

Traditional vs non-motorized curve treadmill: differences in energetic requirements

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Previous studies suggest that exercise performed on curve surface treadmill (CT) can increase energy expenditure more than exercise performed on a traditional motorized treadmill (MT). However, to date, there are no data about energy cost that confirm this hypothesis. Thus, the purpose of the study is to analyze the physiological requirements of walking and running on a CT as compared to a traditional MT.

26 subjects (11M + 15W) (24.1±3.4yy; 64.7±11.2kg; 171.1±8.6cm) performed preferred walking speed test and running ramp test to exhaustion on both treadmill in two separated sessions.

The gross energy cost of walking (C_w) is greater ($p < .05$) in CT than in MT (3.79 ± 0.35 j/m/kg, 2.43 ± 0.38 j/m/kg, respectively). The gross energy cost of running (C_r) is greater ($p < .05$) in CT than in MT (5.05 ± 1.67 j/m/kg, 4.09 ± 0.70 j/m/kg, respectively). Moreover, MT allows to reach higher speeds than CT (MT: 15.5 ± 1.7 km/h, CT: 13.9 ± 1.4 km/h, $p < .05$) with lower peak blood lactate concentrations (MT: 8.98 ± 2.43 mmol/L, CT: 10.75 ± 2.76 mmol/L, $p < .05$).

Our data confirm that i) the C_w , matched for speed, is greater in CT than MT; ii) the C_r , analyzed during incremental ramp test, is greater in CT than MT; iii) during the ramp test, for the same metabolic load, the mechanical load is lower in the CT compared to MT. The increased physical effort is due to the greater frictional characteristics and force generation requirements inherent with the use of a CT.