Anaerobic Capacity Estimated by the sum of both oxygen equivalents from the glycolytic and phosphagen pathways on a treadmill is higher compared with a cycle ergometer

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The regarding "*anaerobic*" assessment (i.e., non-mitochondrial metabolic pathways) seems to be affected by the exercise modality. The purpose of this study was to verify whether the exercise modality (i.e., running and cycling) alters the magnitude of "*anaerobic*" capacity estimated by a single supramaximal exhaustive effort ($MAOD_{ALT}$). Fourteen healthy men (age: 26±9 years) underwent a maximum incremental test to determine the maximal oxygen uptake ($\dot{V}O_{2max}$); the minimal velocity (for the treadmill) and power output (for the cycle ergometer) at which $\dot{V}O_{max}$ was reached ($i\dot{V}O_{2max}$), was considered $i\dot{V}O_{2max}$ for each ergometer. A supramaximal effort to exhaustion at 115% of the $i\dot{V}O_{2max}$ was conducted to determine the $MAOD_{ALT}$ (i.e., sum of both oxygen equivalents from the glycolytic and phosphagen pathways). During all tests, the respiratory responses were measured breath-by-breath using a stationary gas analyzer (Quark PFT/COSMED Italy). The blood samples were collected in the rest and 3, 5, and 7 min after each effort and the highest [La^-] measured was assumed as the peak value for each test. Afterward, it was conducted an electrochemical analysis of lactate (YSI 2300 STAT/Yellow Spring Inst., USA). The $\dot{V}O_{2max}$ during running was higher (p=0.001; large effect size) vs. cycling (48.9±3.9 $mL \cdot kg^{-1} \cdot min^{-1}$ vs. 44.8±5.5$mL \cdot kg^{-1} \cdot min^{-1}$ respectively). Contrarily, the oxygen equivalent from the glycolytic metabolism was not different between exercise modalities (p=0.133; small effect size; running=2.35±0.48 L and cycling=2.18±0.58 L)**.** Furthermore, the "anaerobic" capacity was *likely meaningfully* (3.65±0.70 L) and *very likely meaningfully* (949.1±5.7 $mL \cdot kg^{-1}$) greater in running than cycling (3.81±0.71 L and 52.0±8.1 $mL \cdot kg^{-1}$). Additionally, the contribution of the phosphagen metabolism was higher (p=0.001; large effect size) for running compared to cycling (1.6±0.3 L vs. 1.3±0.3 L respectively). Therefore, the "anaerobic" capacity estimated by the sum of both oxygen equivalents from the glycolytic and phosphagen pathways during a supramaximal effort is influenced by exercise modality and is able to identify the difference in phosphagen metabolic contribution. **Keywords**: Anaerobic capacity, Blood lactate response, Excessive post-exercise oxygen consumption, Supramaximal effort
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