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Changes in Aerobic Ability During A Macro Cycle of Training in Swimming

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Abstract: It seems that critical velocity and critical stroke rate are associated with aerobic performance. The aim of this study was to analyse the changes of critical velocity and critical stroke rate during 12 weeks of training in a group of young competitive swimmers. Fourteen age group male swimmers took part in this investigation. The evaluation took place in two different trials. The first one was conducted at the beginning of the season and the second one after 12 weeks of training. For each subject the critical velocity and the critical stroke rate were determined in both trials. The main result was that critical velocity increased, whereas critical stroke rate decreased between the first and second trials. It seems that technical ability was improved during the 12 weeks of training. The swimmers were able to perform at the same physiological intensity at higher velocities and with less stroke rate.

Keywords: Age group swimmers, aerobic capacity, technique, training effects.

INTRODUCTION

Critical velocity was defined as the maximum swim speed that can be maintained during a long period of time without exhaustion [1]. Besides the concept of critical velocity which is frequently used by coaches as a method to determine the intensity of swimmers' aerobic capacity, Pelayo *et al*. [2] were pioneers in hypothesising the existence of a theoretical stroke rate that could be maintained without exhaustion during a long period of time, defined as critical stroke rate. It seems that critical velocity and critical stroke rate are associated with aerobic performance. However, these two variables are not always linked together during training. On this, it is unclear whether an improvement of the aerobic capacity (e.g. critical velocity) is dependent on bioenergetical and/or biomechanical enhancement (technical efficiency). Therefore, the aim of this study was to analyse the changes of critical velocity and critical stroke rate during 12 weeks of training in a group of young competitive swimmers.

METHODS

Fourteen age group male swimmers took part in this investigation. The mean age, height, body mass and years of competitive practice were: 13.60±0.21 years old, 1.60±0.10 m, 49.07±13.69 kg, and 4.43±0.51 years. The evaluation took place in two different trials. The first one was conducted at the beginning of the season and the second one after 12 weeks of training. For each subject the critical velocity and the critical stroke rate were determined in both trials.

RESULTS

The main result was that critical velocity increased (from 1.07±0.09 to 1.10±0.10 m/s, $p<0.05$), whereas critical stroke rate decreased between the first and second trials (from 1.10±0.09 to 1.05±0.08 cycles/s, $p<0.05$).

DISCUSSION

It seems that technical ability was improved during the 12 weeks of training. The swimmers were able to perform at the same physiological intensity at higher velocities and with less stroke rate. This information could help swimming coaches monitoring their training without expensive instruments, as suggested by Renoux [3].

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