Muscle Exertion of Running Heel and Toe Strike on Gastrocnemius and Tibialis Anterior

Van Valkenburg, Alissa

This experiment tested heel striking versus toe striking in a test for muscle exertion. Toe striking is when the toe of the foot hits the ground first while running, and heel striking is when the heel hits the ground first. As a long distance runner it is important to conserve the most energy and to have the correct running form. By finding out which running form uses the least amount of energy in the muscle, the runner will be able to run further and save more energy. To test this, 20 cross country participants ran controlled heel and toe striking for two minute intervals on a treadmill at speed five. Each trial was videoed and an Electrocardiogram sensor and electrodes were used to measure the amount of energy being exerted by the gastrocnemius and tibialis anterior muscles. These muscles were chosen because the tibialis anterior is affected mainly by heel striking, and the gastrocnemius by toe striking. After recording all data, T Distribution tests for independent samples were used on each muscle to see if heel striking or toe striking exerted the most energy, thereby concluding which uses the most energy. The P-Values of both tests came back saying that there was not a significant difference, therefore no conclusion could be drawn saying that one was better than the other. The hypothesis that toe striking uses less energy was inconclusive.

Awards Won: