Influence of Lower-Body Compression Garments on Athletic Performance

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The purpose of this study will be to determine how compression shorts effect athletic performance. Subjects are 10 men and 10 women varsity track athletes specializing in sprint or jump events. Testing will utilize the neoprene-cloth compression shorts, which run from the knee to just above the waist, and loose fitting gym shorts as the control garment. Both conditions for each of a series of performance tests will be conducted on the same day using a balance, randomized block design to remove day-to-day variation. Following is a brief description of each performance test.

Joint ROM Test (60m Sprint): One 120Hz camera will be positioned at the 55m mark of a 60m sprint. Kinematics will be compared between conditions. Photocells will be positioned at the start and finish to measure time. Athletes will rest for a minimum of 10 minutes between conditions.
Ensure garment does not restrict range of motion and analyze kinematics. Garment may reduce injury by assisting hamstrings at end of recovery phase.

Fatigue-Agility Test: A modified T-Test (Seminec, 1990) to include four cycles with maximal jump at T-cross. Two sets will be performed with 2 minutes rest in between sets and a minimum of 10 minutes rest between conditions. Four touch mats will be used to measure intervals and ground-contact time. A custom software program will be used to link mats and measure times.
Improved hip stability and/or proprioception may improve agility. Increased muscle pump and removal of lactate may reduce fatigue from muscle.

Jump-Power Test: Three maximal efforts (hands on hips) at: 24" drop jump, 12" drop jump, and countermovement jump will be performed on a force plate. Film (120 Hz) countermovement jump to measure thigh muscle oscillation between conditions. Jump height will be measured with cable transducer attached to waist.
Elasticity of garment may add force to jump. Increased proprioception may improve jump technique. Reduced muscle oscillation on landing will decrease fatigue.

Shock Attenuation (treadmill) Test: Each subject will run for five minutes on treadmill at 6 miles per hour. Accelerometers will be attached to the tibia (5cm below patella) and on the forehead. Peak values and difference between peak values for tibial and forehead acceleration will be compared between conditions.
Garment may physically attenuate shock from tibia to the head.

Skin Temperature: A thermister will be secured 9 inches above the top of the knee. Subjects will pedal on a bicycle ergometer with 1.5 Watt per Kilogram of bodyweight resistance. Temperature measurements will be sampled with the thermister immediately before the warm-up protocol, once per minute during the warm-up and immediately following warm-up. Total change and rate of change will be compared for with and without garment conditions. Other condition tested on a different day to ensure return of skin temperature to normal.
Garment should decrease warm-up time, reducing injury and improving performance.

Mechanical characteristics of garment: Standard impact testing will be conducted on the garment material to determine the amount of impact force it will attenuate. This will be valuable information for impact-related injury prevention.
Additionally the garment will be fitted to a mannequin to measure resistive, elastic and compressive properties.