) and it was unclear whether any of the included studies reported data suitable for populating a 2x2 contingency table, which would have facilitated accurate calculation of diagnostic test performance. No measures of variability were reported and it appeared that publication bias was not formally assessed. All these factors made it difficult to interpret the review findings. The authors appropriately chose not to pool the data and acknowledged in the text the problems associated with study heterogeneity. In view of the limited search and lack of information about the design and quality of the included studies, it is difficult to determine the reliability of the authors’ conclusions.

Implications of the review for practice and research
Practice: The authors stated that pain could not be considered an accurate indicator of disc displacement in temporomandibular joint diseases. An MRI should be performed when it was necessary to determine disc position.

Research: The authors stated that higher-quality studies were required to investigate the relationship between clinical
and MRI diagnoses of temporomandibular joint diseases. Studies should employ detailed and standardised reporting of study methods and findings, including definitions and rationales for tests, thresholds, categories and diagnoses. The authors recommended implementation of Research Diagnostic Criteria/temporomandibular disorders protocols and the Standards for Reporting of Diagnostic Accuracy (STARD) statement.

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