Efficacy of radiofrequency procedures for the treatment of spinal pain: a systematic review of randomized clinical trials

Authors' objectives
To determine the efficacy of radiofrequency (RF) procedures for spinal pain.

Searching
MEDLINE (from 1966 to 2000), EMBASE (from 1989 to 2000), the Cochrane Library, the Dutch Central Catalogue of theses (from 1988 to 1999) and Current Contents (from 1999 to 2000) were searched; the search terms were reported. In addition, the references in relevant RCTs were screened. The review was limited to studies reported in the English language. Conference proceedings, abstracts and letters were excluded.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion.

Specific interventions included in the review
Studies of RF procedures were eligible. The studies included in the review assessed RF treatment of the cervical, thoracic and lumbar regions. Treatment was compared with an active control or sham RF.

Participants included in the review
Studies of patients treated for spine-related pain, which had existed for 6 months or longer, were eligible. The patients included in the review had low-back pain, neck-shoulder pain or whiplash.

Outcomes assessed in the review
To be included, the studies had to report a measurement of pain relief, measured by a validated instrument. The included studies all used a visual analogue scale. Only the first results after completion of the trial were used in the review.

How were decisions on the relevance of primary studies made?
All titles, abstracts and manuscripts were checked to ensure they met all the inclusion criteria. The number of reviewers involved was not reported.

Assessment of study quality
Studies were assessed for quality using the Jadad scale. Studies scoring at least 3 out of a possible 5 were considered to be of a high quality, while those scoring 2 or less were considered to be of a low quality. The studies were also scored for the following items: the avoidance of cointerventions; the reporting of whether patients were compliant with the study protocol; the inclusion of data proving that pain conditions had similar aetiologies; and whether the therapeutic times between the control and treatment groups were equivalent.

Since the reporting of the methods of patient selection and technical aspects of RF was poor, additional evaluation criteria were developed. These assessed the studies for the following: description of baseline psychological profile of included patients; description of clinical tests used to circumscribe patients' pain syndrome; description of method of selection by diagnostic blocks; accurate description of needle positions; specification of number of lesions per treated level; specification of treated levels; specification of applied RF lesions, regarding temperature or voltage and time; description of sensory or motor stimulation criteria; and description of needle used and technical details.

Three reviewers independently assessed the studies and resolved any disagreements through discussion.
Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

The primary outcome was judged to be: positive if it was reported that the RF intervention was statistically significantly more effective than the comparator treatment (P<0.05); neutral if the RF intervention was not significantly different from the comparator; and negative if the RF intervention was significantly less effective than the comparator treatment (P<0.05).

Methods of synthesis
How were the studies combined?
A meta-analysis could not be performed due to differences between the studies. A best evidence synthesis method was therefore used to combine the results (see Other Publications of Related Interest); this was only conducted for the sham-controlled trials. The evidence was graded as strong (more than 1 relevant high quality RCT with generally consistent outcomes), moderate (1 relevant high-quality RCT and 1 or more relevant low-quality RCTs with generally consistent outcomes), limited (1 relevant high-quality RCT or more than 1 relevant low-quality RCT with generally consistent outcomes), or inconclusive (1 relevant low-quality, no relevant RCTs, or RCTs with inconsistent outcomes). A generally consistent outcome was defined as a situation in which 75% of the studies agreed on the results of pain relief.

How were differences between studies investigated?
Differences between the studies were discussed in the text.

Results of the review
Six RCTs were included. The total number of patients was 211.

There was moderate evidence for the efficacy of RF denervation of cervical zygapophyseal joints for facet pain in the lumbar region. There was limited evidence that cervical RF treatment of the dorsal root ganglion for cervicobrachialgia will result in adequate pain relief. There was also limited evidence that pain complaints in patients with whiplash can be treated by RF denervation of cervical zygapophyseal joints.

Authors' conclusions
There was moderate evidence that RF lumbar facet denervation is more effective for chronic low-back pain than placebo. In addition, there was limited evidence for the efficacy of RF neurotomy in chronic cervical zygaphysical joint pain after flexion-extension injury. Finally, there was limited evidence that RF heating of the dorsal root ganglion is more effective than placebo in chronic cervicobrachialgia.

CRD commentary
The review addressed a clear question and defined the inclusion criteria. The literature search covered several relevant sources, but the restriction to studies reported in English might have introduced language bias. The possibility of publication bias also cannot be ruled out. The extensive quality assessment was incorporated into the synthesis of the results, but it was difficult to distinguish between the quality of reporting and the potential for study bias. Insufficient details of the included studies were presented to enable an independent affirmation of the authors' evaluations. The assessment of efficacy in the review was simplistic and the individual study results were not shown. The authors' conclusions were based on a very small number of small trials and, as they pointed out, may be too optimistic.

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

Research: The authors recommended the systematic application of their additional parameter assessments (see quality criteria) in future evaluations of RF studies. They also recommended that future RCTs include sufficiently
homogeneous patient populations, and that reports provide a meticulous description of the RF technique used.

**Bibliographic details**

**PubMedID**
11561257

**DOI**
10.1053/rapm.2001.23673

**Other publications of related interest**

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Chronic Disease; Humans; Low Back Pain /radiotherapy; Neck Pain /radiotherapy; Radio Waves /therapeutic use; Randomized Controlled Trials as Topic

**AccessionNumber**
12001002285

**Date bibliographic record published**
30/11/2004

**Date abstract record published**
30/11/2004

**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.