

**The addition of upper cervical manipulative therapy in the treatment of patients with fibromyalgia:
A randomized controlled trial**

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The aim of this study was to investigate the immediate and long-term effects of a one-year multimodal program, with the addition of upper cervical manipulative therapy, on fibromyalgia management outcomes in addition to three-dimensional (3D) postural measures. It is a prospective, randomized, clinical trial.

KEY POINTS FROM THIS ARTICLE:

- 1) Fibromyalgia syndrome (FMS) is a common and chronic disorder manifested by increased pain sensitivity and a number of other symptoms such as fatigue, stiffness, non-restorative sleep patterns, memory and cognitive difficulties, and reduced quality of life.
- 2) Long-term treatment outcomes on FMS patients "are typically poor." A survey of 1200 primary care physicians in the USA found that only 14% of respondents indicated very good or excellent satisfaction with the management of patients with FMS.
- 3) Published theories as to the cause of FMS include:
 - Poor nutrition
 - Stress
 - Alterations in sleep patterns
 - Changes in neuroendocrine transmitters
 - Poor posture
 - Cervical spine dysfunction
 - Abnormal afferent processing and/or abnormal sensorimotor integration
- 4) "Increasing evidence suggests that spinal dysfunction, particularly in the upper cervical region (which has more mechanoreceptors per unit surface area than any other region of the spinal column), might affect central neural processing and potentially lead to maladaptive central plastic changes."
- 5) "Evidence is emerging that spinal manipulation might ameliorate the potential issues that arise with spinal dysfunction via a positive neuromodulatory effect and thus contribute to more than simple pain management." **[Key Point]**
- 6) "Cervical manipulation might help to modulate disordered sensorimotor integration and thus counteract changes in the processing of sensory information in the brain and spinal cord." **[Key Point]**

7) “Upper cervical manipulation might be required to achieve optimal full-spine postural correction because the rest of the spine orients itself in a top-down fashion.” **[Key Point]**

8) “Posture correction is also essentially for normalizing aberrant afferent input to the central nervous system, which is considered to be an essential component of normal sensorimotor integration.”

9) Protocols:

- This is a randomized clinical trial with a one-year follow-up, assessing 120 patients with fibromyalgia syndrome (FMS) and definite C1-2 joint dysfunction. Subjects were assessed at 12 weeks (at the end of the treatment program) and again at a 1-year follow-up period.
- The subjects were randomly assigned to the experimental [upper cervical manipulation] group ($n = 60$) or the control group ($n = 60$). Both groups completed a 12-week multimodal program consisting of an education program, a cognitive behavior therapy, and an exercise program.
- The treatment measurement outcomes were:
 - Fibromyalgia Impact Questionnaire (FIQ)
 - Pain Catastrophizing Scale (PCS)
 - Algometric score
 - Pittsburgh Sleep Quality Index (PSQI)
 - Beck Anxiety Inventory (BAI)
 - Beck Depression Inventory (BDI)
 - Three-dimensional postural measures

10) Interventions:

- Education program

The education program consisted of one 2-hour session per week for 12 weeks, and included:

Information about typical symptoms

The usual course for fibromyalgia

Potential causes of fibromyalgia

The influence of psychosocial factors on pain

Current pharmacologic and non-pharmacological treatments for fibromyalgia

The benefits of regular exercise on fibromyalgia

- Cognitive behavior therapy (CBT)

The cognitive behavior therapy consisted of one 2-hour session per week for 12 weeks, and included educational, physical, cognitive, and behavioral elements.

- Exercise program

This program was conducted for 1 h three times per week for 12 weeks. The participants were instructed to perform the relaxation exercises at home twice daily as their home routine.

- Upper Cervical Spinal manipulation:

The experimental group received the upper cervical manipulative therapy, consisting of both:

- Low-velocity cervical joint mobilization techniques.
- High-velocity manipulation techniques for the treatment of cervical joint disorders.

Upper cervical manipulative therapy was conducted in 12 treatments (three times per week) over a one-month period in addition to maintenance spinal manipulations in one session per week for the following 8 weeks.
[3X/week for 4 weeks, then 1X/week for 8 weeks]

11) The group receiving upper cervical spinal manipulation showed significant improvements in spinal posture.

12) After 12 weeks of treatment, the two treatment arms were roughly equally successful in improving the fibromyalgia management outcomes.

13) At the 1-year follow-up, the upper cervical spinal manipulation group showed greater improvements in all the fibromyalgia measurement outcomes. **[Important]**

14) "At the one-year follow-up after the end of the treatment, there were statistically significant changes that indicated that the fibromyalgia syndrome management outcomes of the experimental [upper cervical manipulation] group exhibited continued improvement and that the control subjects' scores regressed back toward the baseline values (i.e., the scores worsened)."

15) "The normalization of the afferent input of the upper cervical spine seems to offer an explanation for these one-year improved outcomes in the experimental group."

16) "The one-year improvements in the FMS management outcome measures observed in the experimental [upper cervical manipulation] group are the most significant findings of our investigation."

- 17) "The experimental group that received the upper cervical manipulation experienced significant changes in the posture parameters that occurred in the sagittal, transverse, and coronal planes. These significant changes might suggest the important role of the cervical spine in global spinal posture. These results are conceptually in agreement with neurophysiological studies that have identified a neurological regulation of static upright human posture that is largely dependent on head posture and thus normal afferentation."
- 18) The upper cervical articulations have the greatest number of receptors in the cervical spine and therefore the greatest potential for spinal mechanoreceptive afferentation into the neuroaxis. **[Key Point]**
- 19) "The upper cervical afferents feed directly into the vestibular and other high-order nuclei, which would allow the input of less-modified information from the upper cervical articulations into the brain stem nuclei compared to the lower segments of the spine." **[Key Point]**
- 20) Correction of forward head posture is "effective in improving the spinal posture in transverse, coronal, and sagittal planes."
- 21) "Upper cervical spinal manipulation is paramount for restoring normal afferent input to the CNS and allowing the body to correctly perceive itself and its environment."
- 22) There is a "significant role of upper cervical manipulation in normalizing the afferentation processes and consequently correcting 3D posture."
- 23) "Sustained postural imbalances can result in the establishment of a state of continuous asymmetric loading. Once this state is established and maintained beyond critical weight and time threshold, degenerative changes in the muscles, ligaments, bony structures, and neural elements increase." **[Important]** When postural asymmetry is reversed, and the unbalanced loading is thereby corrected the "reversibility of these degenerative changes or even their improvement requires some time." **[Important]**
- 24) "Importantly, our results from the one-year follow-up revealed statistically significant changes that favored the experimental [upper cervical manipulation] group's outcomes in terms of all of the FMS management outcome variables."
- 25) "The continuous asymmetrical loading and muscle imbalance that results from biomechanical dysfunction due to abnormal spinal posture in the sagittal, transverse, and coronal planes elicits abnormal stress and strain in many structures, including the bones, intervertebral disks, facet joints, musculotendinous tissues, and neural elements and causes a barrage of nociceptive afferent input that results in dysafferentation." **[Key Point]**

26) There is a strong association between FMS and poor posture: "In fibromyalgia as well as in low back pain, we frequently find disturbances of the posture of vertebral column clinically and radiologically."

27) "The addition of the upper cervical manipulative therapy to a multimodal program is beneficial in treating patients with fibromyalgia syndrome."

28) These authors imply that new guidelines for the treatment of FMS should be established and they should include upper cervical manipulation.

29) The long-term one-year follow-up revealed "statistically significant changes that favored the FMS management outcomes of the experimental [upper cervical spinal manipulation] group."

COMMENTS FROM DAN MURPHY

This is an important study, and the data suggests this model:

Fibromyalgia is a multifaceted problem that tends to be linked to poor posture. This is because the postural system controls a large quantity of the afferent neurology into the central neural axis.

The upper cervical spine has more afferent neurons that enter the central neural axis than any other spinal region. In addition, upper cervical afferents communicate mono-synaptically in the vestibular nucleus.

The vestibular nucleus controls whole body posture.

Upper cervical spinal manipulation makes a significant and lasting improvement on whole body posture by influencing the vestibular nucleus.

This study also indicates that the benefits of chiropractic postural corrections take time to manifest, but once these benefits are obtained, they tend to be long lasting.