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ORIGINAL RESEARCH

Comparison of an indirect tri-planar myofascial release (MFR) technique and a hot pack for increasing range of motion

Jay Kain, PT, PhD, ATC, IMTC^a, Laura Martorello, PT, DPE^{b,*},
Edward Swanson, PT, PhD, MBA, MEd^b, Sandra. Segó, PhD^b

^a Jay Kain Physical Therapy, Great Barrington, MA 01230, USA

^b American International College, 1000 State Street, Springfield, MA 01109, USA

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Summary Purpose: The purpose of the randomized clinical study was to scientifically assess which intervention increases passive range of motion most effectively: the indirect tri-planar myofascial release (MFR) technique or the application of hot packs for gleno-humeral joint flexion, extension, and abduction.

Methods: A total of 31 participants from a sample of convenience were randomly assigned to examine whether or not MFR was as effective in increasing range of motion as hot packs. The sample consisted of students at American International College. Students were randomly assigned to two groups: hot pack application ($N = 13$) or MFR technique ($N = 18$). The independent variable was the intervention, either the tri-planar MFR technique or the hot pack application. Group one received the indirect tri-planar MFR technique once for 3 min. Group two received one hot pack application for 20 min. The dependent variables, passive gleno-humeral shoulder range of motion in shoulder flexion, shoulder extension, and shoulder abduction, were taken pre- and post-intervention for both groups. Data was analyzed through the use of a two-way factorial design with mixed-factors ANOVA.

Results: Prior to conducting the study, inter-rater reliability was established using three testers for goniometric measures. A 2 (type of intervention: hot packs or MFR) by 2 (pre-test or post-test) mixed-factors ANOVA was calculated. Significant increases in range of motion were found for flexion, extension and abduction when comparing pre-test scores to post-test scores. The results of the ANOVA showed that for passive range of motion no differences were found for flexion, extension and abduction between the effectiveness of hot packs and MFR. For each of the dependent variables measured, MFR was shown to be as effective as hot packs in increasing range of motion, supporting the hypothesis.

* Corresponding author. Tel.: +1 413 205 3024; fax: +1 413 654 1430.
E-mail address: laura.martorello@aic.edu (L. Martorello).

Discussion and conclusion: Since there was no significant difference between the types of intervention, both the hot pack application and the MFR technique were found to be equally effective in increasing passive range of motion of the joint in flexion, extension, and abduction of the gleno-humeral joint. The indirect tri-planar intervention could be considered more effective as an intervention in terms of time spent with a patient and the number of patients seen in a 20-min period. No equipment is required to carry out the MFR intervention, whereby using a hot pack requires the hot pack, towels, and a hydraculator unit with the use of the indirect tri-planar intervention, a therapist could treat four to five patients in the time it would take for one standard hot pack treatment of 20 min, less the hands-on intervention of the therapist.

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Introduction

Few studies have examined the effectiveness of myofascial release (MFR) techniques on the direct parameters of patient outcomes (Hanten, 1994; Barnes, 1997; Bucher, 1993, 1994; Weiselfish-Giammatteo and Kain, 2005). Additionally, experimental research does not exist that compares the effectiveness of MFR outcomes versus any modality intervention. Within the field of rehabilitation, especially physical therapy, a common outcome reference for evidence-based research lies in a pre- and post-assessment of range of motion (ROM). For the purposes of the most accurate reflection of change, passive ROM assessment appears to be the most objective to measure. Further, when ROM assessments utilize physiologic and accessory joint motion, outcomes are more reliable and objective (Weiselfish-Giammatteo and Kain, 2005; Kaltenborn, 1976; Prentice, 1990). The post-treatment effects of MFR intervention have been postulated to parallel those of massage and soft tissue mobilization techniques. These effects include circulatory changes, blood flow changes, capillary dilatation, cutaneous temperature changes, and changes in metabolism (Cantu and Grodin, 1992). These changes are reflected in increased ROM, improved biomechanics of the joint, increased extensibility of tissues, improved flexibility, muscle relaxation, reduction of spasm, decreased tone, reduction of edema and analgesia (Cantu and Grodin, 1992)

Heat in its various forms has been a popular longstanding modality used to facilitate healing. Transmission of heat, either by conduction, convection, radiation, and/or conversion, comprises the most common methods of heat usage. Whether the modality is a whirlpool, hot pack, diathermy, moist air sauna, infrared, paraffin, whirlpool or ultrasound the outcome potential is nearly the same (Taylor, 1990).

For the purpose of this study, hot packs were chosen as our comparative modality for a number of reasons:

- (1) the simplicity of access to the modality
- (2) the ease of application
- (3) the accepted usage within the field of rehabilitation
- (4) minimal contraindications
- (5) standardization of application.

Predicted outcomes for the use of heat parallel those of MFR. However, Taylor (1990) points out that many of the

assumed outcomes of heating are not backed up by scientific evidence. One such example Taylor (1990) offered was that the reduction of stiffness of arthritic joints is more the result of decreased viscosity of synovial fluid rather than the heating effect on connective tissues. Taylor (1990) further noted that there was no objective evidence that superficial heating had a suppressive effect on the mechanisms responsible for maintaining muscle spasms. The outcome predictors for the application of superficial heat were the result of "... secondary physiological and/or psychological factors from the heat application" (Taylor, pp. 835–848). The purpose of this study was to compare end results, passive ROM, after MFR techniques and hot pack application.

The MFR technique is specifically described as an indirect three-planar soft tissue MFR technique as outlined by Weiselfish-Giammatteo and Kain (2005). The technique was applied for 3 min while the hot pack was applied for a standard 20 min. As MFR and the superficial heat application of hot packs have similar outcome predictors, it was felt that passive ROM assessment would yield similar results with both treatments. Should ROM assessments demonstrate comparable outcomes, MFR would exhibit a significant improvement in treatment efficacy (3 min versus 20 min). This study would be one of the first to show objective, measurable changes from the use of an MFR technique.

Methods

Participants

This study was reviewed by the Human Participants Review Board at American International College and was approved for data collection. Each participant signed an informed consent prior to testing. All testing was administered at American International College in Springfield, Massachusetts. All participants ($N = 31$) were selected from a sample of convenience from the junior and senior physical therapy classes and were randomly assigned into two treatment groups. The independent variable used was the type of intervention, either the tri-planar MFR technique or the hot pack application. Group one ($N = 18$) received the indirect tri-planar MFR technique once for 3 min. Group two ($N = 13$) received one hot pack application for 20 min. The dependent variables, passive gleno-humeral shoulder range of motion in shoulder flexion, shoulder extension, and

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