Upper Cervical and Upper Thoracic Manipulation Versus Mobilization and Exercise in Patients with Cervicogenic Headache: A Multi-center Randomized Clinical Trial

BioMed Central (BMC) Musculoskeletal Disorders
February 6, 2016; Vol. 17; 64

James R. Dunning, Raymond Butts, Firas Mourad, Ian Young, Cesar Fernandez-de-las Peñas, Marshall Hagins, Thomas Stanislawski, Jonathan Donley, Dustin Buck, Todd R. Hooks and Joshua A. Cleland:
From Alabama Physical Therapy & Acupuncture, Montgomery, AL, USA and
Nova Southeastern University, Ft. Lauderdale, FL: this article has 86 references.

This is the first study to compare the effectiveness of cervical and thoracic *manipulation* **to** *mobilization* and exercise in individuals with cervicogenic headache. "The purpose of this randomized clinical trial was to compare the effects of manipulation versus mobilization and exercise in patients with cervicogenic headache."

It used 110 subjects who were randomized:

- 58 received both cervical and thoracic *manipulation*
- 52 received *mobilization* and exercise

The treatment period was 4 weeks (6-8 treatments) with follow-up assessment at 1 week, 4 weeks, and 3 months after initial treatment session. Subjects were assessed with a number of standard measurement outcomes.

KEY POINTS FROM THIS ARTICLE:

1) "The International Classification of Headache Disorders defines cervicogenic headache (CH) as, 'headache caused by a disorder of the cervical spine and its component bony, disc, and/or soft tissue elements, usually but not invariably accompanied by neck pain'."

2) The prevalence of cervicogenic headache may be as high as 20% of the headache population.

3) The prevalence of cervicogenic headache may be as high as 53% in patients with headache after whiplash injury.

4) The dominant features of cervicogenic headache include:

- Unilateral head pain without side-shift
- Elicitation of pain with external pressure over the ipsilateral upper neck

- Limited cervical range of motion

- Triggering of attacks by various awkward or sustained neck movements

5) "Individuals with cervicogenic headache are frequently treated with spinal manipulative therapy including both mobilization and manipulation."

- Spinal mobilization consists of slow, rhythmical, oscillating techniques

- Spinal manipulation consists of high-velocity low-amplitude thrust techniques

6) "The most recent literature suggests that pre-manipulative cervical artery testing is unable to identify those individuals at risk of vascular complications from cervical manipulation, and any symptoms detected during pre-manipulative testing may be unrelated to changes in blood flow in the vertebral artery."

- "Hence, pre-manipulative cervical artery testing was not performed in this study; however, screening questions for cervical artery disease had to be negative."

7) "For both the upper cervical and upper thoracic manipulations, if no popping or cracking sound was heard on the first attempt, the therapist repositioned the patient and performed a second manipulation. A maximum of 2 attempts were performed on each patient."

8) "No 'major' adverse events (stroke or permanent neurological deficits) were reported for either group."

9) "The results suggest 6–8 sessions of manipulation over 4 weeks, directed mainly to both the upper cervical (C1-2) and upper thoracic (T1-2) spines, resulted in greater improvements in headache intensity, disability, headache frequency, headache duration, and medication intake than mobilization combined with exercises."

10) "The current study may provide evidence that the management of patients with cervicogenic headache should include some form of manipulation despite the fact it is often suggested that cervical manipulation should be avoided because of the risk of serious adverse events." **[Important]**

- "It has been shown that individuals receiving spinal manipulation for neck pain and headaches are no more likely to experience a vertebrobasilar stroke than if they received treatment by their medical physician."

11) "Based on the results of the current study clinicians should consider incorporating spinal manipulation for individuals with cervicogenic headache." **[Key Point]**

12) Proposed Mechanisms for Manipulation Benefits:

- High-velocity displacement of vertebrae with impulse durations of less than 200 ms stimulates mechanoreceptors and proprioceptors, thereby altering their afferent discharge rates and changing alpha motorneuron excitability levels and subsequent muscle activity.

- Manipulation stimulates receptors in the deep paraspinal musculature while mobilization is more likely to facilitate receptors in the superficial muscles.

- Manipulation may activate the descending inhibitory pain pathway.

13) "The results of the current study demonstrated that patients with cervicogenic headache who received cervical and thoracic manipulation experienced significantly greater reductions in headache intensity, disability, headache frequency, headache duration, and medication intake as compared to the group that received mobilization and exercise; furthermore, the effects were maintained at 3 months follow-up." **[Key Point]**

14) "Individuals with cervicogenic headache who received both cervical and thoracic manipulation experienced significantly greater reductions in headache intensity and disability than those who received mobilization and exercise at a 3-month follow-up."
[Key Point]

15) "Individuals in the upper cervical and upper thoracic manipulation group also experienced less frequent headaches and shorter duration of headaches at each follow-up period." **[Key Point]**

16) "Conclusions: Six to eight sessions of upper cervical and upper thoracic manipulation were shown to be more effective than mobilization and exercise in patients with cervicogenic headache, and the effects were maintained at 3 months."
[Key Point]

COMMENT FROM DAN MURPHY

The manipulations done for this study were done by physical therapists. This article includes 2 photographs of a patient receiving a high-velocity low-amplitude thrust manipulation. One cervical and one thoracic:

- C1-C2
  Patient supine
  Appears to be a standard knife-edge contact on C1 with ipsilateral lateral flexion and contralateral rotation.

- T1-T2
  Patient supine
  Appears to be a standard crossed arm A-P thoracic adjustment.