

# A SYSTEMATIC REVIEW OF CONSERVATIVE TREATMENTS FOR ACUTE NECK PAIN NOT DUE TO WHIPLASH

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## ABSTRACT

**Objective:** To identify the evidence base of clinical trials of conservative treatments for acute neck pain not due to whiplash injury.

**Design and Setting:** A comprehensive literature search was performed in MEDLINE, CINHAHL, AMED, MANTIS. Index to Chiropractic Literature, Alt Health Watch, the Cochrane Database of Systematic Reviews, the Cochrane Controlled Trials Registry, and several EBSCO Information Services databases. Systematic retrieval and evaluation procedures were used.

**Results:** The search generated 1980 citations. Four trials (5 publications) were accepted according to the inclusion/exclusion criteria. Three trials used a form of spinal manual therapy. One of these trials used only one manipulation and reported immediate effects on pain, with real manipulation producing significantly greater pain reduction than control procedure. The other 2 of these trials reported on outcomes over 1 to 3 weeks. In 1 trial, the group receiving manipulation showed significantly greater pain reduction at 1 week than did the group receiving only medication. In the other trial, the group receiving transcutaneous electrical nerve stimulation had a significantly greater level of pain reduction at 3 weeks. In the fourth trial, exercise was compared to passive physiotherapy; however, outcomes were not reported until 6 and 12 months, so the results cannot be compared to the natural history of acute neck pain not due to whiplash. **Conclusion:** There is limited evidence of the benefit of spinal manipulation and transcutaneous electrical nerve stimulation in the treatment of acute neck pain not due to whiplash injury. There is a dearth of high-quality clinical trials of conservative treatments for this condition. (*J Manipulative Physio! Ther* 2005;28:443-448) **Key Indexing Terms:** Neck Pain; Clinical Trial; Review; Systematic; Treatment; Acute

Neck pain is a common musculoskeletal problem, second only to low back pain in its frequency in the general population<sup>1,4</sup> and in musculoskeletal practice.<sup>5</sup>

Neck pain is the most common secondary complaint of patients who present with a primary complaint in a different body area<sup>5</sup> and it is the leading musculoskeletal complaint in a number of important occupational categories.<sup>6,7</sup> It has been estimated that 25% of primary complaints among chiropractic patients involve neck pain.<sup>5</sup>

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The lifetime prevalence of neck pain in Western populations has been estimated at around 70%," whereas annual or point-prevalence rates range from 10% to 35%.<sup>2,4</sup> Bovim et al,<sup>2</sup> in their landmark Norwegian population study, reported an annual prevalence of 34.4%, with 13.8% of respondents reporting chronic neck pain. Guez et al<sup>3</sup> reported an annual prevalence of 43%, with slightly more women than men reporting neck pain. The prevalence of chronic neck pain was approximately 20%. More recently, Cote et al<sup>4</sup> studied a Saskatchewan (Canada) population and found a lifetime prevalence of 66.7%, a 6-month prevalence of 54.2%, and a point prevalence (current neck pain) of 22.2%.

Estimates of the prevalence of acute neck pain not due to whiplash in adults are difficult to obtain, as prevalence studies typically do not distinguish this from other kinds of neck pain. We speculate that 10% of the population has acute neck pain not due to whiplash at any point time based on the point prevalence of Cote et al.<sup>4</sup>

Acute neck pain not due to whiplash injury in adults is generally regarded as a self-limiting disorder. Acute neck pain may arise in adults in the course of typical activities (eg, lifting, twisting, stretching) in various life settings (eg, occupational, recreational, domestic). Acute neck pain can arise from loads imparted internally to the tissues, in single episodes of overstrain or in repetitive episodes of micro-

strain. Acute neck pain may also arise from externally imparted loads (eg, from falls, from objects striking the head and neck).

There is no consistent definition for applying the term *acute* to the time since onset of pain, with reports in the literature varying from days to months. We have defined "acute" as clinical symptoms lasting no longer than 4 weeks. The work of the Quebec Task Force Report on Whiplash-Associated Disorders<sup>8</sup> and the Cochrane Back Group<sup>9</sup> supports this definition.

This review is concerned with the clinical category of acute mechanical neck pain in adults not due to whiplash. Whiplash-type injury typically involves rapid flexion-extension or side-to-side forces to the head and neck, such as those resulting from a motor vehicle collision.<sup>8</sup> The most significant feature distinguishing pain arising from whiplash compared with the pain dealt with herein is that whiplash causes whiplash-associated disorder (WAD)—a disorder usually including headache and numerous other symptoms (dizziness, tinnitus, sleep disturbance, mood disturbance, pain in areas outside the neck).<sup>8</sup> These symptoms are outside our case definition. Furthermore, individuals with WAD are very often involved in some form of compensation or litigation exercise, which further complicates the syndrome from the point of view of additional psychosocial issues. The Quebec Task Force excluded any studies not involving whiplash-injured subjects from its WAD review. It is therefore appropriate to separate WAD studies from studies of acute mechanical neck pain.

There are numerous systematic reviews of conservative therapies for neck pain.<sup>10-44</sup> All of these reviews include a broad spectrum of clinical entities, ranging from acute to chronic neck pain, with or without whiplash injury, with or without headache and with or without arm pain. One review<sup>4</sup> does deal with acute neck pain, but the time frame for acute is longer. This review includes studies with whiplash as well as with neck and arm pain. As such, there is no review specifically limited to conservative treatments of acute mechanical neck pain not due to whiplash injury and without arm pain or headache.

The therapies included in these reviews span a wide spectrum including manual therapies, physical therapy modalities (laser, electrotherapy), traction, exercises, acupuncture, pillows, and collars. Manual therapy is a generic therapeutic category which is composed of a variety of procedures directed at the musculoskeletal structures in the treatment of mechanical pain.<sup>44</sup> Two major subcategories exist which divide these therapies into those which involve or target joint motion and those which do not. The first subcategory includes manipulation, mobilization, and manual traction. The second subcategory involves both generalized soft tissue therapies such as the many types of massage as well as focal soft tissue therapies such as trigger point therapy, shiatsu, and acupuncture. For this

review, we used the separate therapy categories of manipulation, mobilization, manual traction, massage, and pressure techniques.

The therapeutic category of exercises includes numerous types and protocols. A useful subcategorization identifies exercises aimed at improving flexibility, strength, endurance, and coordination. These 4 subcategories and any combinations were used in this review.

Systematic retrieval and evaluation procedures were used in this review to identify the evidence base of clinical trials of conservative treatments for acute neck pain not due to whiplash injury.

## METHODS

A comprehensive literature search was performed in MEDLINE, CINAHL, AMED, MANTIS, Index to Chiropractic Literature, Alt Health Watch, the Cochrane Database of Systematic Reviews, the Cochrane Controlled Trials Registry, and several EBSCO Information Services databases (Biomedical Reference Collection, Nursing and Allied Health Collection, Psychological and Behavioral Sciences Collection) using the following strategy: (a) published from 1996 to August 2003, English OR German, NOT letters OR editorials, "neck pain"; (b) published at any time to August 2003, English, NOT letters OR editorials, "neck" OR "neck injuries" OR "neck muscles" AND pain (subject) OR "pain."

Selections from the initial search were made by 2 investigators according to the following criteria: the study design was a randomized clinical trial of conservative or complementary therapies for acute neck pain (as defined above); studies using exclusively medication or surgery were excluded. Studies that consisted of only one treatment but which included clinically important and relevant outcomes (pain, impairment) measured more or less immediately as well as over the typical duration of clinical treatment (days to weeks) were accepted.

Studies were rejected for the following reasons: they included an inseparable mix of patients with acute and chronic neck pain, but did not analyze the outcomes data separately for these 2 subgroups; they included patients with both neck and back pain, or multiple areas of pain, or pain which was described as "myofascial," and therefore, multisited, but did not analyze and present the data on acute neck pain subjects separately; they reported on only one treatment and the outcomes which were investigated were considered as mechanisms of action of the intervention with no clinically relevant data presented.

The method of each study was scored using the Amsterdam-Maastricht Consensus List,<sup>45,46</sup> which generates a score out of 19. This instrument is currently used by the Cochrane Collaboration Back Review Group for Spinal Disorders. Two assessors scored studies separately and disagreements were resolved by consensus. No threshold for

**Table I.** Evidence table for acute neck pain randomized clinical trials

Study	Sample size Sex	Age	Tx.'s	Results	Adverse reactions	Quality score
Nordemar and Thomer <sup>4</sup>	30 18 F, 12 M	40 (14)	1. Manual therapy + collar (n = 10) 2. TENS + collar (n = 10) 3. Collar (n = 10) For 1 and 2: 3 per week x 2 wk	A. Change in pain at 1 wk (1-100): 1. 79 (52) 2. 66 (23) 3. 55 (31) (NS)  B. Change in ROM at 1 wk (deg): 1. 132 (117) 2. 115 (42) 3. 65 (49)	None reported	47
Howe et al	52 31 F, 21 M		1. SMT(1 Tx. for most subjects; a few had 2 or 3 Tx) + azapropazone (n = 26) (2 subjects also had cortisone injection) 2. Azapropazone (n = 26)	2 vs 3 = .025 A. % "showing improvement":  1. Immed: 68% P = .04; 1 wk: 74%; 3 wk: 76% 2. Immed: 6%; 1 wk: 60%; 3 wk: 58% B. Change in rotation (deg): 1. 5.5° immed.**, 1 wk**, and 3 wk*	None reported	47
Ekberg et al <sup>49-51</sup>	93 74 F, 19 M	40 (10)	1. Active rehab (n = 53) 2. Passive physiotherapy (n = 40) For 1 and 2: 8 wk of treatments. Treatment regimens not described.	A. Reduction in pain at 12 mo (1-100): 1. 0.060 2. 0.80 NS  B. % returned to work by 6 mo: 1. 21% 2. 63% P = .04 A. Pre-post pain scores (1-100):	None reported	55
Pikula <sup>5</sup>	36 28 F, 8 M	42.1 (7)	. SMT: ipsilateral (n = 12) . SMT: contralateral (n = 12) . Detuned ultrasound (n = 12)	1. 42.5 (19.8)-23.6 (18.6) P = .0005 Effect size = 0.98 2. 44.1 (27.5)-41.4 (28.4) NS Effect size = 0.10 3. 50.4 (22.5H6.5 (21.8) NS Effect size = 0.17 B. Pre-post ROMs: 1 > 3 for extension, ipsi-rotation, ipsi-bending (P = .05-.0005) 1 > 2 for ipsi-bending 2 = 3 NS	None reported	58

Data are expressed as mean (SD). SMT, Spinal manipulative therapy; Tx.'s, treatments; ROM, range of motion; NS, not significant.

\* P = .05

\*\* P = .01

inclusion was used; however, the categories of low, medium, and high quality used by van Tulder et al<sup>45,46</sup> were applied. Evidence tables were compiled from extracted data. The primary outcome measure for this review was pain level or level of pain-related improvement. Secondary outcomes included ranges of motion and return to work.

## RESULTS

The search generated 1980 citations. Four trials (5 publications)<sup>47,51</sup> were accepted according to the inclusion/exclusion criteria described above. Table 1 displays the relevant data from these studies.

## DISCUSSION

The total number of trials qualifying for this review is small (N = 4). Three trials used spinal manipulation or manual therapy.<sup>47,48,31</sup> In these 3 studies, only one of them<sup>51</sup> used a control intervention, although this study involved only one treatment with immediate outcome. These 3 studies used the following comparative therapies: electrotherapy,<sup>47</sup> collars,<sup>47</sup> and drug treatment.<sup>48</sup> The trial by Ekberg et al<sup>49,50</sup> was the only one to involve active exercise and standard passive physiotherapy. There are no studies for the treatment of acute neck pain in adults by massage, traction, ultrasound, or acupuncture.

The total number of subjects investigated in these studies is 211. This is a relatively small number as compared with the situation for acute back pain and for chronic neck pain. The quality scores for all 4 trials were in the fair-to-medium range. None scored above 60%. Therefore, none of these studies can be said to provide convincing evidence for their findings.

There was a wide variation in clinical approach taken in these 4 trials. One of them<sup>31</sup> involved only one treatment with immediate outcome. One study<sup>48</sup> involved one treatment, which was then monitored for up to 3 weeks. Only 2 trials used a clinical regimen of treatments with a sufficient monitoring period. Nordemar and Thorner<sup>47</sup> were explicit in the description of their clinical regimen, specifying that it involved 6 treatments over 2 weeks. Ekberg et al<sup>49</sup> did not specify the length of the treatment period, but did involve a follow-up period of 12 and then 24 months.<sup>50</sup> Only these 2 studies can be appropriately generalized to the typical clinical situation encountered in general practice treatment of acute mechanical neck pain. However, Ekberg et al did not report outcomes until 3 months post-treatment, so the short-term effect of their exercise approach is unknown. The trials by Pikula<sup>31</sup> and Howe et al<sup>48</sup> can be said to provide some evidence of the very short-term benefit of a single spinal manipulative treatment in the treatment of acute neck pain. There were no adverse reactions to any of the therapies reported in any of these studies. This could be interpreted to

mean that no adverse reactions actually occurred or that they were not monitored and, therefore, not reported.

There were a number of trials which were excluded because they either included both acute and chronic patients (some with back and neck pain) or they did not specify the duration of complaint at all (list available from authors).

There is a striking lack of high-quality trials of the typical treatments used in the treatment of this common disorder. There are no studies of a regimen of spinal manipulation, mobilization, or soft tissue therapy over a typical course of treatments. The effectiveness of these studies in comparison to the natural history of acute mechanical neck pain not due to whiplash injury cannot be determined. There are no controlled trials so that the efficacy of these treatments can be determined. There are no studies of treatments such as traction, electrotherapeutics, massage, and others. There are no studies in which combinations of these treatments could be used to determine if such are more effective and to determine if the typical practice approach of using multiple therapies is effective.

## CONCLUSION

A systematic review of the literature was conducted for randomized clinical trials of conservative treatments of acute neck pain not due to whiplash. Four trials were retrieved and reviewed for quality and content. Three of these trials included a treatment group that received spinal manipulation or manual therapy. The comparison treatments in these studies were passive treatments such as transcutaneous electrical nerve stimulation (TENS), a collar, or a medication. Only one of the trials investigated the effects of an exercise program. None of these trials achieved a rating of "high quality," although they all achieved a rating of medium quality.

Two trials<sup>48,51</sup> provide limited evidence of the immediate benefit of a spinal manipulation. One trial<sup>47</sup> provides some evidence that TENS treatment is beneficial over a 3-week interval.

There is a serious dearth of high-quality clinical trials of conservative treatments for acute neck pain not due to whiplash injury.

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