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Perceived Influence of a Compression, Posture-Cueing Shirt on Cyclists' Ride Experience and Post-Ride Recovery

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Abstract

Objective: The purpose of this study was to evaluate the opinions of experienced cyclists on perceived influence of a posture-cueing shirt with compressive properties on their comfort and recovery.

Methods: Twenty experienced cyclists wore a compressive shirt during rides and as a postride recovery shirt; cyclists rated their perceived experiences during rides and recovery. They completed 2 separate questionnaires specific to riding or recovery; scores ranged from −3.0 (negative influence) to +3.0 (positive influence), addressing posture, discomfort, breathing, and recovery. Data analysis included frequencies and *t* tests to compare groups.

Results: Cyclists completed 53 rides, averaging 95.48 km (SD = 31.72 km), wearing the shirt and reported a perceived benefit (mean score = 1.17, SD = 0.25). For their postride recovery perceptions, scores averaged 1.99 (SD = 0.48) for perceived benefits for recovery. No differences in scores were identified between male and female cyclists during rides ($t = -0.28$, $P > .05$); however, female riders perceived greater benefit during recovery ($t = -2.24$, $P < .05$). There were no correlations with scores and cyclist age, experience, or ride distances during rides or recovery (r = 0.02-0.35).

Conclusion: A posture-cueing, compressive shirt was rated to have a perceived benefit by experienced cyclists for riding posture, postride posture, spine discomfort, and postride recovery. This study did not evaluate physical or physiologic variables to confirm these perceptions.

Introduction

Cycling is an endurance activity often requiring long bouts of physical exertion in a position of forward flexion. Multiple studies have shown that a cyclist's upper body orientation can influence the muscle

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activity and recruitment pattern in the lower body.[1-4] To produce a smooth and effective pedaling motion, a coordinated pattern of muscle recruitment is used to transmit power from the body to the crank of the bike. The work that a muscle is able to produce is dependent on the length-tension and force-velocity power relationships of the involved muscles.[1] Therefore, a cyclist's posture may affect not only muscle recruitment and performance but also the resulting fatigue from the activity due to changes in the activation and timing of these muscles that may lead to an earlier onset of fatigue.[2-4] A number of aids have been developed to assist with fatigue and to improve motor function and posture in athletes, including compression garments and Kinesio taping.

Compression garments were developed and have been used for many years to treat medical pathologies, including venous insufficiencies, by compressing superficial veins to increase venous return to the heart.[5-10] Only more recently have compression garments been used to enhance sport performance and improve recovery. It is thought that wearing compression garments during high-intensity activities will increase venous return, which helps to facilitate clearance of metabolites, reduce swelling, limit the resulting inflammatory response, and decrease blood lactate concentration and creatine kinase levels post-exercise. As a result, many studies have shown a decrease in reported muscle soreness, decrease in pain, decrease in fatigue, and increase in vitality during the recovery period after exercise.[5-10] Because previous studies have shown that compression garments can alter venous flow and decrease reports of fatigue and exertion in other populations of athletes, examination of these garments in the cycling population is appropriate.[5,8,9]

Kinesio tape has been used on athletes in an attempt to increase force production and improve proprioception. It is thought that the fiber direction and elasticity of the tape provide pulling forces on the skin to lift the fascia and increase cutaneous stimulation. Results vary on the ability of Kinesio tape to alter force production; but multiple studies have shown that it can alter cutaneous sensation, which can lead to other improvements.[11-16] A study by Wong et al[16] (2012) demonstrated that, in a group of healthy women, the time to achieve peak torque knee extension and flexion was significantly decreased while wearing Kinesio tape on the knee. This suggests that an increase in cutaneous sensation may lead to increased ease of recruitment of motor units.[16] Also, an athlete's force sense in forearm muscles was enhanced with Kinesio tape, despite a lack of increased grip strength.[16] Although taping may not always lead to increased force production and muscle strength, the cutaneous cue it provides may lead to a decreased sense of difficulty with activity.

Numerous theories have been presented to explain the benefits of taping on the skin for performance improvement and pain management, and it has been suggested that tape applied directly over the skin provides improved sensor-motor function by way of facilitated activity of the working muscles while inhibiting activity of the antagonist muscle groups.[17] Additional theories include increased body part stability, support of body and joints, and correction of body segment alignment such as posture.[17-19] Studies by Ackermann et al[17] (2002) and Cools et al[18] (2002) reported improved kinesthetic coordination of the movement of the scapula during activities involving the upper extremity, whereas Host[19] (1995) theorized that improved alignment of the scapula, resulting from tape application, improved shoulder pain.

Recently, garments have been developed that attempt to provide the effects of Kinesio tape and compression directly into the clothing material. Intelliskin is a line of compression garments designed to improve upper body alignment by stimulating the appropriate nerve endings to produce specific postural cues. According to Intelliskin, the pressure of the compression garment and alignment of the stitching of the garment material are proposed to provide sensorimotor stimulation to the cutaneous nerve receptors of the skin, whereas the panels are intended to correct muscle imbalances and are intended to improve anatomical alignment. By combining the proprioceptive input seen similarly in Kinesio tape with the fit of a compression garment, the Intelliskin is purported to provide performance, enhancing posture cueing and recovery compression. Two recent studies suggest that the garment might be effective in improving the performance of overhand athletes such as throwers and volleyball players. Russell et al[20] (2013) determined that the use of a compression posture-cueing shirt resulted in improved throwing performance and less pain in pitchers. In an unpublished study presented at the American Orthopaedic Society of Sports Medicine annual meeting (2012), volleyball players reported fewer shoulder injuries over the course of a season while wearing a posture-cueing compression shirt.

Because the performance of a cyclist is dependent on proper riding posture and adequate postride recovery, the effectiveness of a posture-cueing and compression shirt is of interest and worthy of study. Therefore, the purpose of this study was to determine cyclists' perceptions of (1) wearing a posture-cueing shirt on