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Lactate threshold in elite race walkers – descriptive study of development rates and associated training

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INTRODUCTION:

The lactate threshold (LT) is one of the most important physiological factors in race walking. However, research concerning the development of this factor and the associated training in elite race walkers is limited [1]. Therefore, the aim of this descriptive study was to determine the development of LT for different training phases of elite race walkers and to describe the realised training.

METHODS:

The study is based on retrospective data from 1992 to 2018, collected at the Institute of Applied Training Science in Leipzig. The athletes included in the study were members of the German national team and competed at international level. To determine the LT, athletes completed a step test on the treadmill (4-6x 3000 m, increments: 0.2 m/s, rest duration: 60 s). LT was defined as the velocity where the lactate-velocity-curve crossed 3.0 mmol/l lactate. Furthermore, training data were collected with a standardized diary and processed in an Access database. Male athletes with an age of at least 22 years and a baseline LT of at least 3.6 m/s were included. The development of LT and the average training were investigated for three training phases (P1: preparation phase 1 from Nov/Dec to Jan/Feb, P2: preparation phase 2 from Jan/Feb to Mar/Apr, P3: competition phase from Mar/Apr to June/July). All data are given as mean \pm standard deviation.

RESULTS:

33 training phases of 14 athletes with a baseline LT of 3.85 ± 0.12 m/s, an age of 27.2 ± 3.0 years and a duration of 7.4 ± 1.8 weeks were selected for P1. The development of LT within P1 is 0.06 ± 0.10 m/s. The average training includes a training volume of 131.1 ± 43.2 km/week (walking and running), 8.6 ± 1.6 sessions/week (including strength and general endurance training) and an active training time of 12.1 ± 3.4 h/week. The average proportion of training volume near and above the LT (including competitions) is 17.3 ± 14.4 %. Regarding P2, 23 training phases of 9 athletes with a baseline LT of 3.83 ± 0.11 m/s, an age of 27.0 ± 3.0 years and a duration of 9.6 ± 1.4 weeks were analysed. LT increases by 0.04 ± 0.09 m/s. Training consists of 159.5 ± 36.5 km/week, 9.4 ± 1.5 sessions/week, 12.9 ± 2.8 h/week and a proportion of intensity training of 24.8 ± 17.0 %. Finally, 23 training phases of 11 athletes with a baseline LT of 3.92 ± 0.10 m/s, an age of 25.3 ± 1.7 years and a duration of 16.6 ± 2.3 weeks were selected for P3. LT development is 0.04 ± 0.12 m/s. Training includes 122.7 ± 32.4 km/week, 8.1 ± 1.1 sessions/week, 10.5 ± 2.8 h/week and intense walking of 18.9 ± 15.5 %.

CONCLUSION:

The mean changes of LT seems small, but individual ranges of -0.17 to 0.31 m/s have to be considered. This study offers coaches a reference for the development of the LT and the associated training in elite race walkers. Further studies should investigate the statistical relation between changes of LT and different training parameters as well as the baseline LT.

1. Papis, M., Spisiak, M. & Toth, M. (2017). Slovak Journal of Sport Science, 2 (1), 1-6.

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