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Original Articles

The Ergogenic Effect of Elastic Therapeutic Tape on Stride and Step Length in Fatigued Runners



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Abstract

Objective: The purpose of this study was to determine if elastic therapeutic tape placed on anterior lower limbs would affect stride and step length in fatigued runners' gait.

Methods: Forty-two healthy participants were equally divided into a kinesiology tape group (Rocktape) and a no-tape control group. Participants in both groups underwent a baseline running gait test at 6 mph without tape. After this, participants engaged in an exhaustive lower body fatigue protocol until they reached maximal volitional exhaustion. Participants were then randomized to 1 of 2 interventions: (1) Experimental group, which had kinesiology tape placed under tension on the anterior aspect of their lower limbs bilaterally from the upper thigh to just below the patella, or (2) Control group, which did not receive taping. All participants then engaged in a similar 6-mph running gait postanalysis. Participant's gait was analyzed for 90 seconds during each test iteration. Researchers used a 2-way repeated-measures analysis of variance considering fatigue (prefatigue, postfatigue) and group (tape, no-tape) as subject factors.

Results: After the fatigue protocol, the no-tape group demonstrated a significant decrease in step length of 14.2 mm ($P = .041$) and stride length of 29.4 mm ($P = .043$). The kinesiology tape group did not demonstrate a significant decline in these gait parameters.

Conclusions: In this preliminary study, placing elastic therapeutic tape over the anterior lower limbs demonstrated short-term preservation of runner step length and stride length in a fatigued state.

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Introduction

Fatigue occurs with strenuous physical exertion.^{1,2} Physiological fatigue can be caused by central and peripheral mechanisms, with peripheral mechanisms being more critical in motivated athletes.² Four sites that have been shown to be most involved in peripheral fatigue development are impairment of metabolic energy supply, contractile mechanisms, excitation-contraction coupling, and sarcolemma excitability.^{3–5}

Ergogenic aids may be capable of aiding fatigued runners perform. Ergogenics aids may be mechanical (eg, elastic therapeutic tape/kinesiology tape), nutritional, psychological, and/or pharmacologic.

Elastic therapeutic taping, sometimes referred to as *kinesiology taping*, is a supportive aid that is often used by trainers, therapists, and physicians to address conditions in athletes and patients (eg, one brand is Rocktape). The Rocktape brand has made 4 claims about its product: that it increases kinesthetic awareness through cutaneous afferent stimulation; reduces pain by relieving pressure on pain receptors due to the tape's ability to lift the epidermis; improves fluid dynamics, which reduces edema; and improves the athletes' form.⁶ Furthermore, the company claims that "[R]ocktape can help athletes improve form and decrease fatigue through better blood flow."⁷ However, the impact Rocktape has on athlete fatigue and whether modification in blood flow is the reason remain unproven.

Three systematic reviews have demonstrated there is a lack of high-quality evidence that kinesiology tape can be used to treat musculoskeletal conditions.^{8–10} Limited kinesiology taping studies focusing specifically on athletes with musculoskeletal injuries have been generated.^{11–13} In addition, studies focused on the capability of kinesiology tape to act as an ergogenic aid and improve athletic performance are also limited^{12,14–16}; and thus, further research is warranted because of the popularity of kinesiology tape. Two review articles found that conclusive evidence did not exist to support the use of kinesiology tape at improving athletic performance but that kinesiology tape did not cause any negative effects on performance.^{17,18} One of the 2 articles further went on to point out that there were some small but interesting case studies supporting the use of kinesiology tape for athletes.¹⁸ However, because of the possibility of bias, they suggested that larger, more well-controlled studies were needed.¹⁸

It has been recommended that kinesiology tape should be placed on the posterior and anterior aspect of

the lower limbs for runners.¹⁹ However, the impact of taping the anterior and posterior aspect of the lower limbs, individually or collectively, has not been adequately studied.

To date, there have been no published studies to assess step and stride length in fatigued runners with and without elastic therapeutic tape. Therefore, the purpose of the present study was to determine if step length and stride length would be preserved better in a fatigued state for those who have been taped anteriorly compared with those with no elastic therapeutic tape.

Methods

This study was reviewed and approved by the Texas Chiropractic College Institutional Review Board for human subjects in accordance with the Declaration of Helsinki. All subjects were provided a written and oral explanation of the study procedures prior to participation. This trial was registered with the University hospital Medical Information Network Clinical Trials Registry, trial no. UMIN000014662.

Study Design, Rationale, and Setting

This was a single-blind, randomized, controlled study of the immediate impact that elastic therapeutic had on runner gait in a fatigued state. Forty-two participants were involved in this study (Fig 1). Participants underwent baseline testing of their running gait at 6 mph. This was followed by an Åstrand cycle ergometer maximal test to induce fatigue in all participants. The Åstrand cycle ergometer maximal test is a graded exercise test designed to have participants reach volitional exhaustion. Next, participants were randomized to the (1) Experimental group, which had kinesiology tape placed on the anterior aspect of their lower limbs bilaterally from their upper thigh to just below their patella, or (2) Control, no-tape group. Study participants then engaged in another running gait assessment in a fatigued state at 6 mph. All testing took place in a research laboratory with an ambient room temperature at approximately 74°F, and no music was allowed during testing. Music was not permitted because of literature suggesting it could impact runner cadence.²⁶

Subjects

Asymptomatic college students were recruited for this study. All study applicants provided an informed

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