The sensitivity of the alternative maximal accumulated oxygen deficit method to discriminate training status

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The purpose of the study was to investigate the sensitivity of an alternative maximal accumulated oxygen deficit ($MAOD_{ALT}$) to discriminate the "*anaerobic*" capacity while comparing: least trained subjects (LT; n=12), moderately trained subjects (MT; n=12), endurance trained subjects (ET; n=16), and rugby players (RG; n=11). Subjects underwent a graded exercise test on a treadmill and a supramaximal effort at 115% of intensity associated to maximal oxygen uptake for assessing $MAOD_{ALT}$. $MAOD_{ALT}$ was calculated as the sum of oxygen equivalents from the phosphagen (i.e., assumed as the fast component of excess post-exercise oxygen consumption) and glycolytic metabolic (i.e., estimated by subtracting resting blood lactate concentration from peak post-exercise blood lactate concentration, considering a value of 1 $mmol \cdot L^{-1}$ to be equivalent to 3 mL $O_2 \cdot kg^{-1}$ body mass) pathways. $MAOD_{ALT}$ was significantly higher ($P<0.05$) in RG (64.4±12.1$mL \cdot kg^{-1}$) than in ET (56.8±5.4$mL \cdot kg^{-1}$; effect size [ES]=0.77; +13.5%), MT (53.8±5.3$mL \cdot kg^{-1}$; ES=1.08; +19.8%;) and LT (49.9±4.5$mL \cdot kg^{-1}$; ES=1.50; +36.4%;). In addition, the magnitude-based inference analysis revealed that $MAOD_{ALT}$ was *likely* (LT vs MT), *very likely* (MT vs RG, and ET vs RG) and *most likely* (LT vs ET, and LT vs RG) different between all groups, except for MT and ET, which presented an *unclear* difference. In conclusion, $MAOD_{ALT}$ was sensitive enough to distinguish the "*anaerobic*" capacity in individuals with different training status, especially for rugby players compared with least trained subjects and moderately trained subjects.

Keywords: "Anaerobic" capacity; Blood lactate response; Excessive post-exercise oxygen consumption; Physical conditioning.

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