

㊦338 Evaluation of the Blood Lactate Response in a Simulation of the Fifth Section of the Hakone Ekiden using a Runner-motion-response-type Treadmill

Tamotsu TERAU, Tetsuya ONDA, Seiji ARUGA
Research Institute of Sports Medical Science, Tokai Univ.

< Objective >

The purpose of this study is to elucidate the blood lactate response in a simulation of the fifth section of the Hakone Ekiden (distance of 20.7km) using a runner-motion-response-type treadmill in a laboratory.

< Methods >

Ten male subjects were divided into two groups : an experimental group (EG) of five long-distance runners, and a control group (CG) of five triathletes. EG was asked to run at their desired speeds on a programmable treadmill whose "slope-setting" was changed automatically every fifty meters. The runners watched a video of the actual course during the experiment. CG performed treadmill running on the basis of mean values obtained from running speeds in EG at a slope of zero percent.

< Results and Discussion >

The running time for 20.7km did not differ between EG and CG. At distances of 10.35, 16.2 and 20.7km, the mean values of oxygen uptake were significantly higher in EG than that in CG. Changes in respiratory exchange ratio were similar to those of the oxygen uptake. The concentrations of blood lactate for 10.35, 16.2 and 20.7km were significantly higher in EG than in CG. These results suggest that long-distance runners during the fifth section of the Hakone Ekiden are mainly supplied by the carbohydrate component and showed a higher intensity of exercise during this section.

< Keywords > Runner-motion-response-type Treadmill. Blood Lactate. Hakone Ekiden. Respiratory Exchange Ratio.

㊦339 Assessment of the competitive capacity of cyclists using OBLA

Tetsuji ADACHI

Department of medical and sport sciences, Kyoto interdisciplinary institute of community medicine

Objective

The purposes of this study were to clarify the relationship between the maximal exercise capacity and the power output at OBLA (wOBLA) and to evaluate parameters appropriate for the assessment of the competitive capacity of cyclists.

Methods

The maximal exercise capacity was measured in 44 male cyclists by the cycle ergometer exercise test using incremental loads to an all-out state. The ventilation ($\dot{V}E$), oxygen uptake ($\dot{V}O_2$), and CO_2 excretion ($\dot{V}CO_2$) were measured.

Results

At maximal exertion, $\dot{V}E_{max}$ was 150 ± 24.1 l/min and $\dot{V}O_{2max}$ was 3.709 ± 35.4 l/min (58.69 ± 9.13 ml/kg/min). The period until complete exhaustion was 970.0 ± 102.6 seconds, and the maximal power output was 326.4 ± 37.5 W. wOBLA was 268.5 ± 35.4 W; at this point, the $\% \dot{V}O_{2max}$ was $89.3 \pm 4.0\%$, and RER was 1.09 ± 0.04 . The correlation between wOBLA and maximal exercise capacity was highest in the maximal power output ($r=0.905$), followed by the $\dot{V}O_{2max}$ ($r=0.799$), $\dot{V}E_{max}$ ($r=0.590$), and $\dot{V}O_{2max}/kg$ ($r=0.587$) ($p<0.001$). wOBLA showed a stronger correlation with the maximal power output ($p=0.037<0.05$) than $\dot{V}O_{2max}$ ($r=0.777$).

Conclusions

The maximal power output and wOBLA are considered to be better parameters than $\dot{V}O_{2max}$ for the assessment of the competitive capacity of cyclists.

Key words: Cyclist, OBLA, Maximal power output