Systematic review of lumbar provocation discography in asymptomatic subjects with a meta-analysis of false-positive rates

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CRD summary
The review concluded that discography has a low false positive rate in identifying discogenic pain in asymptomatic subjects. Limitations in the search strategy and weaknesses in the reporting of the review together with the small amount of data upon which it was based mean that this conclusion is unlikely to be reliable. The lack of any data on sensitivity further limited the clinical utility of findings.

Authors’ objectives
To assess the specificity and false positive rate of lumbar discography in asymptomatic subjects and discs for diagnosis of discogenic pain.

Searching
PubMed was searched to March 2008 for English-language articles. Search terms were reported. The bibliographies of identified articles were handsearched for additional studies.

Study selection
Clinical studies of discography in asymptomatic subjects or discs with or without a history of spine surgery were eligible for inclusion. Studies that reported numerical ratings of pain intensity, concordancy, pain behaviours, pressure or degree of anular disruption and which reported data for a control disc, were eligible for inclusion. Studies of older discographic techniques (including noxious dyes) were excluded from data analysis and synthesis. Mean age of participants ranged from 22.6 to 46.5 years. All studies except one were conducted in majority male populations.

Abstracts of retrieved studies were assessed against inclusion criteria. Full articles were obtained if the criteria were met. Three physicians assessed studies for inclusion, but the selection process was not reported (for example, it was unclear whether all physicians examined all studies).

Assessment of study quality
Included studies were assigned a quality score on a scale of 0 to 100 using the Agency for Healthcare Research and Quality (AHRQ) rating scale to assess appropriateness of the study population, adequacy of test description, appropriateness of the reference standard, blinding and avoidance of verification bias.

Three physicians independently scored the articles. Any disagreements were resolved by consensus.

Data extraction
Three researchers extracted data from included studies; data were extracted, as reported, per individual disc injection. Data were extracted on the numbers of patients and discs and the false positive rate, per patient and per disc, as available.

Methods of synthesis
A pooled estimate for specificity was calculated using a random-effects model; subgroup analyses were conducted for patients with chronic pain and asymptomatic low back pain. No sensitivity estimate was calculated. Only studies with a minimum score of 45 were included in the meta-analysis. A narrative synthesis of all included studies, stratified by clinical category of participants, was also presented.

Results of the review
Eleven studies (six case series and five case-control studies) with a total of 380 participants and 915 discs were included in the review. AHRQ quality scores ranged from 20 to 80; eight of the 11 included studies reached or exceeded the
quality score threshold of 45.

Overall pooled false positive rates were 9.3% (95% CI 3.0 to 16) per patient and 6.0% (95% CI 2.0 to 10) per disc.

The pooled estimate of specificity for discography using the international Spine Intervention Society (ISIS) standard was 0.94 (95% CI 0.88 to 0.98; five studies, 123 participants).

Further results were reported in the paper.

**Authors' conclusions**
Discography has a low false positive rate for the diagnosis of discogenic pain.

**CRD commentary**
The research objective was clearly stated, although the inclusion criteria applied were broad and not defined clearly. The limitation of the search strategy to a single bibliographic database and English-language studies may have resulted in the omission of relevant data and left the review susceptible to language bias. No attempt to identify unpublished studies was reported, which left open the possibility of publication bias. Measures to reduce error and bias were reported at all stages of the review process. The methodological quality of included studies was assessed and incorporated in the synthesis of results, although the presentation of quality assessment results as summary scores severely limited their informative value. Limited meta-analyses were conducted and as no assessments of between study heterogeneity were reported it was unclear whether these were appropriate. In addition, although estimates of false positive rates and specificity were reported, no definition of a false positive result was provided and no assessment of sensitivity was included. Overall, weaknesses in the reporting of the review together with the small amount of data upon which it was based meant that the authors' conclusion that the false positive rate of discography were low is unlikely to be reliable. The lack of any data on sensitivity limited the clinical utility of any findings; even if a test reliably produced few false positives, it was unlikely to be useful if numbers of false negatives were large (low sensitivity).

**Implications of the review for practice and research**

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

**Research:** The authors stated that further research was required to assess the predictive value of discography and the best conservative, interventional or surgical treatments for patients.

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