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Title: Energy expenditure, metabolic power and high speed activity during linear and multi-directional running

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Abstract

Objectives: The purpose of the study was to compare measures of energy expenditure derived from indirect calorimetry and micro-technology, as well as high power and high speed activity during linear and multi-directional running.

Design: Repeated measures

Methods: Twelve university standard team sport players completed a linear and multi-directional running condition. Estimated energy expenditure, as well as time at high speed (> 14.4 $km \cdot h^{-1}$) and high power (> 20 $W \cdot kg^{-1}$) were quantified using a 10 Hz micro-technology device and compared with energy expenditure derived from indirect calorimetry.

Results: Measured energy expenditure was higher during the multi-directional condition (9.0 ± 2.0 *cf.* 5.9 ± 1.4 $kcal \cdot min^{-1}$), whereas estimated energy expenditure was higher during the linear condition (8.7 ± 2.1 *cf.* 6.5 ± 1.5 $kcal \cdot min^{-1}$). Whilst measures of energy expenditure were strongly related ($r > 0.89$, $p < 0.001$), metabolic power underestimated energy expenditure by 52% (95% LoA: 20-93%) and 34% (95% LoA: 12-59%) during the multi-directional and linear condition, respectively. Time at high power was 41% (95% LoA: 4-