TACSM Abstract

Attempting to Acutely Manipulate Ground Contact Time Imbalances Impairs Running Economy

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ABSTRACT

Running economy (RE) is a key performance determinant. Biomechanical markers have been linked to RE, including ground contact time (GCT), cadence, and vertical oscillation (VO). Recently, we showed a strong relationship between GCT imbalances and RE. Because these markers can be tracked real-time with consumer-wearable devices, runners now have access to instant feedback concerning their mechanics. **PURPOSE:** Determine if attempting to correct GCT imbalances real-time alters mechanics and RE. **METHODS:** 7 recreational runners (38 ± 15 years, 24.7 ± 2.8 kg/m^2, 5 male) completed 2, 10-minute running trials (9.65 km/hr) on separate days. For both trials, subjects ran with a heart rate (HR) monitor/watch that measured GCT, GCT imbalances, cadence, and VO. For the control (CT) trial, subjects were not permitted to receive feedback from the watch. During the feedback (FB) trial, the watch was set to display GCT imbalances, and subjects were prompted every 20-30 seconds to monitor/attempt to correct any imbalances. Both trials were preceded by a dynamic warmup and 5-minute jog. For the FB trial warmup, subjects were acclimated to the watch and allowed to experiment with manipulating their GCT imbalances. VO_2 was monitored continuously throughout each 10-minute trial, and average values from 6 to 9 minutes were determined for each trial. Average values for all running biomechanical variables were calculated from 0.5 minutes to 9.5 minutes. Comparisons between trials were made with a dependent sample t-test. **RESULTS:** The FB trial elicited a significantly higher ($p = .011$) working VO_2 (35.5 ± 1.6 ml/kg/min) compared to the CT trial (33.4 ± 1.8 ml/kg/min). There were no other significant differences between trials for the other measured variables. Average values for each variable by trial were as follows: RER (CT: .91 ± .04; FB: .92 ± .05), HR (CT: 159 ± 26 bpm; FB: 163 ± 24 bpm), GCT % difference (CT: 1.69 ± .67%; FB: 1.70 ± 1.70%), GCT absolute difference (CT: 9 ± 3 ms; FB: 8 ± 7 ms), GCT (CT: 272 ± 26 ms; FB: 268 ± 31 ms), Cadence (CT: 165 ± 9 steps/min; FB: 167 ± 9 steps/min); VO (CT: 9.3 ± 2.0 cm; FB: 9.2 ± 1.9 cm), VO ratio (CT: 9.5 ± 1.6 cm/m; FB: 9.5 ± 1.6 cm/m). **CONCLUSIONS:** Acutely attempting to correct GCT imbalances did not result in improved mechanics and actually impaired RE. Altering mechanics based on real-time feedback from consumer-wearable devices may impair performance in the short term. Given that GCT imbalances have been linked to impaired RE, future research should determine how to better correct these imbalances rather than attempting to acutely manipulate them.