

SWACSM Abstract

Lower Extremity Loading and Subsequent Muscle Soreness Following High-Intensity Interval Training Protocols: A Pilot Study

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ABSTRACT

High-intensity interval training (HIIT) is a popular form of exercise that is being performed by the general population as well as athletes. There is little work into how the lower extremity loading within HIIT protocols differs among various exercise modalities and the effects these differences may have on resulting muscle soreness. **PURPOSE:** The purpose of this pilot study was to characterize lower extremity vertical reaction forces (vRF) during treadmill running and cycling HIIT protocols in young, healthy adults and to explore the relations of the vRF with delayed onset muscle soreness (DOMS). **METHODS:** Participants completed a heart rate maximum (HR_{max}) test and two 4x4 HIIT protocols with four 4-minute cycles of 85-95% HR_{max} active periods followed by 3-minute 50-60% HR_{max} recovery periods. vRF's were measured using Moticon shoe insoles and normalized to body weight. The peak vRFs during the middle minute of each active period were averaged, then the 4 average active period values were averaged for a *total* average vRF for the HIIT protocol. DOMS was measured using a subjective, 10-point visual analog scale (VAS). Results are presented as mean \pm SD. The relations between vRF and DOMS at 24h post-exercise was assessed using Pearson's *r*. **RESULTS:** Peak vRF were significantly greater during running (2.25 ± 0.27 [BW]) compared to cycling (0.38 ± 0.09 [BW]) during the HIIT protocols. There was a strong correlation between running vRF and DOMS ($r = 0.98$); however, only a weak relation between vRF and DOMS in cycling ($r = 0.21$). **CONCLUSION:** These findings demonstrate large differences in lower extremity loading between running and cycling HIIT protocols and a strong association between running vRF and subsequent muscle soreness at 24h post-exercise. Recreational exercisers as well as athletes should be aware of how different exercise modalities influence muscle soreness following HIIT training to promote adherence and optimal performance.