Thrust Joint Manipulation to the Cervical Spine in Participants with a Primary Complaint of Temporomandibular Disorder (TMD): A Randomized Clinical Trial

by

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Summary

Background: Temporomandibular disorder (TMD) is a common and costly problem often leading to chronic pain. Standard care includes medical or dental management with medication, injection, and an oral appliance.[1,2] Moderate evidence exists supporting physical therapy (PT) interventions for individuals with TMD; the most commonly reported interventions include behavioral education, modalities, manual therapy and exercise for the masticatory system as well as the cervical spine.[3,4] A known relationship between TMD and the cervical spine exists.[4,5] Previous authors have reported strong correlations between jaw dysfunction and neck disability.[6,7] There are biomechanical relationships based on anatomy, length tension, and coupled movements. A neurophysiological relationship exists based on shared grey matter in the cervicotrigeminal nucleus. Evidence from LaTouche et al[8,9] and Calixtre et al[10] support non-thrust joint mobilizations to the cervical spine in the TMD population. Cervical spine thrust joint manipulation (TJM) has been explored in a limited fashion[11-15], however, it has not been randomized in the TMD population, making the specific effect difficult to determine.

Objectives: To determine the immediate and short term (1 and 4 week) effects of cervical TJM on pain, dysfunction, range of motion, and perception of change in individuals with a primary complaint of TMD.

Methods: In this prospective longitudinal randomized clinical trial, individuals with TMD were randomly assigned to receive cervical TJM or sham manipulation in 4 PT visits over 4-weeks. All participants also received behavioral education, a home exercise program, and soft tissue mobilization. The trial was registered prospectively and followed CONSORT guidelines. IRB approval was attained at Bradley University with an institutional agreement with Nova Southeastern University. All participants provided informed consent and data was collected in Peoria, IL and Las Vegas, NV.

Primary outcomes included jaw range of motion (ROM), Numeric Pain Rating Scale (NPRS), TMD Disability Index, Jaw Functional Limitation Scale (JFLS), Tampa Scale of Kinesiophobia (TSK-TMD), Pressure Pain threshold (PPT), Global Rating of Change (GROC), and Patient Acceptable Symptom State (PASS). Self-report and objective measurements (with a blinded assessor) were taken at baseline, immediately after baseline treatment, 1-week, and 4-weeks.

A 2 x 4 mixed model ANOVA was used with treatment group as the between-subjects factor and time as the within-subjects factor. Separate ANOVAs were performed for dependent variables and the hypothesis of interest was the group by time interaction.

Results: A total of 83 individuals noted interest in participation and 33 were excluded for various reasons. The most common reasons for exclusion were low pain at baseline or a recent

cervical manipulation by another provider. Fifty participants (86% female) were enrolled in the study. Mean age was 35.5 years, mean duration of symptoms was 72.3 months. All 50 participants had a diagnosis of myalgia according to the DC-TMD. Groups were similar at baseline on all variables except left deviation of the jaw. There was no attrition to report.

Statistically significant 2-way interactions were noted in JFLS ($p = .026$) and TSK-TMD ($p = .008$), favoring the cervical thrust joint manipulation (TJM) group. A moderate to large effect size was noted for each measure, $d= 0.60$ and $d= 0.80$, respectively While no other measures had a statistically significant interaction effect, there were statistically significant main effects in all measures over time. The change on each measure favored the cervical TJM group.

There were no adverse events to report. Treatment side-effects were tracked and reported in 36% of the TJM group and 48% of the sham manipulation group. The majority of side effects were mild in nature and lasted <48 hours. GROC and PASS favored the thrust manipulation group at each measurement period with statistically significant differences in successful outcomes noted immediately after baseline treatment (NNT = 5) and at 4-weeks (NNT = 4).

Conclusion: Both groups received identical multi-modal treatments with the addition of the randomized intervention: cervical TJM or sham manipulation. Differences between groups were small, however, improvements favored the TJM group on all measures. A statistically significant interaction effect supported improved function as measured by JFLS and reduced fear on the TSK-TMD for the cervical TJM group. The change in mouth opening ROM exceeded MDC for the TJM group. A change of 2 on NPRS for jaw pain in the TJM group (baseline to 4-weeks) is clinically meaningful.[16,17] Immediate changes in NPRS of the jaw and neck and PPT in all locations favored the cervical TJM group as well. These results are comparable to previously reported evidence of immediate responses with TJM. Clinical Bottom Line: Cervical TJM is an effective PT intervention for neck pain and headache; it may be beneficial in the treatment of TMD as well.

Limitations include an instrumentation threat with the digital algometry measurement of PPT, low levels of baseline pain, external validity related to the RCT design, and sample size estimations powered around maximal mouth opening. Future research should include further analysis of psychometric properties of jaw functional scales and study of a population with a minimal level of disability in both the jaw and the neck.

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