Systematic assessment of diagnostic accuracy and therapeutic utility of lumbar facet joint interventions

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CRD summary
The review assessed diagnostic and therapeutic lumbar facet joint interventions for chronic low back pain. The authors reported level I/II evidence (multiple properly conducted studies) for diagnosis and 'strong' recommendations for therapeutic lumbar facet joint nerve blocks and radiofrequency neurotomy, with weak/no recommendation for intra-articular injections. Limitations of the evidence and review process mean these conclusions should be viewed cautiously.

Authors' objectives
To determine the clinical utility of diagnostic and therapeutic lumbar facet joint interventions in managing chronic low back pain of facet joint origin.

Searching
MEDLINE, EMBASE, the Cochrane Library and Clinical Trials Registry were searched, from 1966 to December 2008, for studies published in English; search terms were reported. Bibliographies of narrative and systematic reviews were screened for additional studies.

Study selection
For diagnostic interventions, studies in patients with chronic pain of greater than three months duration were eligible for inclusion. Eligible studies had to use controlled diagnostic blocks, either placebo or comparative local anaesthetic blocks under fluoroscopy. The reference standard for diagnosis of lumbar facet joint pain was at least 80% pain relief for the duration of local anaesthetic and the ability to perform previously painful movements.

Studies of three types of therapeutic facet joint interventions (intra-articular facet joint injections, facet joint nerve blocks, and medial branch radiofrequency neurotomy) were eligible for inclusion. All therapeutic studies had to provide appropriate management with outcome evaluations of at least six months and report appropriate statistical analysis. Included studies were also required also have met diagnostic criteria.

The primary outcome measure was pain relief (short-term up to six months and long-term greater than six months). The secondary outcome measures were functional status improvement, psychological status improvement, return to work, and opioid intake.

The authors did not state how many reviewers assessed studies for inclusion.

Assessment of study quality
For studies of diagnostic interventions, two physician reviewers assessed the methodologic quality of included studies using Agency for Healthcare Research and Quality (AHRQ) criteria for diagnostic studies; any disagreements were resolved by the third physician. The criteria assessed were: appropriate study population; adequate description of test; adequate and reproducible reference standard; evaluation of test without knowledge of disease status; independent blind interpretation of test and reference standard; and avoidance of verification bias. An overall quality score, on a scale of 0 to 100, was derived for each study.

For studies of therapeutic interventions, two physician reviewers assessed the methodologic quality of included studies using modified Cochrane criteria for randomized trials and AHRQ quality criteria for observational studies; any disagreements were resolved by the third physician. The criteria assessed were: adequate description of participants; interventions and treatment settings; reporting of all clinically relevant outcomes; clinical relevance of effect size; and assessment of benefits in comparison to harms. An overall quality score, on a scale of 0 to 100, was derived for each study.
Only studies with a methodological quality score between 50 and 100 were considered to have met the inclusion criteria.

**Data extraction**
For diagnostic studies, data were extracted on prevalence of lumbar facet joint pain and false positive rates associated with diagnostic blocks, with 95% confidence intervals (CIs). The results of therapeutic intervention studies were extracted as reported.

The authors did not state how data were extracted for the review.

**Methods of synthesis**
Studies were summarised in a narrative synthesis, stratified by diagnostic and therapeutic interventions, and by specific intervention type. For diagnostic intervention studies, overall prevalence and false positive rates, with 95% confidence intervals (CIs) were presented, but it was not clear how these were calculated. Each intervention was assigned a level of evidence/strength of recommendation grade.

**Results of the review**

**Diagnostic interventions** (seven studies, n=1,320 patients reported in text, or 1,420 patients based on table 4)

The prevalence of lumbar facet joint pain ranged from 16% (95% CI 9 to 23) to 41% (95% CI 33 to 49); the overall prevalence was 31% (95% CI 28 to 33; seven studies, eight data sets). False positive rates ranged from 17% (95% CI 10 to 24) to 49% (95% CI 39 to 59); the overall false positive rate was 30% (95% CI 27 to 33; six studies, seven data sets).

Each of the seven studies had a quality score of 75.

**Therapeutic interventions**

Intra-articular facet joint blocks: No randomized controlled trial or observational study of intra-articular facet joint blocks met the inclusion criteria.

Lumbar facet joint nerve blocks (two randomized controlled trials - RCTs, n=204 patients): One RCT assessed the clinical effectiveness of therapeutic local anaesthetic lumbar facet joint nerve blocks with (group II) or without (group I) steroid; it found significant improvement with significant pain relief (50% or more) in 80% of group I patients and functional improvement (40% or more) in 85% of group I patients. The second RCT allocated 84 patients with lumbar facet joint mediated pain to receive therapeutic injections with local anaesthetic and sarapin (a natural medicine from the pitcher plant), or a mixture of local anaesthetic plus sarapin plus methylprednisolone; it found a cumulative significant relief with one to three injections of 100% up to one to three months, 82% for four to six months, 21% for seven to 12 months, and 10% after 12 months, with a mean relief of 6.5 ± 0.76 months and a significant improvement in overall health status. The methodological quality scores of these two studies were 73 and 59.

Radiofrequency neurotomy of lumbar facet nerves (one RCT, n=40 patients; two observational studies, n=15 patients and n=209 patients): The RCT found that patients in the active treatment group showed improvement accompanied by significantly greater improvements in paravertebral tenderness, various movements, quality of life, and use of analgesics, when compared with the placebo group (no data reported). One observational study reported that 87% of 15 patients obtained at least 60% pain relief 12 months after the intervention, with 60% achieving at least 90% relief. The second observational study reported that, of 174 patients with complete data, 55 (31.6%) experienced no benefit from the procedure and 119 (68.4%) had good to excellent pain relief lasting from six to 24 months. The RCT had a methodological quality score of 50. The two observational studies had scores of 73 and 63.

**Authors’ conclusions**

The evidence for diagnosis of lumbar facet joint pain with controlled local anaesthetic blocks was Level I or II-1 (evidence from multiple properly conducted diagnostic accuracy studies, or evidence from at least one properly conducted diagnostic accuracy study of adequate size).
The indicated level of evidence for therapeutic lumbar facet joint interventions was Level II-1 or II-2 with a 1B or C/strong recommendation (benefits clearly outweighed risks and burdens, and evidence derived from RCTs with important limitations/observational studies) for lumbar facet joint nerve blocks, Level II-2 or II-3 evidence with a recommendation of 1B or 1C for radiofrequency neurotomy, and Level III (limited) evidence with a recommendation of 2C/very weak recommendation or recommendation not to provide intra-articular injections.

**CRD commentary**

The review addressed two separate research questions on the diagnostic and therapeutic applications of lumbar facet joint interventions in managing chronic low back pain of facet joint origin. Inclusion criteria and quality assessment criteria were specified separately for each question. A number of sources were searched for relevant studies, but the restriction to English language raised the possibility of incomplete retrieval and potential language bias. Reporting of study selection and data extraction were limited, and it was unclear whether measures were applied to minimise error and/or bias.

Quality assessment and evidence grading processes were described in detail, and did include measures to minimise error and/or bias. Reporting of the data from individual included studies was limited; some overall outcome measures were reported for diagnostic studies without details of how these were derived. The use of a narrative synthesis was appropriate, but might have been improved by greater use of tables of study characteristics and results; the tables presented were highly focused on quality assessment.

Overall, the authors' rating of levels of evidence and grades of recommendation appears optimistic for the quantity and quality of the data presented, and should be viewed cautiously.

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

**Practice:** The authors stated that the recommendation was 'strong' for both lumbar facet joint nerve blocks and radiofrequency neurotomy for the treatment of chronic lumbar facet joint pain

**Research:** The authors made no recommendations for future research.

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