HEART RATE MONITORING DURING TRIATHLON COMPETITIONS

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Introduction. Enhancement of training process in elite triathletes requires objective information concerning physiological changes during competitions and their role in sport performance. Heart rate registration is one of a few noninvasive methods, which may be utilized during competitions without decrement in sport performance.

The purpose of the present study was to analyze heart rate response, percentage of time spent at different heart rate zones during Olympic and sprint distance triathlon and to determine usefulness of heart rate monitoring during competitions.

Methods. The following methods were used: GPS monitoring, exercise tests, gas exchange measurements, analysis of competition results, statistical analysis. 10 males (age 21.9±5.04 years, VO2max 69.2±7.21 ml.kg⁻¹.min⁻¹) and 7 females (age 20.6±3.46 years, VO2max 63.0±4.44 ml.kg⁻¹.min⁻¹) elite triathletes have participated in the study. Prior to competitions each athlete performed incremental exercise test to exhaustion on a motorized treadmill (Jaeger LE 500, VIASYS, Germany) to determine heart rate zones and physiological characteristics. Heart rate was measured continuously by telemetry (Polar S810i, Polar Electro Oy, Finland). Gas exchange data were collected breath-by-breath (Oxycon Pro, VIASYS, Germany). We determined 4 heart rate intensity zones as follows: 1. <HR at 40% of VO2max – recovery zone, 2. HR at 40% of VO2max – HR at VT1 – aerobic zone, 3. HR at VT1 – HR at VT2 – aerobic–anaerobic zone, 4. HR at VT2 – HRmax – anaerobic-aerobic zone. Each subject was monitored during each stage of Ukrainian championships in Olympic and sprint distance triathlons. All values are presented as mean ± standard deviation (SD).

Results. Mean heart rate during Olympic distance triathlon (174.5±4.09 beats.min⁻¹) was significantly different from HR at VT1 (163.5±4.51 beats.min⁻¹) (P<0.001) and HR at VT2 (180.2±3.66 beats.min⁻¹) (P<0.05). Mean heart rate (177.1±7.29 beats.min⁻¹) during sprint distance triathlon was significantly different from HR at VT1 (162.3±9.54 beats.min⁻¹) (P<0.01), but not as compared to HR at VT2 (179.8±8.01 beats.min⁻¹) (P>0.05). Intensity distribution during swimming, cycling and running stages wasn’t differ significantly and athletes spent most time in zone 4 (21.5±11.07% – Olympic distance and 25.2±22.51% – sprint distance) and 3 (70.6±9.60% – Olympic distance and 72.5±22.16% – sprint distance) correspondingly. Despite the fact that the changes were not significant we observed marked individual differences in intensities between phases.

Conclusions. Thus, we concluded that the less developed the exact aspect of triathlon the higher HR will be observed during this stage. HR monitoring during triathlon competi-

tions allows to analyze the pacing strategies in triathlon, to determine less developed aspects (swimming, running, cycling), mistakes accordingly physiological and pedagogical standpoint.

Keywords: Monitoring, Anaerobic Threshold, Sport Physiology

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