

THE RELATIONSHIP BETWEEN BODY LOAD AND RUNNING FATIGUE

SAINT A. SACKY^a, **KURT H. SCHÜTTE**^{a, b}, **RACHEL E. VENTER**^a

^a Movement Laboratory, Department of Sport Science, Stellenbosch University, Stellenbosch, Western Cape, South Africa

^b Human Movement Biomechanics Research Group, Department of Kinesiology, KU Leuven, Leuven, Belgium

Introduction

The concept of player load has been developed to determine the physical and physiological demands of team players (Dalen et al., 2016). The quantification of player load has been carried out with video analysis, and GPS. However, sideways movements, decelerations, tackles and other complex movements were found to be ignored by the video analysis system. Consequently, the use of tri-axial accelerometers at the lower or upper back for the estimation of player load (Hollville et al., 2015) became popular. The concept has not been explored in running ("body load"). Physiological parameters (VO_2 , $PetCO_2$, HR_{max}), RPE and blood lactate have been the major criteria that have been used by researchers to determine the demands of running and monitor fatigue. However, those parameters give an indication of internal load and do not consider external loading (mediolateral and anteroposterior body movements) (Scott et al., 2013). Information on the body load could be helpful in management of fatigue, overtraining, and injury potential. The current study therefore uses tri-axial accelerometers to determine the influence of running fatigue on body load.

Methods

32 runners (Age 21.75 ± 1.4 , height 1.72 ± 0.07) volunteered to participate in the study. Participants underwent a fatigue protocol (modified Koblbauer et al., 2014) at a treadmill incline of 1% to depict outdoor energetics. A triaxial accelerometer (± 16 g range, sampling at 1024 Hz, 16-bit resolution, 23.6 g weight, Dublin, Ireland) was securely positioned over L3 spinous process of the trunk to collect accelerometry data throughout the run.

Results

Body load significantly increased ($p = 0.04$; $p = 0.028$ when sampled at 1024Hz and 105Hz respectively) with running-induced fatigue.

Conclusion

The physical and physiological demand on runners (body load) increase with fatigue. The sampling rate of accelerometers should be considered when interpreting body load (player load).