ABSTRACT

Study Design: Repeated measures

Background: Both clinicians and researchers often utilize treadmills to analyze spatiotemporal and biomechanical factors during running. However, there is question of whether or not treadmill running mimics overground running. The development of new wearable technology, such as pressure sensor insoles, presents an opportunity to compare the two running conditions.

Purpose: To compare the spatiotemporal factors between overground and treadmill running in collegiate runners, using pressure sensor insoles.

Methods: Twenty-one collegiate runners (age 20.1 ± 1.5 years, 81% female) were recruited from a Division I Cross Country team. Subjects participated in two 15-minute testing sessions. During the first session, subjects ran at their “easy run pace” for 200 meters, while wearing pressure sensor insoles. During the second session, subjects ran at a speed-matched pace on a treadmill for one minute at a level grade, and one minute at a 1% incline. Cadence, stance duration and swing duration were processed using Moticon Science Pro+ software (Munich, DE). Data between overground and treadmill running was compared using repeated measures analysis of variance with $\alpha = 0.05$.

Results: Compared to overground running, level and incline treadmill running was associated with increased cadence (mean difference [MD]=3.55-3.22 strides per minute; $p< 0.01$), decreased stance duration (MD=14-16 ms; $p< 0.01$), and decreased swing duration (MD=11-12 ms; $p< 0.05$).

Conclusion: In collegiate runners, overground and treadmill running differ in spatiotemporal comparisons.

Levels of Evidence: 3

Key Words: Cadence, cross country, pedobarometry, running injury, movement system

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