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FASCIA SCIENCE AND CLINICAL APPLICATIONS: CLINICAL STUDY

Influence of instrument assisted soft tissue treatment techniques on myofascial trigger points

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KEYWORDS
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Summary *Objective:* The purpose of this study was to examine the influence of instrument assisted soft tissue techniques (IASTT) on myofascial trigger points (MTrP).
Design: Randomized, controlled study with the researcher assessing the MTrP sensitivity blinded to the treatment rendered.
Participants: Phase 1 = 27; Phase 2 = 22.
Intervention: MTrPs were identified in the upper back. In phase 1, two MTrPs (right & left) were identified. One was treated with IASTT, the other was a control. In phase 2, one MTrP was identified in a treatment and a control group. In each phase, the treatment groups received six treatments of IASTT.
Outcome measures: Sensitivity threshold of the MTrP was assessed with a dolorimeter.
Results: There was a significant improvement in both groups over time but there was no difference between the treatment and control groups.
Conclusions: The use of a pressure dolorimeter may have served as a form of ischemic compression treatment. This assessment tool may have been a mitigating factor in the overshadowing any potential influence of the IASTT on the MTrP. Thus, another assessment tool needs to be identified for MTrP assessment. Until that technique is identified, the effect of IASTT on MTrPs in inconclusive.

Introduction

A myofascial trigger point (MTrP) is a palpable, hypersensitive, nodule within a taut band of skeletal muscle (Travell and Simons, 1989; Alverez and Rockwell, 2002). MTrPs can develop from strenuous or unaccustomed activity as well as poor posture (Cheng, 1987). MTrPs can result for any form

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of stress: mental or physical. Trigger points may develop from acute injury or by cumulative microtrauma (Travell and Simons, 1989). MTrPs can be active or latent. Active trigger points may be painful at the site of the trigger point or may refer pain to an adjacent location. Whereas latent trigger points tend to exist in a dormant state and do not produce discomfort until the area is stressed. This stress may manifest in the form of a forceful muscle contraction or a firm palpation. A local twitch response may occur via an involuntary spinal cord reflex when there is a contraction of the taut band. Whereas, pressure on the MTrP may result in a "jump sign" that radiates to a zone of reference (Alverez and Rockwell, 2002).

Chen et al. (2007) has shown that stiffness of the taut bands may be 50% greater than that of the surrounding muscle tissue. This stiffness has been correlated with muscle pain, weakness, and limitations in motion (Graven-Nielsen et al., 1991; Hong and Simons, 1998; Mense, 1996, 1991, 1993; Simons et al., 1995a, 1995b; Simons, 1996; Travell and Simons, 1989).

There are a variety of modalities purported to relieve or diminish the symptoms associated with MTrPs. Massage (Cantu and Grodin, 1992; Ebel and Wisham, 1952; Pemberton, 1939; Travell and Simons, 1989), needling (Hammeroff et al., 1981; Hong and Simons, 1998; Jaeger and Skootsky, 1987; Lewit, 1997; Melzack, 1981; Melzack et al., 1977; Travell and Simons, 1989), vapocoolant spray and stretch (Simons, 1996; Travell and Simons, 1989), electrical stimulation (Hooker, 1998), laser therapy (Cheng, 1987; Laakson et al., 1967), ultrasound (Draper and Prentice, 1998; Draper et al., 1995; Draper, 1996; Gam et al., 1998; Gulick et al., 1996; Srbely et al., 2008; Williams et al., 1987) and ischemic pressure (Gulick et al., 2001, 2011) have all had varying degrees of success.

Instrument Assisted Soft Tissue Techniques (IASTT) use special stainless steel instruments with beveled edges to assist the clinician in the evaluation and mobilization of soft tissue (Looney et al., 2011). Instruments are used in a multidirectional stroking fashion applied to the skin at 30°—60° angles to detect soft tissue irregularities via the undulation of the tools (Howitt et al., 2006; Sevier et al., 1995). In addition, IASTT has been purported to enhance proliferation of extracellular matrix fibroblasts, improve ion transport, and decrease cell matrix adhesions (Gehlsen et al., 1999; Hammer and Pfefer, 2005; Howitt et al., 2006; Loghmani and Warden, 2009). IASTT has been suggested to be useful in the treatment of chronic fibrosis, lateral epicondylitis, carpal tunnel syndrome, trigger thumb, and plantar fascitis (Howitt et al., 2006; Leahy, 1995; Melham et al., 1998; Sevier et al., 1995). However, the effects of the IASTT on MTrPs have not been explored. This study was intended to be the first randomized, controlled, IASTT study using a previously developed protocol (Gulick et al., 2011) to examine the influence on MTrPs.

Methods

The investigator of this study is a Graston Technique (GT) trained clinician and educator with approximately 1.5 years of IASTT experience. The methodology of this study was developed in consultation with the GT clinical advisor. She not only recommended the strokes, treatment duration, and specific instruments to be used, but she provided a video demonstration of the way GT teaches the skills. This was helpful in the establishment of a standardized treatment protocol.

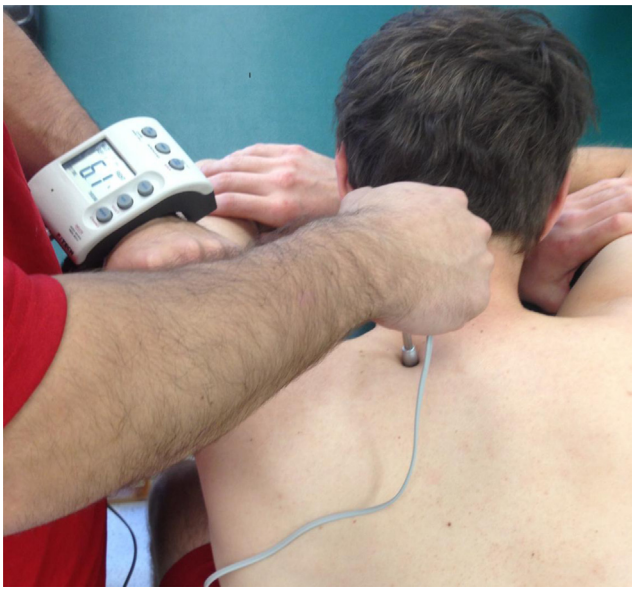

Figure 1 Myofascial trigger point assessment technique.

As a result of the initial data collected in phase one, this study evolved into a two phase methodology. When the potential participants responded to a posted flyer, the research assistant inquired about the presence of "knots" (i.e. MTrP) in the neck and upper back region. If the potential participant had knot(s) and was not receiving any treatment to this area, he/she was asked to sign a consent form approved by the University Institutional Review Board. To satisfy the exclusion criteria, each participant was screened for sensory problems in the upper or midback regions, heart/circulation problems, cancer, diabetes mellitus, tuberculosis, and shoulder, neck, or upper/midback surgeries. The upper/midback region was inspected for wounds, lesions, and infections. The participants were seated in a chair with his/her forearms resting on a treatment table and forehead on the forearms. MTrPs were identified by manual palpation of taut muscle bands in the upper back with the presence of a "jump sign" and referred pain when pressure was applied. This task was performed by a licensed clinician (DTG) with 30 years of clinical experience. An algometer/dolorimeter (JTECH Company, Salt Lake City, UT) with a 1-cm diameter tip was used to measure pressure sensitivity (in grams) of the MTrPs. Test-retest reliability of this instrument in assessing muscle soreness is reported to be $r = 0.91—0.95$ (Gulick et al., 1996; McCarty et al., 1965).

Phase 1

Phase 1 included healthy participants ($n = 27$; 13 male, 14 female; age $= 23.88 \pm 1.13$; ht $= 167.98 \pm 10.13$ cm; Wt $= 69.26 \pm 14.19$ kg) recruited by a flyer. Phase 1 used two MTrPs in the upper back. When possible, MTrPs were