**Article Full Title**

Decrease in elbow flexor inhibition after cervical spine manipulation in patients with chronic neck pain

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**Paper Abstract**

Muscle inhibition, i.e., the inability to fully activate a muscle, has been observed following joint pathologies and in low back pain conditions. Although chronic neck pain has been associated with changes in muscle recruitment and coordination in the shoulder and arms, the possibility of muscle inhibition has not been explored.

**Was the study question or objective clearly stated?**

Yes

**Were eligibility/selection criteria for the study population prespecified and clearly described?**

Yes

**Were the participants in the study representative of those who would be eligible for the test/service/intervention in the general or clinical population of interest?**

Cannot Determine, Not Reported, Not Applicable

**Were all eligible participants that met the prespecified entry criteria enrolled?**

Yes

**Was the sample size sufficiently large to provide confidence in the findings?**

No

**Was the test/service/intervention clearly described and delivered consistently across the study population?**

Yes

**Were the outcome measures prespecified, clearly defined, valid, reliable, and assessed consistently across all study participants?**

Yes

**Were the people assessing the outcomes blinded to the participants' exposures/interventions?**

No

**Was the loss to follow-up after baseline 20% or less? Were those lost to follow-up accounted for in the analysis?**

No

**Did the statistical methods examine changes in outcome measures from before to after the intervention? Were statistical tests done that provided p values for the pre-to-post changes?**

No

**Were outcome measures of interest taken multiple times before the intervention and multiple times after the intervention (i.e., did they use an interrupted time-series design)?**

Cannot Determine, Not Reported, Not Applicable

**If the intervention was conducted at a group level (e.g., a whole hospital, a community, etc.) did the statistical analysis take into account the use of individual-level data to determine effects at the group level?**

Cannot Determine, Not Reported, Not Applicable

**Key Finding #1**

Significant dysfunction in biceps activation was evident in patients with chronic neck pain, indicating that this muscle group cannot be used to the full extent

**Key Finding #2**

Chronic neck pain has been found to have changes in muscle contracting and coordination in the shoulder and arms, however, more exploring needs to be done to assume the possibility of muscle inhibition

**Key Finding #3**

Cervical spine manipulation was applied at the level of C5/6/7 and found to have good results with repeated assessment.

**Key Finding #4**

**Please provide your summary of the paper**

Several methods were used in this study of 16 participants; biceps incitement all along a maximum willing elbow flexor shortening was evaluated utilizing the interpolated twitch method and electromyography, cervical range of motion and pressure pain thresholds were assessed utilizing a goniometer and an algometer and manipulation of the cervical spine at level C5/6/7 with repeated mobilizations. Before cervical spine manipulation, patients showed inhibition in bicep muscles, restriction in cervical range of motion laterally and report of high pressure pain sensitivity. Following the cervical spine manipulation, not only was cervical motion and pressure pain significantly improved but decrease in inhibition and increase force were found in the biceps. Further research is necessary to confirm whether muscle restriction is linked with clinical symptoms and functional outcome.

**Please provide your clinical interpretation of this paper. Include how this study may impact clinical practice and how the results can be implemented.**

Muscle restriction in the biceps has not been previously reported or charted in patients who suffer of chronic neck pain. With that being said, more research and studies will need to be establish in order to prove muscle inhibition is related to the clinical symptoms and functional outcome. However, improved muscle function, cervical range of motion and pain sensitivity were all reported with spinal manipulation, and may include a benefit for treating patients with chronic neck pain.