Comparison Between the Effects of Passive and Active Soft Tissue Therapies on Latent Trigger Points of Upper Trapezius Muscle in Women: Single-Blind, Randomized Clinical Trial

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Abstract

Objective: The purpose of this study was to investigate the effects of passive versus active soft tissue therapies on pain and ranges of motion in women with latent myofascial trigger points.

Methods: Forty-two female patients, aged 18 to 64 years, with a history of neck pain and latent myofascial trigger points in the upper trapezius muscle were randomly assigned to 3 groups: group A received passive soft tissue therapy, group B received active soft tissue therapy, and a control group C received a sham procedure. The treatment consisted of 3 sessions in a 1-week period with 1-day break between each session. The local pain intensity, measured with a visual analog scale and pain pressure threshold (PPT) using algometry, and active cervical contralateral flexion (ACLF) measured with goniometry, were obtained at baseline, after the third session, and a week after the third session.

Results: The results indicated a significant decrease in local pain intensity on the visual analog scale within each group (A and B) compared with the control group (C) ($P < .05$). The passive group had significant improvement in PPT compared with the control group ($P < .05$). There were no significant differences in ACLF after treatment between the 3 groups ($P > .05$).

Conclusion: Both passive and active soft tissue therapies were determined to reduce pain intensity and increase ACLF range of motion, although passive therapy was more effective in increasing PPT in these patients compared with the control group. (J Chiropr Med 2016;xx:1-9)

Key Indexing Terms: *Musculoskeletal Manipulations; Trigger Points; Trapezius Muscle; Therapy, Soft Tissue; Massage; Myofascial Pain Syndromes*

Introduction

Musculoskeletal disorders are tissue dysfunctions in the musculoskeletal system that arise as a result of continuous exposure to abnormal, adverse physical conditions during rest or while performing job duties, as well as steady and repeated movements leading to pain and injury in the body, especially in the neck and shoulder.[1-4] Some consider musculoskeletal pain related to the neck and shoulder areas as affected by occupational injuries, which, by a prevalence of more than 50%, are ranked the first compared with pain in other areas of the body. Given the importance of the issue, ignoring proper treatment can cause postural disorders, reduce performance in daily activities and quality of life, and, consequently, increase work absences and medical expenses over time, which impose a heavy financial burden on the individual and society.[5-7]

Computer use, especially among office workers and for the purpose of work-related duties, has prominently spread around the world.[8-12] A review of published reports reveals a number of risk factors for neck and shoulder pain among computer-using office workers. These risk factors include lack of or low job satisfaction, unfavorable work environment

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and physical conditions, failure to comply with ergonomic factors (lack of proper footrest, improper mouse, and incorrect angle of the monitor),[13-18] and gender (women, because of differences in anatomical and physiological structure and also hormonal cycle changes in the second to fifth decade of their lives, compared with those for men, are more susceptible to musculoskeletal pains and disorder in a similar workplace with a constant pressure).[11]

Repetitive tasks with long static loads lead to the development of clinical disorders such as myofascial pain syndrome (MPS) with trigger points (TPs) and, subsequently, the relevant musculoskeletal disorders such as MPS.[10,19-23] In accordance with the clinical manifestations, the TPs are classified as active or latent: The active type manifests as referred pain even during rest, and the latent type, according to Simons, causes limitation of motion and muscle weakness and can be painful only with direct firm pressure.[24] Trigger points can occur in any muscle, but a common place is in the muscles that are involved in maintaining posture.[15,20] Trester et al reported that the upper trapezius muscle is the most common muscle involved in MPS associated with TPs among computer users.[14]

Given the high prevalence of musculoskeletal injuries among staff who use computers, the present study was carried out to investigate effective treatment to improve these injuries with minimal side effects. There are many therapeutic approaches available for the treatment of patients with TPs, among which is manual therapy.

Some studies have been conducted to identify effective treatments for soft tissue–related problems. Research on active techniques includes applying pressure to nodules or bands in a muscle and then the abnormal tissue being taken from contracted position to elongated position, while the therapist maintains directed manual contact along the muscle fibers.[25-27]

Passive methods have also been used as a clinical tool for the treatment of muscle dysfunction. This technique aims to interrupt the pain spasm cycle and influence the muscle by correcting musculoskeletal and neurologic imbalances in a relaxed position for a specified period (90 seconds or 3 minutes).[22]

A review of the related published reports revealed that no study has reported the comparison of these passive and active soft tissue therapies. Therefore, the purpose of this study was to examine the effects of these manual therapy techniques on pain and ranges of motion in women with latent myofascial TPs.

Methods

Design and Participant Selection

This was a randomized single-blind sham controlled clinical trial approved by the Ethics Committee of Physiotherapy Research Centre (PTRS# IR.Sbmu.ram.Rec.1394.310), at Shahid Beheshti University of Medical Sciences, Tehran, Iran, with the registration code no. IRCT2016010425847N1 in the Iranian Registry of Clinical Trials. Random sampling was used to select the participants from the available community—that is, all women among the staff and students of the School of Rehabilitation, Shahid Beheshti University of Medical Sciences, Tehran.

To calculate the sample size, because we had 3 independent groups and also because of the quantitative nature of the variables, 1-way analysis of variance menu of power and sample size (version II) was used. In the SPSS software (version 16), considering the first error type the level of α was considered to be .05 and considering the second error type, β was considered to be .1—that is, a power of 90% and average pain of $\mu 1 = 2$, $\mu 2 = 1.08$, and $\mu 3 = 0.67$ (standard deviation [SD] = 0.9), based on the study by Trivedi et al.[28] So, a sample size of 14 participants in each group (42 in total) was obtained.

Before the random distribution of the participants into groups of 14, they were first examined to determine the most sensitive latent TP in the left or right upper trapezius by evaluating the level of sensitivity using hand palpation and algometry. Next, informed consent was obtained from each of the participants after an explanation of the study. The researchers made sure that participants did not incur any additional cost. All participants' rights were observed throughout the study. Participants were included if they had a minimum of 1 palpable nodule in the upper trapezius muscle and hypersensitive tender spot in a taut band in response to 2.5 kg/cm^2 of pressure and were excluded if they had a history of thyroid disease, neck pain after a motor vehicle accident and cervical surgery, myofascial pain therapy within the month before the study, presence of spontaneous referred pain pattern (active TP), or jump sign.[29-36] A total of 42 women (because of availability issues), aged between 18 and 64 years, were selected as the final participants of the study. The volunteers were female because gender differences may have influenced the results.[37] The selected participants were then randomly allocated to 3 groups using a lottery draw: each participant received a sealed envelope containing one of the letters A, B, or C. Those who received letters A, B, and C became members of passive, active, and control groups, respectively.

Outcome Measures

The variables assessed were active cervical contralateral flexion (ACLF) range of motion (ROM) by goniometer, intensity of pain on the visual analog scale (VAS), and pain pressure thresholds (PPTs) by algometry. The algometer used in the present study was the Taiwan 5020 version, with a 1-cm square disc area; the calibration was approved by the official manufacturer before data collection commenced. The validity and reliability of the instruments were previously verified in other studies (intraclass correlation coefficient: 0.75-0.89).[38,39] Using the algometer, 2.5 kg/cm^2 pressure was applied on the latent TP while the patient was asked to mark the pain level on VAS (a 10-cm line with 0 representing the lowest and 10 representing the highest level of pain),[40,41]