BIOMECHANICAL, CARDIOVASCULAR AND AEROBIC DIFFERENCES BETWEEN CONTACT AND NO-CONTACT TECHNIQUES WHEN CLEARING OBSTACLES IN THE STEEPLECHASE

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1 RESUMO

The aim of this study is to compare the biomechanical, cardiovascular, and aerobic characteristics of the step-on (SOT) and hurdling (HT) techniques used in the 3000 metres steeplechase. More specifically, this study seeks to identify the optimal technique for athletes, through the analysis of lactate concentration (LC), using The Edge Lactate Analyzer, maximum heart rate (MHR), using Garmin HRM-Dual heart rate meter, and maximum acceleration (MA), using Xsens MVN Awinda motion sensors on the pelvis, upper and lower legs, and feet. When analysing the normalized LC and MHR data, the median of normalized LC for HT was 0.95 n.u (normalized units), compared to 0.93 n.u. for SOT ($p = 0.396$). Comparably, the median of normalized MHR for HT was 0.99 n.u., while for SOT it was 0.98 n.u. ($p = 0.674$). Both p-values show no significant differences ($\alpha=0.1$) between techniques for both LC and MHR. Normalized LC and MHR for HT had a significant moderate positive correlation ($\rho = 0.437$, $p = 0.070$), while there was a significant strong positive correlation ($\rho = 0.703$, $p = 0.001$) for SOT. Biomechanical analysis showed that the feet and upper leg movements have similar MA in opposed limbs when using different techniques ($p=0.436$ and $p=0.363$ for dominant and non-dominant feet, respectively; $p=0.314$ and $p=0.770$ for dominant and non-dominant upper legs, respectively), while lower leg movements have similar MA in the same limbs when using different techniques ($p=0.650$ and $p=0.626$ for dominant and non-dominant lower legs, respectively). Lastly, it was concluded that the pelvis movements are similar when using both techniques ($p=0.256$). Future research should focus on studying larger sample sizes, as well as elaborating protocols that better mimic this event, such as collecting metabolic data after a competitive or simulated race.