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Validation Of Capillary Blood Gas Analysis For The Assessment Of Training Load In Track Cycling

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Objective The energy supply of daily training of track cycling should be mainly by anaerobic metabolism, which can make the blood buffer capacity facing huge Challenge and being improved. The arterialized capillary blood gas analysis can be a reliable method to evaluate the blood status of base-acid balance, which may reflect the effect of exercise intensity on blood buffer system. The paper validate the blood gas analysis as a reliable method for evaluating the total periodical training load of track cyclists.
Methods Five male and five female elite track cyclists performed two phases (four weeks per phase) of training respectively. The content included the track specific, strength and aerobic training. The Borg's Rating of Perceived Exertion (RPE) Scale (0-11) was recorded in the ten minutes after each session and calculated the session RPE (sRPE). The total inertial load (TIL) was calculated by sRPE sum from Monday to Thursday. The arterialized capillary blood gas analysis was performed at 7:00 AM on Monday and Friday. The delta value (ΔPH, ΔPCO2, ΔTCO2, ΔHCO3-, ΔBE, ΔPO2, ΔSO2) were calculated by Friday minus Monday. Pearson's linear correlation was applied to calculate the correlation between TIL and delta value. Independent t test was used to test the differences between two genders.
Results There was the moderate correlation between TIL with ΔPH and ΔHCO3- (Correlation Coefficient= 0.712 and 0.642 respectively, *P<0.01*). But other blood gas indexes didn't show the obvious relationship with TIL (Correlation Coefficient < *0.5*). There was no differences for TIL between male and female (3870.1±788.4 vs. 4130.2±716.7, *P>.05*). Moreover, ΔHCO3- of male was significant more than female by 95.1% (*P<0.01*). There were significant correlation between TIL and ΔPH for both male and female (Correlation Coefficient= 0.785 and 0.812 respectively, *P<0.01*), and between TIL and ΔPH for both male and female (Correlation Coefficient= 0.662 and 0.658 respectively, *P<0.01*).
Conclusions The PH value and bicarbonate radical of blood should be sensitive to the high intensity track cycling training, which can be the valid to evaluate the inertial load. However, gender has no influence on evaluating. The oxygen partial pressure and oxygen saturation of blood can not reflect the training load accurately.