



Short-term effects of traditional Thai massage on electromyogram, muscle tension and pain among patients with upper back pain associated with myofascial trigger points

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ARTICLE INFO

Article history:

Received 17 June 2016

Received in revised form 12 July 2016

Accepted 18 July 2016

Available online 19 July 2016

ABSTRACT

Objective: To investigate effects of traditional Thai massage (TTM) on electromyographic (EMG) activity, muscle tension and pain intensity in patients with upper back pain associated with myofascial trigger points (MTrPs).

Design: A single-blind, randomized clinical trial.

Setting: The Department of Physical Therapy, School of Health Science, Mae Fah Luang University, Thailand.

Intervention: Fifty patients were randomly assigned to receive a 30-min session of either TTM or control (sham microwave diathermy).

Outcomes: Electromyogram (EMG), Muscle tension rating, and pain intensity rating

Results: TTM were associated with significant decreases in EMG, muscle tension and pain intensity after the end of treatment session ($p < 0.05$). For all outcomes, similar changes were not observed in the control group ($p > 0.05$) except for muscle tension ($p < 0.05$). In addition, there was a significantly greater reduction in all parameters for the TTM group when compared with the control group.

Conclusion: We therefore suggest that TTM can increase physical relaxation and reduce pain in patients with upper back pain associated with MTrPs.

Trial Registration: ClinicalTrials.gov Identifier: NCT02067325.

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1. Introduction

Myofascial pain syndrome (MPS) is a common musculoskeletal condition which is characterized by localized and referred pain, decreased range of motion, sleep problems and the presence of myofascial trigger points (MTrPs). A MTrP is a hyperirritable spot located in a palpable taut band of skeletal muscle that is painful on compression or stretch and produces a local twitch in response to snapping of the band.¹ The epidemiological study conducted in Thailand regarding musculoskeletal disorders found that MPS was highly prevalent and was the primary diagnosis in 36% of 431 patients.² A study by Skootsky et al.³ found that MPS in the upper

part of the body was more common than in other parts. Additionally, Rachlin and Rachlin⁴ reported that most common sites of MPS were found in the upper trapezius, levator scapulae and axial postural muscles, respectively.

At present, the pathophysiology of MPS remains obscure making it difficult to choose the appropriate treatment for these patients, however, there are two theories; the motor endplate hypothesis and the energy crisis theory^{5,6} might provide beneficial information for therapist in order to design an effective treatment. Simons⁷ suggested that an effective intervention of MPS can be designed based on motor endplate hypothesis. He postulated that the MTrP pressure release (gentle thumb or finger pressure against the palpable tissue barrier in the MTrP) can normalize the length of shortened sarcomeres (also known as contraction knot) in the muscle fiber that causes release of MTrP.

Traditional Thai massage (TTM) is a popular branch of traditional Thai medicine.⁸ It is a form of deep pressure massage with brief sustained compression on the targeted muscles along with spe-

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cific passive stretching.^{9,10} The therapist uses his own body weight to apply thumb or digital pressure to the body of a patient along imaginary lines called “Sen Sib” and stretches the muscles at the end of massage session.⁹ A previous study¹⁰ found that most trigger points throughout the body fall along the “Sen Sib”. Thus, it is believed that TTM could be an effective treatment to release MTrPs. TTM is usually conducted on a floor mat with the patient fully clothed.⁹ Chaithavuthi and Muangsiri¹¹ claimed that TTM can improve the depth of breathing and relaxation, remove toxins from muscle mass, relieve muscle tension, relax tendons and enhance elasticity of muscle. Moreover, Eungpinichpong¹² reported that TTM can improve physical and mental relaxation, improve blood circulation, decrease pain and muscle tightness, and increase range of motion and muscle flexibility in several musculoskeletal disorders. Although the indigenous use of TTM for relieving various conditions has been practiced in Thailand for a long period of time, strong evidence to support its beneficial effects is still not enough. Thus, TTM needs more reliable scientific evidence to confirm its outcomes, especially its relevant physiological effects.

Nowadays, there are some research studies that have investigated the physiological effects of TTM on different conditions.^{13–15} However, the research to support the effect of TTM on electromyographic (EMG) activity, which can provide direct and reliable information regarding the physical relaxation of the muscle, is lacking. The current study evaluated the immediate effects of TTM on EMG activity, feeling of muscle tension and pain intensity in patients with upper back pain associated with MPS.

2. Methods

2.1. Design

A prospective, parallel group, assessor-blind, randomized controlled trial was conducted in the Department of Physical Therapy, School of Health Sciences, Mae Fah Luang University, Chiang Rai Province, Thailand. Patients with upper back pain associated with MTrPs were randomly allocated to either a TTM or a control group (sham microwave diathermy: MWD) using the permuted-block randomization in blocks of 2, 4 and 6 subjects (the STATA software). A list was generated by one of the researchers and used by a research assistant. Patient assignment to a group was determined through sealed envelope distribution and investigators were blinded. Outcomes were assessed baseline and immediately after the treatment sessions. The primary outcome measure was the EMG activity and the secondary outcomes included feeling of muscle tension and pain intensity. The study was approved by the ethics committee of Mae Fah Luang University. Written informed consent was obtained from all patients.

2.2. Participants

Patients with upper back pain associated with MTrPs were recruited from Chiang Rai province, Thailand during a 4-month period between February 2014 and May 2014 through advertisements on bulletin boards. Inclusion criteria were patients aged between 18 and 50 years with spontaneous upper back pain for longer than 3 months, and with at least one MTrP present in the upper trapezius muscles. The criteria used to diagnose MTrP described previously by Buttagat et al.¹⁶ was as follows; the presence of a tender nodule that causes a referred pain within taut bands of muscle in areas which the patient identified as painful.

The present study excluded patients with a history of cervical radiculopathy, a history of neurological disorders and a diagnosis of conditions that could be contraindicated for TTM, such as fever, contagious skin disease, injury or inflammation of muscle,

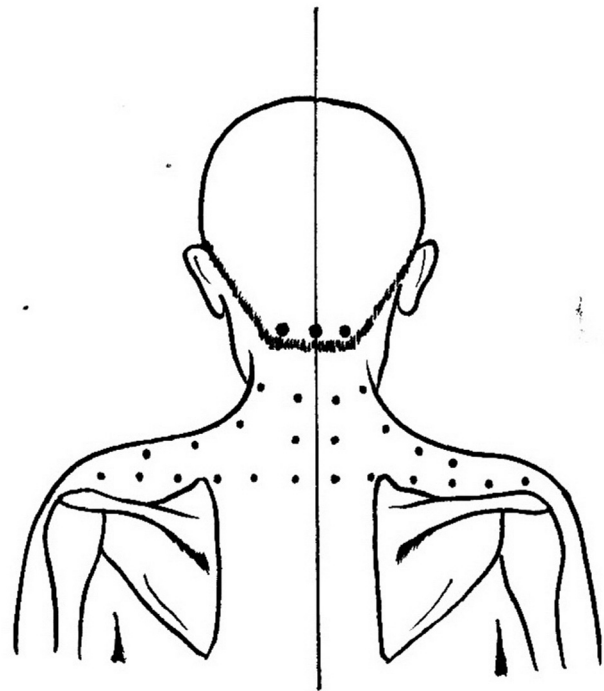


Fig. 1. The massage points are located along three lines on each side of the body and at an additional, three points along the superior nuchal line.

bone fracture and/or joint dislocation, open wound, uncontrolled hypertension, Thrombophlebitis, Hemophilia, drug and/or alcohol intoxication.

Sample size determination was conducted using an analysis of covariance (ANCOVA) formula.¹⁷ The calculation was based on our pilot study that compared the effect of TTM ($n = 10$) with that of sham MWD (Control group) ($n = 10$) for patients with upper back pain associated with MTrPs. A standard deviation (of EMG activity) of 0.0027 mV for the TTM group and of 0.0064 mV for the sham MWD group was observed. These variances were used to calculate the sample size needed to detect a 0.0030 mV change in EMG activity with 90% power and 5% significance. According to these criteria, 50 patients were needed.

2.3. Interventions

The patients in the TTM group received a 30 min session of TTM onto the upper back area while lying on their side.

All TTM in the current study was performed by a well-trained massage therapist. Massage points included in this method are located along three lines on each side of the body and at an additional, three points along the superior nuchal line (Fig. 1). The pressing technique employed in TTM used the body weight of the massage therapist to apply gentle and gradually increasing pressure through the thumbs or fingers for 5–10 s per point. The amount of pressure did not exceed the pain pressure threshold of each patient. This sequence could be repeated several times for each massage point. Specific stretching technique for the upper back pain patients was applied passively at the end of the session to conclude the treatment (Fig. 2). The TTM technique and procedure for upper back pain patients used in the current study has been described in more detail by Eungpinichpong.¹²

The patients in the control group received one 30-min session of sham MWD (in the same environment as the TTM group) using the Enraf-Nonius Radarmed 950 Plus (Delft, The Netherlands) with a large field radiator placed 15 cm from the upper back while a patient lay on their side. The MWD device was turned on but kept

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