Spinal radiographic findings and nonspecific low back pain: a systematic review of observational studies

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Authors' objectives
To explore whether there is a causal relationship between abnormal findings on lumbar radiographs and non-specific lower-back pain.

Searching
MEDLINE was searched from January 1966 to September 1994 using the following keywords: 'diagnostic imaging', 'backache', 'spine', 'back pain', 'low back pain', 'radiography', 'roentgenograms' and 'x-rays'. EMBASE was also searched, but the search revealed no further publications. The references cited in relevant selected papers were also examined, regardless of the year of publication. Experts in the field were contacted.

Study selection

Study designs of evaluations included in the review
Observational studies were included. Studies of animals or cadavers were excluded, as were case reports with five patients or less, abstracts, letters and editorials.

Specific interventions included in the review
Studies where at least one of the diagnostic tests was plain radiographic evaluation of the lumbar spine, not including flexion-extension radiographs, were eligible. The diagnostic entities included degenerative changes, spondylolysis and spondylolisthesis, spina bifida, transitional vertebrae, spondylosis and Scheuermann's disease. The definitions of the diagnostic entities measured were those supplied by the authors of the primary studies.

Reference standard test against which the new test was compared
No reference standard was specified. The included studies were diagnostic case-control studies where the odds ratio (OR) was used to assess the association between diagnostic entities and lower-back pain.

Participants included in the review
The studies were required to include patients with and without lower-back pain. Studies about specific lower-back pain caused by malignancies, infections, inflammations, osteoporosis, or fractures were excluded.

Outcomes assessed in the review
No inclusion criteria relating to the outcome measures were specified. The OR with 95% confidence interval (CI) was the calculated outcome measure used in the review.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
Validity was assessed using a 14-item checklist that was based on published guidelines and reviews (see Other Publications of Related Interest). The criteria covered in the checklist referred to: the study population; the assessment of radiographs; the assessment of lower-back pain status; the blinded assessment of radiographs and lower-back pain; and the analysis and presentation of the data. Two reviewers independently scored the quality of each study. Any disagreements were dealt with in a consensus meeting.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.
Methods of synthesis
How were the studies combined?
The OR and 95% CIs of the most prevalent diagnostic entities were estimated using the 'Conference Interval Analysis' program. The ORs were only presented for those studies scoring more than 50% on the validity checklist.

How were differences between studies investigated?
The studies were ranked in order of validity.

Results of the review
Thirty-one studies were included in the review, of which only two were prospective.

The methodological quality of the studies varied greatly, with validity scores ranging from 0 to 91% of the maximum attainable score. Eighteen studies scored more than 50% and were considered to be of acceptable or good methodological quality.

The ORs of the association between degeneration and lower-back pain ranged from 1.21 to 3.32, with most 95% CIs not including 1; this indicated a statistically-significant positive association.

The ORs for spondylolysis and spondylolisthesis ranged from 0.33 to 2.12, with most CIs including 1, i.e. no significant association.

Only a few studies of acceptable quality reported on the association between spina bifida, transitional vertebrae, spondylosis and Scheuermann's disease. In general, these findings were not associated with non-specific lower-back pain.

Authors' conclusions
There was no firm evidence for the presence or absence of a causal relationship between radiographic findings and non-specific lower-back pain.

CRD commentary
The review reported a clear search strategy, a thorough assessment of study validity, and a detailed discussion. However, the review's research question was unclear. The authors stated that the objective of the review was to examine the causal relationship between radiographic findings and non-specific lower-back pain but, as discussed in the review, it was impossible to attribute causality in a retrospective study. Prospective studies, evaluating and controlling for confounding factors, are necessary to examine an association between radiographic findings and non-specific back pain. Since only two of the trials included in the review were prospective, little weight can be given to the findings of this review.

Implications of the review for practice and research
The authors did not state any implications for practice or further research.

Bibliographic details

PubMedID
9055372
Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Evaluation Studies as Topic; Humans; Low Back Pain /physiopathology /radiography; Odds Ratio; Research Design; Spine /radiography

AccessionNumber
11997000341

Date bibliographic record published
30/09/2004

Date abstract record published
30/09/2004

Record Status
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.