Manipulation and mobilization of the cervical spine: a systematic review of the literature

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Authors' objectives
To assess the evidence for the efficacy and complications of cervical spine manipulation and mobilisation for the treatment of neck pain and headache.

Searching
MEDLINE, EMBASE, CHIROLARS and CINAHL were searched from 1966 or start date to 1994 [presumed from paper submission date] for English language publications. The search terms are outlined.

Content experts who had conducted a systematic overview provided further citations, including non-English language papers.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were given priority; nonexperimental studies, including cohort, case-control, and cross-sectional studies were given second priority; and case series and case reports were given lowest priority.

Specific interventions included in the review
Manipulation of the cervical spine (the use of a short- or long-lever high-velocity thrust directed to one or more joints of the cervical spine); mobilisation of the cervical spine (any manual therapy directed at joint dysfunction that does not involve a high velocity thrust).

Manipulation with instrumentation, manipulation under anaesthesia and manual therapies not directed at influencing joint function were excluded.

Participants included in the review
People with acute (less than 3 weeks' duration), subacute (3 to 13 weeks' duration) and chronic (over 13 weeks' duration) neck pain, with muscle tension headaches and with migraine headaches.

Outcomes assessed in the review
The outcomes were mobility or functionality, and pain.

How were decisions on the relevance of primary studies made?
One reviewer checked all citations for broad relevance, then retrieved and checked the papers of those judged broadly relevant using stricter relevance criteria.

Assessment of study quality
The quality of RCTs was assessed using two published scoring systems (see Other Publications of Related Interest nos.1–2). Two investigators applied the quality scoring systems.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the authors performed the data extraction.

Methods of synthesis
How were the studies combined?
The effects of both cervical spine manipulation and mobilisation were considered separately for acute, subacute and chronic neck pain, and for muscle tension and migraine headaches. Data from RCTs were considered separately and given priority. Where the authors considered meta-analysis appropriate, they used the random-effects method of DerSimonian and Laird (see Other Publications of Related Interest no.3) to calculate a pooled effect size.

How were differences between studies investigated?
Narrative and tabular descriptions identified differences in the populations studied (e.g. causes of neck pain), the interventions given and control group comparisons, study quality and follow-up period.

Results of the review
For efficacy data: 14 RCTs (892 patients), 2 cohort studies, 14 case series and 37 case reports.

For complications data: 80 papers documenting over 110 cases.

Acute neck pain.
No RCTs have been done on the efficacy of cervical spine manipulation.

Of the 3 RCTs involving mobilisation, the best quality one found no difference between groups with neck collar and mobilisation, neck collar and transcutaneous electrical nerve stimulation, or neck collar alone at 6 weeks and 3 months, although the group with mobilisation had higher mean improvements in mobility and pain reduction at 1 week. Another study found that both Maitland mobilisation and exercises, and a neck collar and advice were more effective than rest and analgesics. A third study found Maitland mobilisation more effective than a neck collar.

Subacute and chronic neck pain.
Two RCTs compared the immediate effects of manipulation and mobilisation. In both studies, manipulation appeared to have a greater effect on pain reduction, although the difference was statistically significant in only one study.

Two RCTs compared manipulation and muscle relaxant with muscle relaxant alone, and another compared manipulation and other manual therapies with usual general practitioner care. The pooled effect size from these 3 studies was 0.42 (95% confidence interval, CI: -0.005, 0.85), favouring the manipulation groups.

One RCT compared salicylate and mobilisation, salicylate and massage, traction and electrical stimulation, and salicylate alone for 3 weeks. One week after the end of treatment, the patients receiving mobilisation had a statistically-significant (p<0.05) improvement in self-reported pain.

Muscle tension headache.
One RCT comparing manipulation plus moist heat and light massage with amitriptyline daily for 6 weeks, found no differences in headache pain intensity and frequency between the two groups at immediate follow-up, but better maintenance of improvement among the manipulation group 4 weeks later. Another RCT found statistically-significant better pain relief in the short term, but not in the long term, among people with post-traumatic headache treated with manipulation rather than with cold packs.

One relatively poor-quality RCT comparing multicomponent physiotherapy with acupuncture, found statistically-significant less analgesic intake and muscle tenderness among the physiotherapy group.

Migraine headache.
One RCT compared chiropractic manipulation, manipulation given by doctors and physiotherapists, and mobilisation. Chiropractic patients had statistically-significant less pain intensity than the other groups.

Complications.
Various complications have been reported, including instances of death and permanent disability. The incidence of
complications was difficult to ascertain, but appeared to be very low.

**Authors' conclusions**
The lack of data from RCTs on the benefit of manipulation for acute neck pain means that recommendations cannot be made. The limited literature available on mobilisation indicates that this may be beneficial for some patients with acute neck pain, at least when used in combination with other treatments.

Manipulation, mobilisation or physiotherapy are probably all more effective than muscle relaxants or usual medical care in producing short-term pain relief among people with subacute or chronic neck pain. Manipulation is probably slightly more effective than mobilisation or physiotherapy.

The sparsity and poor quality of the data on the effects of manipulation or mobilisation for people with headaches prevent a firm conclusion from being reached.

More high-quality research is needed before definitive recommendations can be made regarding the use of manipulation or mobilisation for neck pain and headache. Factorial study designs should be seriously considered because it is common in clinical practice to use manual therapies in conjunction with other treatments.

**CRD commentary**
The methods and findings of this systematic review have been clearly laid out, and the authors have provided useful guidance about factors to bear in mind when interpreting the data they present.

**Implications of the review for practice and research**
Good-quality research is needed to ascertain the effectiveness of cervical manipulation and mobilisation for people with neckache and headache.

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