CRD summary
This review assessed the efficacy of manual therapy for cervicogenic dizziness. The authors concluded that there is limited evidence to support the use of manual therapy and that further research is required. The small number of poor-quality studies included in the review justify these conclusions.

Authors' objectives
To assess the efficacy of manual therapy in treating patients with cervicogenic dizziness.

Searching
MEDLINE, EMBASE, CINAHL, PEDro, MANTIS, AMED and the Cochrane Controlled Trials Register were searched from inception to July 2003 for studies published in any language; some search terms are reported. The reference lists of English language reports were checked. Five experts in the field were contacted for details of other studies. One identified unpublished study was unobtainable.

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

Specific interventions included in the review
Studies that used some type of manual therapy, including manipulation, mobilisation or massage, either alone or as part of a multi-modal intervention, were eligible for inclusion. Studies of non-touch therapies were excluded. The included studies used various modes of manual therapy either alone or in combination (including soft tissue treatment, exercise, active and passive cervical spine mobilisation, traction manipulation and traditional Chinese manipulation), home training programmes, ergonomic changes, acupuncture, non-steroidal anti-inflammatory drugs and support in a collar.

Participants included in the review
Studies of patients with dizziness or vertigo considered to originate from the cervical spine were eligible for inclusion. The review defined this as patients with dizziness plus simultaneous complaints of pain or stiffness in the cervical spine, or dizziness provoked by movements or positions of the cervical spine. Studies of patients with dizziness caused by the ear, nose, throat, central nervous system, cardiovascular system and benign positional paroxysmal vertigo causes were excluded.

Outcomes assessed in the review
Studies that assessed pain, dizziness, postural performance or a global measure were eligible for inclusion. The studies included in the review assessed a variety of different outcomes: posturography body sway, pain using a visual analogue scale (VAS), dizziness using a categorical scale for its frequency and intensity, duration of dizziness, VAS scale or subjective reporting, X-rays, subjective rating of improvement in vertigo, symptom questionnaire, cervical range of motion instrument, kinesthetic awareness, cervical run test and electronystagmography.

How were decisions on the relevance of primary studies made?
One reviewer selected studies.

Assessment of study quality
The studies were assessed using the Maastricht-Amsterdam criteria. These criteria cover:

internal validity (randomisation, concealment of randomisation, blinding, comparable cointerventions, acceptable...
compliance, relevant outcomes measures, treatment of withdrawals and drop-outs, comparable outcome assessment and use of intention-to-treat analysis; external validity (specification of eligibility criteria, baseline similarity of treatment groups, description of interventions, adverse effects and outcomes measures); and statistical criteria (reporting of sample size, point estimates and variability).

Both an overall quality score (QS) and an internal validity score (IV) were calculated for each study. Studies scoring more than 50% on the QS or IV were considered to have acceptable quality. The name of the authors, institution and journal were initially removed from the studies. Two reviewers then independently assessed validity and resolved any disagreements through consensus. One of these reviewers selected the studies, hence blinding was not complete.

Data extraction
Two reviewers independently extracted the data and resolved any disagreements through consensus. Patient characteristics, outcome measures and results were extracted. The authors of the primary studies were contacted for additional information.

Methods of synthesis
How were the studies combined?
There were no studies with acceptable quality. The studies were considered too heterogeneous so a meta-analysis was not performed. The level of evidence for manual therapy was graded using a hierarchy of evidence described by Van Tulder et al. (see Other Publications of Related Interest):

level 1 represented strong evidence from generally consistent (75% or more of studies with statistically significant findings in same direction) multiple higher quality RCTs;
level 2 represented moderate evidence from generally consistent findings in one higher quality RCT and one or more lower quality RCTs;
level 3 represented limited evidence from one or more lower quality RCTs; and
level 4 represented no evidence where there were no RCTs, or if the results were conflicting.

How were differences between studies investigated?
Sensitivity analyses were conducted by using a cut-off of 40% to classify higher quality studies and by assuming all quality items scored as 'don't know' on quality criteria were 'yes'. Differences were also apparent from the tables.

Results of the review
Nine studies (n=328) were included: one RCT (n=17) and eight non-randomised studies (n=311).

The studies were generally of a poor quality and none had acceptable validity. Major methodological limitations included lack of a control group and poor reporting.

All studies reported a statistically significant improvement in symptoms and signs of dizziness after manual therapy. This was classified as level 3 evidence.

The RCT (n=17) found complete relief in 12% of patients, improvement in 71% and no change in 17%.

The seven non-randomised studies reporting percentages of patients improved reported complete relief in 0 to 73% of patients, improvement in 20 to 92%, and no change in 7 to 26%.

The eighth non-randomised study found a reduction in the duration and intensity of dizziness.
Lowering the threshold for classifying studies as higher quality led to two studies being classified as higher quality; this would have increased the strength of the conclusions.

Assuming all the 'don't know' scores to be 'yes' would also have increased the strength of the evidence.

**Authors' conclusions**
There is limited evidence supporting manual therapy. Further research is required.

**CRD commentary**
The review addressed a clear question that was defined in terms of the participants, intervention, outcomes and study design; the criteria used for study design were broad. Several relevant sources were searched and attempts were made to minimise publication and language bias, but one identified unpublished study could not be obtained. Methods were used to minimise errors and bias in the validity assessment and data extraction processes, but only one reviewer selected studies; the authors acknowledged that this lack of duplication might have led to errors and bias. Validity was assessed and taken into account when considering the results. However, the study designs were not clearly described, the results were not always reported for the intervention compared with the control, and the validity of the methods used to assess the outcomes was not evaluated.

Given the small number of heterogeneous studies, a narrative approach was appropriate and the weakness of the evidence base was rightly highlighted. However, the classification system for evidence was based on RCTs and was not designed for use with non-RCTs. The single RCT involved only 17 patients. In addition, several of the included studies assessed multiple outcomes, making at least one statistically significant finding more likely, but this was not taken into account when summarising the results. The limitations of the review and the small number of poor-quality studies included in the review justify the authors' conclusions about limited evidence and the need for further research.

**Implications of the review for practice and research**
Practice: The authors stated that manual therapy should be considered for cervicogenic dizziness if there is evidence of improvement.

Research: The authors stated that there is a need for high-quality RCTs to examine individual types of manual therapy and multi-modal interventions.

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**Other publications of related interest**

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**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.