ABSTRACT

The purpose of this study was to explore the effectiveness of Kinesio Tex (KT) tape on myofascial trigger points (MTTs). Healthy participants (n=31) with MTTs in their upper back participated. Two MTTs were selected from the same muscle group on the right and left sides. Both MTTs were assessed for discomfort thresholds (pretest) using the JTECH dolorimeter. One MTT served as a control (no treatment) and the other was treated with KT tape. The KT treatment side was applied in a “star” format over the center of the MTT for 3 days and then retested with the JTECH. A third assessment was completed 4 days after tape removal (follow-up). A one-way ANOVA with repeated measures on time revealed no statistically significant differences. Kinesio Tex (KT) tape has been theorized to shorten muscle fibers to decrease afferent 1a discharge from the spindle, decrease motor neurons of anterior horn, decrease H-reflex, and produce MTTP inhibition with decreased pain. This study did not demonstrate a statistically significant improvement in discomfort from MTTP. Further studies should consider the use of another KinesioTaping technique, reapplying the tape each day, or extending the time period of tape application.

Key Words: KinesioTaping, myofascial pain, muscle pain

INTRODUCTION

Travell and Simons clinically defined a myofascial trigger point (MTT) as “a hyperirritable spot in skeletal muscle that is associated with a hypersensitive palpable nodule in a taut band.”1-5 Myofascial trigger points can develop from a number of conditions: genetics, aging, and performing a strenuous activity as part of a sedentary lifestyle.2 Myofascial trigger points can be the result of an acute injury or occur from cumulative microtrauma. Examples of cumulative trauma are abnormal posture, repetitive motion, or psychological stresses.1-4 Forming and presence of a MTT is correlated with muscle pain, weakness, and dysfunction.1,5-13 A variety of modalities have been purported to relieve or diminish the symptoms associated with MTTs. These include massage,1,14-15 needling,1,6,20-25 vapocoolant spray and stretch,1,13,26 electrical stimulation,27-30 laser therapy,31-33 ultrasound,34-42 diathermy,43 and ischemic compression.44-45

Taping is a common method of treatment for various injuries. Numerous athletes have used KinesioTaping to address a variety of musculoskeletal pathologies. Although founded in 1979, KinesioTaping became a high profile intervention at the 2008 Olympic Games. Kinesio Tex tape (KT tape) (Kinesio USA, Albuquerque, NM) is a special form of tape that is reported to have a texture and elasticity similar to human tissue (Figure 1). By pulling in distinct ways, these tissues are believed to be either facilitated (proximal to distal) or inhibited (distal to proximal). In the case of a MTT, KT tape is applied to inhibit muscle firing, thereby reducing the level of discomfort. Kinesio Tex tape has been proposed to shorten the muscular fibers, which produces a decrease in the afferent 1a discharge from the neuromuscular spindles, causing a reduction in the motor neurons of the medullar anterior horn and diminished amplitude of the H reflex.46-49 Potentially lowering muscular tone might explain the MTTP inhibition and the decrease of discomfort. Despite its popularity, scientific studies on KT taping are lacking. Anecdotal reports support the efficacy of the use of KT tape for the treatment of MTTs. This study is a component of a larger research agenda of the primary investigator (DTG) to explore the most efficacious treatment method for MTTs.14-45 The purpose of this study was to compare the effects of Kinesio Tex tape on MTT discomfort by comparing to that of a control in which no treatment was rendered.

METHODS

Participants

Healthy participants (n=31) over the age of 18 with two MTTs in their upper back (one on the left side, one on the right side) were recruited. Exclusion criteria were: (1) individuals with sensory deficits or skin lesions including but not limited to acne, cellulitis, or infections in the area of the trigger points, (2) a personal history of cardiovascular problems, cancer, diabetes mellitus, or tuberculosis, and (3) anyone receiving treatment for, or having a prior history of, shoulder, neck, or upper/midback surgeries.

Materials

An algometer/dolorimeter (JTECH Medical, Salt Lake City, UT) with a one-cm diameter tip was used to measure pressure sensitivity (grams) of the participants’ MTTPs (Figure 2). Test-retest reliability of this instrument in assessing muscle soreness has been previously reported as r = 0.91-0.95.50-52 All equipment was calibrated prior to the initiation of the study. All JTECH assessments were performed by the same researcher (SC) to assure consistency in technique. Kinesio Tex tape was used as the taping treatment. This product brand is a special form of tape that is advertised to have a texture and elasticity similar to human tissue (Figure 2).

Procedures

Participants signed a consent form approved by the University Institutional Review Board for the Protection of Human Subjects. The procedure was explained to the participants but they were not biased by any knowledge of the potential effects of the KT tape. The subjects were positioned with their forearms on a plinth and their head on their forearms, face down on a pillow/towel
The researcher (DTG) detected the MT rPs by palpating for taut muscle bands in the upper and mid-back. Two MT rPs were selected in a corresponding muscle group on the right and left sides (e.g., right and left levator scapula muscles). During the pretest, an algometer/dolorimeter (JTECH Medical, Salt Lake City, UT) with a one-cm diameter tip was used to measure the participants’ MT rPs (Figure 2). Test-retest reliability of this instrument in assessing muscle soreness has been previously reported as \( r = 0.91-0.95 \).\(^{50-52}\) The equipment was calibrated prior to initiation of the study. All assessments were performed by the same researcher (SC) to assure consistency in technique. Kinesio Tex tape was used as the taping treatment. This product is a special form of tape that is advertised to have a texture and elasticity similar to human tissue (Figure 3). Pressure was slowly applied by the investigator until the participant reported that the pressure reached the threshold of discomfort. The level achieved was recorded for each MT rP. Measurements were recorded by a different researcher (CK) so that the tester was blinded to the measurements.

Subjects were assigned a number from 1-30 for data collection purposes. Subjects assigned an odd number had the MT rP on the left side treated with the taping procedure and those assigned an even number were treated on the right side. The treatment side had KT tape applied to inhibit the MT rP. Four pieces of 4” long KT tape was applied in a “star” pattern over the center of the trigger point (Figure 4). As per the manufacturer’s recommended inhibitory technique, 35% tension was applied to the tape. Tape strips were applied as follows (Figure 5): (1) the first strip was applied from inferior to superior, (2) the second strip was applied from medial to lateral, (3) the third strip was applied from bottom left to top right, and (4) the fourth strip was applied from bottom right to top left.

The nontreatment (control) side received a small, one-inch diameter single piece of KT tape over the MT rP with no tension applied. This single piece of tape simply served as a marker for the location of the control MT rP. The tape was left on the subjects for 3 days. The adhesion of the tape was checked on a daily basis. If edges of the tape began to curl, they were re-secured. At the conclusion of the intervention phase, the tape was carefully removed and a post-test dolorimeter assessment was performed. Another small piece of KT tape was then placed without any tension on each of the MT rPs to mark the location for the final pressure reading made at follow-up 4 days later.

**DATA ANALYSIS**

A one-way analysis of variance (ANOVA) with repeated measures (time) was performed for the dolorimeter measurements (soft tissue discomfort). Significance was set at the \( p = 0.05 \) level. A Bonferroni post-hoc analysis was also performed if significance was found.

**RESULTS AND DISCUSSION**

Thirty-five participants began the study but 4 participants were excluded from data analysis due to lack of thorough adherence of the tape. The means and standard deviations of the treatment and control groups are displayed in Table 1. A graph of the change over time by treatment group is displayed in Table 1. The ANOVA was not significant for either of the main effects of treatment or time, or the interaction of treatment and time (\( p > 0.05 \)). Power for this study was calculated to be 0.809.

Simons\(^{13}\) proposed that taut bands in a muscle are attributed to excessive acetylcholine release at the motor endplates resulting in compression of capillaries, decreased local blood flow, ischemic tissue, a limitation in oxygen, and glucose availability, and ultimately an “energy crisis.” Myofascial trigger points in the upper trapezius muscle have been found to have higher concentrations of inflammatory mediators.\(^{53}\) They also have a lower pressure point threshold and increased pain intensity.\(^{42,45,51,54}\)

In the current study, an interesting development was the increased sensitivity of the control MT rP in the post-test assessment. The authors surmise that the use of the dolorimeter for baseline testing may have
caused the MTrPs to “flare up,” resulting in a decrease in pressure tolerance for the control group at the post-test assessment. Although not statistically significant, the taping treatment may have had an influence on the MTrPs to off-set the influence of the dolorimeter pressure. Upon the removal of the KT tape, both MTrPs returned to the baseline measurement by the 4-day post-treatment follow-up. There may be several reasons for these results. Perhaps the KT taping star pattern is not the optimal choice for MTrPs. Another KT taping option might be to identify the muscle in which the MTrP is located and then apply strips of tape from the distal to the proximal attachments to inhibit the muscle tension. Perhaps the tape could have been left on longer or re-taped each day to optimize the inhibitory effect on the MTrP.

In summary, this study did not demonstrate a statistically significant improvement with the use of the KT taping technique for the release of MTrPs in the upper back. Future studies should explore different taping protocols to examine how they influence the signs and symptoms of MTrP pathology.

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