Immediate Changes in Neck Pain Intensity and Widespread Pressure Pain Sensitivity in Patients With Bilateral Chronic Mechanical Neck Pain: A Randomized Controlled Trial of Thoracic Thrust Manipulation vs Non–Thrust Mobilization

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Abstract

Objective: The purpose of this study was to compare the effects of thoracic thrust manipulation vs thoracic non–thrust mobilization in patients with bilateral chronic mechanical neck pain on pressure pain sensitivity and neck pain intensity.

Methods: Fifty-two patients (58% were female) were randomly assigned to a thoracic spine thrust manipulation group or of thoracic non–thrust mobilization group. Pressure pain thresholds (PPTs) over C5-C6 zygapophyseal joint, second metacarpal, and tibialis anterior muscle and neck pain intensity (11-point Numerical Pain Rate Scale) were collected at baseline and 10 minutes after the intervention by an assessor blinded to group allocation. Mixed-model analyses of variance (ANOVAs) were used to examine the effects of the treatment on each outcome. The primary analysis was the group * time interaction.

Results: No significant interactions were found with the mixed-model ANOVAs for any PPT (C5-C6: $P > .252$; second metacarpal: $P > .452$; tibialis anterior: $P > .273$): both groups exhibited similar increases in PPT (all, $P < .01$), but within-group and between-group effect sizes were small (standardized mean score difference [SMD] < 0.22). The ANOVA found that patients receiving thoracic spine thrust manipulation experienced a greater decrease in neck pain (between-group mean difference: 1.4; 95% confidence interval, 0.8-2.1) than did those receiving thoracic spine non–thrust mobilization ($P < .001$). Within-group effect sizes were large for both groups (SMD > 2.1), and between-group effect size was also large (SMD = 1.3) in favor of the manipulative group.

Conclusions: The results of this randomized clinical trial suggest that thoracic thrust manipulation and non–thrust mobilization induce similar changes in widespread PPT in individuals with mechanical neck pain; however, the changes were clinically small. We also found that thoracic thrust manipulation was more effective than thoracic non–thrust mobilization for decreasing intensity of neck pain for patients with bilateral chronic mechanical neck pain. (J Manipulative Physiol Ther 2014;37:312-319)

Key Indexing Terms: *Manual Therapy; Neck Pain; Spine; Pressure*

Neck pain is a common musculoskeletal complaint with a point prevalence around 15% in males and 23% in females.[1] Studies examining the course of neck pain have shown that symptoms usually decrease over the first few weeks and months, but complete resolution of symptoms is not attainable for all, even after years.[2] The economic burden associated with neck pain should not be underestimated because many participants will continue

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Fig 1. *Thoracic spine thrust manipulation. (Color version of figure is available online.)*

Fig 2. *Thoracic spine non–thrust mobilization. (Color version of figure is available online.)*

to use health care resources for up to 10 years after the initial onset.[3] In fact, there has been a consistent increase in the medical costs associated with the management of spinal pain conditions between 1997 and 2005.[4]

Participants reporting neck pain often seek manual therapy for the management of their symptoms. In fact, physical therapy is generally the first management option for patients with mechanical neck pain. Physical therapists treat mechanical neck pain with a number of interventions including joint mobilization and/or manipulation, therapeutic exercises, soft tissue massage, electrotherapy, or education. Manual therapies targeted to the neck and deep neck flexor musculature exercises are probably the most accepted therapeutic interventions for the management of this population. In fact, clinical practice guidelines for manual therapy management of patients with neck pain suggest use of treatment approaches including cervical spine manipulation or mobilization and training of the deep neck flexors.[5,6]

The use of cervical spine thrust manipulations is still controversial based on the fact that all potential risks cannot be avoided.[7] Hence, the use of thoracic spine thrust manipulations in individuals with neck pain has increased in recent years. Two recent systematic reviews concluded that individuals with mechanical neck pain benefit from thoracic spine thrust manipulation;[8,9] however, the exact neurophysiologic mechanism by which thoracic manipulation exerts it effects remains to be elucidated.[10,11] Segmental and central theories have been proposed as the most likely hypotheses for spinal thrust manipulation to act through the stimulation of descending inhibitory mechanisms, particularly the periaqueductal gray matter.[12,13] This assumption is mainly based on the premise that spinal thrust manipulation exerts a mechanical hypoalgesic effect, thereby increasing pressure pain thresholds (PPTs). Several studies demonstrated that cervical spine manipulation induces this hypoalgesic effect in healthy people,[14–16] individuals with mechanical neck pain,[17] and patients with lateral epicondylalgia.[18] However, few studies had investigated if thoracic spine thrust manipulation can exhibit a hypoalgesic effect. A small clinical trial compared changes on PPT over the elbow after the application of either cervical or thoracic thrust in individuals with lateral epicondylalgia and reported that the cervical manipulation produced a greater increase in PPTs than thoracic spine manipulation.[19] A recent randomized clinical trial found that cervical and thoracic thrust manipulation induces similar changes in widespread PPTs in individuals with chronic mechanical neck pain; however, these changes were small and did not surpass their respective minimal detectable change (MDC) values.[20]

To date, only 2 studies have compared the effects of thoracic thrust manipulation and non–thrust mobilization in reducing pain for individuals with mechanical neck pain. Cleland et al[21] found that those patients with mechanical neck pain who received thoracic manipulation had greater pain reduction at a 2-day follow-up period than did patients who received thoracic mobilization. Conversely, Suvarnnato et al[22] did not find a significant difference in pain reduction between individuals with neck pain who received thoracic thrust manipulation or non–thrust mobilization. Perhaps the difference is related to the fact that the participants in the study by Cleland et al[21] exhibited symptoms for less than 2 months, whereas those in the study by Suvarnnato et al[22] had to have symptoms greater than 3 months to be included in the trial. Considering these discrepancies and the fact that the physiological effects of thoracic thrust manipulation remain to be elucidated, the purpose of this randomized clinical trial was to examine the widespread effects of thoracic spine thrust manipulation and thoracic non–thrust mobilization on pressure pain sensitivity and intensity of neck pain in patients with chronic mechanical neck pain.