Systematic review of the effectiveness of thermal annular procedures in treating discogenic low back pain

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CRD summary
This narrative review focused on thermal annular procedures in low back pain. Based mainly in observational studies, it showed that this intervention may have been of benefit in carefully selected patients. However, the risk of bias of the conclusions is important.

Authors' objectives
To determine the effectiveness of thermal annular procedures in reducing low back pain in patients with intradiscal disorders.

Searching
PubMed, EMBASE, The Cochrane Library and DARE were searched from 1966 to November 2008. The search was restricted to articles in English or with English abstracts. Search terms were reported. References of included articles were searched. Authors known to be active in the field were contacted.

Study selection
Randomised controlled trials (RCT) and observational studies were considered for inclusion. Studies of at least six months duration that evaluated thermal annular procedures in patients with lumbar intradiscal pain and had a minimum follow-up of six months were eligible.

Included studies were placebo-controlled RCTs and observational studies. Number of patients ranged from 15 to 99. Follow-up ranged from six months to two years.

Two investigators reviewed all selected articles. A third reviewer solved discrepancies.

Assessment of study quality
Quality assessment depended on study design. For RCTs, modified and weighted Cochrane Review criteria were used. These comprised a 100-point scale that considered population, interventions, effect and data presentation/analysis. For observational studies, Agency for Healthcare Research and Quality criteria were used. These comprised a 100-point scale that paid special attention to study population, comparability of subjects, intervention exposure, outcome measures, statistical analysis and results. Only studies with a score of 50 or higher were included.

Clinical relevance was evaluated according to recommendations of Cochrane Back Review Group. This scale had five questions that could each be scored positive, negative or unclear.

For each study, level of evidence was determined based on United States Preventive Services Task Force criteria and degree of recommendations on Guyatt's criteria.

Two investigators assessed clinical relevance, level of evidence and degree of recommendations. A third reviewer solved discrepancies.

Data extraction
Two authors reviewed each article. One reviewer extracted data on pain relief, functional and psychological improvement, and return to work. Significant improvements were defined as a pain reduction of 50% or more or a disability improvement of 40% or higher.

Methods of synthesis
The studies were described narratively and grouped by study design and thermal annular procedure technique:
Intradiscal Electrothermal Therapy (IDET), Radiofrequency Annuloplasty (RFA) and Intradiscal Biacuplasty (IDB). Description of the methodological assessment, clinical relevance, study characteristics and results of each thermal annular procedure technique were shown in several extended tables.

**Results of the review**

Twenty-one studies were included in this review: two placebo-controlled RCTs (121 patients) and 19 observational studies (917 patients). Both RCTs complied with the quality score threshold. The text read that 11 of 31 observational studies did not meet the required quality evaluation score and were extracted from the analysis; details of 19 observational studies were included in a table. The two RCTs were placebo-controlled.

One RCT was favorable to the use of intradiscal electrothermal therapy and the other showed no benefit after six months. Fourteen of the 16 observational studies that considered intradiscal electrothermal therapy found it to be effective.

**Radiofrequency Annuloplasty:** Two observational studies reported conflicting results. One case-series study found the procedure effective and an observational study showed it was less effective than intradiscal electrothermal therapy.

**Intradiscal Biacuplasty:** One pilot study showed pain relief in seven of 13 patients. A RCT was in progress.

**Authors' conclusions**

Intradiscal electrothermal therapy provided clinical relief in about one half of carefully selected patients who suffered from refractory low back pain.

Evidence to support radiofrequency annuloplasty and intradiscal biacuplasty was minimal.

**CRD commentary**

This review addressed a broadly defined question in terms of participants, interventions, outcomes and study designs. Eligibility criteria were specified. Relevant databases were reviewed. The authors only included studies in English, which increased the chance of selection bias. Steps were taken to minimise reviewers bias. Methodological quality was thoroughly assessed with scales developed to address study quality, clinical relevance level of evidence and degree of recommendation. Heterogeneity of the retrieved studies, interventions and outcomes made a narrative synthesis appropriate. The analysis and characteristics of each study were described meticulously in several extended tables. The results were mainly extracted from observational studies in settings where the studied procedure was performed routinely, hence there was a bias risk in favour of the procedure (this limitation was acknowledged by the authors). The conclusions were non specific and even though the level of evidence was low, the authors supported the use of thermal annular procedure in selected patients.

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

**Practice:** The presented evidence supported use of thermal annular procedure in carefully selected patients with refractory low back pain.

**Research:** The authors did not state any implications for research.

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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.