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Preliminary evidence for feasibility, efficacy, and mechanisms of Alexander technique group classes for chronic neck pain

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ABSTRACT

Objectives: To determine feasibility and potential of Alexander technique (AT) group classes for chronic neck pain and to assess changes in self-efficacy, posture, and neck muscle activity as potential mechanisms for pain reduction.

Design: A single-group, multiple-baseline design, with two pre-tests to control for regression toward the mean, a post-test immediately after the intervention, and another post-test five weeks later to examine retention of benefits. Participants were predominately middle-aged; all had experienced neck pain for at least six months.

Intervention: Participants attended ten one-hour group classes in AT, an embodied mindful approach that may reduce habitual overactivation of muscles, including superficial neck muscles, over five weeks.

Outcome measures: (1) self-reports: Northwick Park Questionnaire (to assess neck pain and associated disability) and Pain Self-Efficacy Questionnaire; (2) superficial neck flexor activation and fatigue (assessed by electromyography and power spectral analysis) during the cranio-cervical flexion test; (3) posture during a video game task.

Results: There were no significant changes in outcomes between pre-tests. All participants completed the intervention. After the intervention: (1) participants reported significantly reduced neck pain; (2) fatigue of the superficial neck flexors during the cranio-cervical flexion test was substantially lower; (3) posture was marginally more upright, as compared to the second pre-intervention values. Changes in pain, self-efficacy, and neck muscle fatigue were retained at the second post-test and tended to be correlated with one another.

Conclusions: Group AT classes may provide a cost-effective approach to reducing neck pain by teaching participants to decrease excessive habitual muscle contraction during everyday activity.

1. Introduction

Neck pain is the 4th leading cause of disability in the U,[1] with annual global prevalence around 26%.[2] Possible causes include poor postural alignment and inefficient distribution of muscle activity. Support for a connection between neck pain and postural alignment comes from studies showing that people with neck pain may tend to habitually carry their heads forward from their spines (called forward head posture),[3–5] and that forward head posture increases loading on neck muscles.[6–8] Support for the connection between neck pain and inefficient neck muscle organization comes from studies showing increased activation of the superficial sternocleidomastoid muscles in patients with neck pain, along with an inverse relationship between activation of sternocleidomastoids and activation of deep cervical flexors responsible for support of the cervical spine.[9,10] This can be seen clearly in performance of the *cranio-cervical flexion test* (CCFT), which involves gently flexing the neck while lying supine.[10]

Successful treatment of neck pain by exercise has been associated with decreased activation of the sternocleidomastoids during the CCFT, thought to indicate an appropriate commensurate increase in activation of deep cervical flexors.[11] However, exercise programs can be time consuming, people suffering from pain may find exercise aversive, and compliance may be low.[12–14] In addition, a recent meta-analysis suggests that exercise may not be as effective for neck pain-related disability as previously thought.[15] Therefore, development of an effective non-exercise program that addresses patterns of neck muscle activity could provide an alternative for individuals who are unwilling or unable to participate in exercise programs targeting neck pain, while shining additional light on mechanisms underlying neck pain and recovery.

Abbreviations: CCFT, cranio-cervical flexion test; AT, Alexander technique; NPQ, Northwick Park Questionnaire; PSEQ, Pain Self-Efficacy Questionnaire; ANOVA, analysis of variance

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One possible alternative to exercise is embodied mindfulness education. Results of studies investigating the effectiveness of education for neck pain have not been encouraging.[16,17] However, ineffective studies have not included information or skills known to be important to musculoskeletal rehabilitation, such as how the spine functions and how to practically apply this knowledge to daily activities.[18]

Alexander technique is a non-exercise-based embodied mindfulness approach that aims to improve overall patterns of postural muscle organization by teaching people to observe and inhibit habitual patterns of reaction while maintaining an intention of length and integration.[19–22] Importantly, AT principles and skills are meant to be applied in everyday activities, rather than being tied to particular exercises. In a recent randomized controlled trial, 20 one-to-one AT lessons led to reduced neck pain and increased self-efficacy compared to usual care, with higher self-efficacy associated with lower neck pain scores one and seven months after lessons were completed.[23] This is a promising result; however, one-to-one lessons may be cost-prohibitive for some people. AT is often taught in groups.[24–26] but the present study is the first to examine the feasibility or efficacy of AT group classes for people with neck pain. If group classes in AT lead to reduce neck pain and improve pain self-efficacy (as was found for one-to-one lessons), this could provide a cost-effective intervention.

The present study also investigated three possible mechanisms by which learning and applying the AT might reduce neck pain. If changing postural alignment is an important AT mechanism, the AT intervention should lead to reduced forward head posture, associated with reductions in pain. If AT alters patterns of postural muscle activation by inhibiting excessive contraction of superficial muscles, leading to more efficient overall self-organization of skeletal muscles,[27–30] the intervention should lead to decreased sternocleidomastoid activation and fatigue during CCFT, associated with decreased neck pain. If AT alters coordination through increased understanding, awareness, and ability to choose more comfortable posture and movement patterns, the group AT intervention should lead to increased self-efficacy.

2. Methods

2.1. Design

This single group pilot study began with two baseline data collection sessions (B1 and B2) spaced five weeks apart to determine if there was regression towards the mean (spontaneous recovery). Following B2, participants completed five weeks of AT classes (ten meetings, twice per week), followed by two post-intervention testing sessions (P1 and P2). The first testing session was administered immediately after the intervention; the second testing session was administered 5 weeks later to assess retention of benefits.

2.2. Participants

Participants were recruited through radio ads, flyers, and the University of Idaho employee newsletter. Volunteers were screened through an online survey and were invited to participate in the study if they scored > 8/50 on the Neck Disability Index), reported at least six months of neck pain, and had not received specialized treatment for neck pain within the past six months.[31] Participants were excluded if they indicated they could not attend all classes and testing sessions. Ten participants (eight women, two men; age 48 ± 10 years) completed all testing sessions and the intervention. Participants consented to take part in the study according to a protocol approved by the University of Idaho's institutional review board (#16-1131). Testing took place in the Mind in Movement Laboratory on the University of Idaho campus. See Table 1 for additional demographic information.

2.3. Intervention

AT classes were held from 6 to 7 pm on Mondays and Fridays in a rehearsal room on the University of Idaho campus and were delivered by a certified trained AT teacher (co-author SLC, member of Alexander Technique International, mATI). Participants were taught AT principles and skills that would allow them to notice unproductive habits of muscle tension and to become aware of the possibility of making different choices. The AT classes included instruction in basic biomechanical and ergonomic principles (including anatomy of the neck, spine, and major joints of the upper and lower limbs) and advantages of maintaining an external focus during activity. In addition, participants were guided in self-observation during everyday activities such as standing, sitting, computer work, texting, driving, household chores, and personal care tasks. Hands-on work was used occasionally to demonstrate how to maintain a fluid connection between the head and spine during activities.[22] On average, each participant received about one minute of hands-on contact per week. Games and partner activities such as tossing and catching were included to create a structure for exploration in a fun, low-stakes context.[24] A typical class began with ten minutes for participants to share observations and ask questions, followed by 20 min of instruction on new material, 20 min of activities and games, and ten minutes of discussion, questions, and planning of individualized application of the material to specific activities.

2.4. Outcomes

Each testing session included three parts: (1) Self-report; (2) Electromyography of sternocleidomastoid activity during CCFT[9]; (3) Assessment of forward head posture during a 5-min video game task.

2.4.1. Self-report measures

Our primary outcome measure was the Northwick Park Questionnaire (NPQ), a 9-item questionnaire assessing severity of neck pain and disability during activities of daily living.[32] Each item is scored from 0 to 5 and then summed.

The Pain Self-Efficacy Questionnaire (PSEQ) is a 10-item questionnaire assessing confidence regarding performance of daily activities despite neck pain.[33] Each item is scored using a 7-point Likert scale, where 0 = not confident at all and 6 = completely confident, and item scores are summed for a total score.

At P1, we administered a survey about participants' experience of the AT classes. At P2 we administered a survey asking participants how consistently they were applying what they had learned.

2.4.2. Electromyography

Prior to electrode placement, skin was prepped by shaving any hair, lightly abrading with sand paper tape[a], and cleansing with 70% isopropyl alcohol. Single Bagnoli[b] DE-2.1 Ag-AgCl electrodes were placed bilaterally on the sternocleidomastoids approximately 2/3 of the way down the muscle, close to the manubrium. Electrode placements were obtained from previous studies of the CCFT[10] and were based on palpation during supine neck raises and rotations. Data were collected and pre-processed with the MotionMonitor Classich software.

Following electrode placement, participants performed a reference voluntary contraction while lying supine. The reference value was obtained by having participants hold their heads approximately 3 inches off the floor for 10 s while muscle activity was recorded. Three reference contractions were recorded to ensure a reliable measurement and later averaged during data analysis.

2.4.3. CCFT

CCFT was administered using a standard clinical protocol adopted from Jull et al.[9] Participants lay supine, with a Chattanooga biofeedback unit[c] under the neck touching the external occipital protuberance to provide visual feedback to the participant and experimenter. The

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