

Study of Training Cycles in Kayak Rowers during Yearly Training Cycle

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1 OBJECTIVES

The aim of our research was to investigate Lithuanian elite kayak rowers' (K-2) preparation during the yearly training cycle, as well as to evaluate the development of aerobic capacity.

2 METHODS

The research was carried out in the first year of the Olympic four-year cycle, preparing for 2013 World Championship, where two (1,2) athletes became the winners of the 10th place in 1000 m event (K-2).

The applied training workload for aerobic development was classified into five zones of intensity:

- first zone – working intensity HR - 140±10 b/min, blood lactate concentration (BLC) – up to 2 mmol/l.
- second zone – working intensity HR - 155±5 b/min, BLC – 2,1-3 mmol/l.
- third zone – working intensity HR - 165±5 b/min, BLC – 3,1-5 mmol/l.
- fourth zone – working intensity HR - 175±5 b/min, BLC – 5,1-8 mmol/l.
- fifth zone – working intensity HR – 180-185 b/min, BLC – 8,1 mmol/l and higher.

Our devised training program underwent discussion by athletes, coaches and scientists; it hardly experienced any changes within the process of athlete' preparation.

Boat speed, distance and athletes' heart rate had been estimated using computer system Garmin Connect Forerunner 910 XT.

Work intensity had been evaluated by examine of lactate concentration (La) (mmol/l), which was measured by analyzer Lactate Pro LT-1710 (ver. 1,0), ARKRAY, taking capillary blood from finger. Gas analyzer Oxycon Mobile 781023-052 version 5.2 (Cardinal Health Germany 234 GmbH, Germany) was used for establishment of the

athletes' aerobic capacity indices: pulmonary ventilation (PV) (l/min), heart rate (HR) (beats/min), oxygen uptake (VO₂) (l/min, ml/min/kg), oxygen pulse (OP) (ml/beat), working capacity (W), rowing economy (l W/ml) at the point of the anaerobic threshold and the point of the critical intensity. Aerobic capacity indices were tested three times: at the beginning of one year cycle in October, in the middle of one year cycle in Mart and before competitor period – in July.

3 RESULTS

According to the results of the research, preparation of the athletes for 2013 World Championship was compiled of one macro-cycle, and possessed characteristics for its features (Table 1). During this macro-cycle, the training load carried out by the athletes was not high and amounted to 707 hours. Considering the zones of intensity, the greatest training load was carried out in the third zone and made up to 31.2 percent. In the fourth zone (mixed aerobic-anaerobic) such work compiled 12 percent, and only 1.2 percent of the training load was carried

Table 1: Characteristics of workload of kayak rowers in the first year of Olympic four-year cycle.

| Proc. time in five zones of intensity | | | | | Month |
|---------------------------------------|------|------|------|-----|-------|
| 1 | 2 | 3 | 4 | 5 | |
| 14 | 17 | 49 | 20 | 0 | 1 |
| 16 | 40 | 38 | 5 | 1 | 2 |
| 6 | 13 | 48 | 31 | 2 | 3 |
| 18 | 19 | 41 | 21 | 1 | 4 |
| 24 | 27 | 22 | 25 | 2 | 5 |
| 43 | 23 | 19 | 13 | 2 | 6 |
| 39 | 19 | 23 | 18 | 1 | 7 |
| 37 | 21 | 25 | 16 | 1 | 8 |
| 39 | 18 | 27 | 15 | 1 | 9 |
| 47 | 17 | 25 | 10 | 1 | 10 |
| 40 | 23 | 28 | 8 | 1 | 11 |
| 36 | 22 | 29 | 12 | 1 | 12 |
| 29.9 | 21.6 | 31.2 | 16.2 | 1.2 | Total |

Table 2: Changes in kayak rowers' aerobic capacity indices during the first year of Olympic four-year cycle.

| Testing | Athletes | Critical intensity limit | | | La |
|---------|----------|--------------------------|------------------|-----|------|
| | | HR b/min | VO2 ml/min/kg | W | |
| I | 1 | 168 | 56.1 | 280 | 11.9 |
| | 2 | 156 | 61.2 | 240 | 7.2 |
| II | 1 | 178 | 67.5 | 320 | 12.2 |
| | 2 | 135 | 64.7 | 280 | 12.3 |
| III | 1 | 174 | 66.7 | 340 | 12.1 |
| | 2 | 147 | 73.4 | 320 | 12.9 |

out in the fifth zone of intensity. Training sessions, which were carried out during the competitive period, were not of increased intensity, the athletes participated in eight competitions (28 starts).

During the preparation period, aerobic capacity indices under investigation used to progress remarkably for both of the athletes (Table 2).

The obtained research data on aerobic capacity have disclosed individual skills of the athletes, as well as the evolution of such skills.

4 DISCUSSION

The training load which is applied in preparing athletes is divided into different zones of intensity base on various indices. Bompa, Haff (2009) explain such division into zones for the sport by prevailing aerobic capacity due to biochemical processes in muscles. According to Vescovi et al (2011) at the beginning of the season training on the boat is introduced three times a week, dedicated to the development or recovery of aerobic capacity with long outings (60-90 minutes), performed at a HR between 50 - 60% of the maximum. With the pre-competition phase, the workout on the boat increases and reaches up to six times a week. The total amount of workout is decreased with a further intensification of the introduced exercises. Our investigation showed decreased amount of workload hours in competitive period in the first and the second zones of intensity, and it was increased in the third zone of intensity. According to Issurin (2008) the work in this zone improves the function of cardio respiratory systems without great acidity effect on the body.

Rowing 1000 m distance causes reaching critical intensity limit and VO₂max (Bishop et al., 2002). Analysis of the intensity and volume of our investigated athletes' training sessions in competitive period shows that very little workload used to be carried out in the fifth zone of intensity while preparing for first competition of the season.

Although flat water kayaking performance is highly supported by aerobic metabolism, it does require a large anaerobic contribution what reduces the absolute importance of the aerobic energetic pathway (Galrcia-Pallares et al., 2010).

Low-intensity work remained widely unchanged at approximately 95% throughout the season. In the competition period, the athletes exhibited a shift within <2 mmol exercise toward lower intensity and within the remaining approximately 5% of total rowing toward more training near VO₂max intensity (Seiler, 1009).

The obtained research data on aerobic capacity have disclosed individual skills of the athletes, as well as the evolution of such skills. The results provide preconditions for more individualized preparation of the athletes, and prove the fact that training load should not be decreased remarkably in a short transitory period, as the purpose of such load is to maintain aerobic capacity.

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