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Physiological responses and energy system profiling during the simulation of epée competitions in elite fencers

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INTRODUCTION:
To determine sport-specific characteristics, this study aimed to evaluate physiological responses and energy system contributions during simulated epée competitions in elite fencers.
METHODS:
Ten elite male fencers participated in this study. They performed simulated epée (direct elimination; DE) matches. Simulated epée matches consisted of three rounds of three min each, with one min rest between each round. During these competitions, physiological parameters such as heart rate (HRpeak and HRmean), oxygen uptake ($\dot{V}O_2$peak and $\dot{V}O_2$mean), metabolic equivalents (METs in $\dot{V}O_2$peak and $\dot{V}O_2$mean), and blood lactate concentrations (Peak La− and delta La−; ΔLa−) were determined. Furthermore, energy system contributions (oxidative; WOxi, glycolytic; WGly, and phosphagen; WPCr) using the PCr- La−-O2 method and time-motion parameters were calculated.
RESULTS:
Values of HRpeak, HRmean, and WOxi (%) were significantly higher in the second and third rounds compared with the first round ($p < 0.05$, $p < 0.0001$, $p < 0.01$, and $p < 0.0001$, respectively). Values of $\dot{V}O_2$peak and METs in $\dot{V}O_2$peak were significantly higher in the first round compared with the third round ($p < 0.05$, respectively). Values of ΔLa−, and WGly (kJ and %) were significantly lower in the second and third rounds compared with the first round ($p < 0.01$, respectively). $\dot{V}O_2$mean and METs in $\dot{V}O_2$mean were significantly higher in the second round compared with the third round ($p < 0.05$, respectively). Furthermore, WOxi (kJ and %) was significantly higher in all bouts compared with WPCR and WGly ($p < 0.0001$, respectively). Low positive and negative correlations were seen between WOxi, $\dot{V}O_2$mean, and sum of attacks and defence times (ADT) and the sum of time without attacks and defences (STWAD) (WOxi vs ADT: $r = 0.48$; $R2 = 0.23$, $\dot{V}O_2$mean vs ADT: $r = 0.45$; $R2 = 0.20$, WOxi vs STWAD: $r = −0.49$; $R2 = 0.24$, and $\dot{V}O_2$mean vs STWAD: $r = −0.45$; $R2 = 0.20$, respectively).
CONCLUSION:
Direct elimination epée matches include high-intensity intermittent exercise and the oxidative energy contribution is 80 to 90% of the total energy demand. Improving aerobic performance such as the increased ability of energy recovery may support high-intensity intermittent actions during entire epée matches (3 rounds) in elite fencers.

Topic: **Training and Testing**

Presentation **Oral**

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