MONITORING THE ELITE SWIMMER’S PERFORMANCE AND ENERGETICAL PROFILE THROUGHOUT A TRAINING SEASON

SCIENTIFIC PROBLEM: The evaluation of seasonal performance and energetical adaptations are probably the most critical element of testing for the coach and athlete. The ability to monitor changes within a season provides fundamental information on the response of swimmers to their training periodization. Since performance depends on energetical profile, there are several factors that can provide an important feedback on training progress and in competition conditions. Adaptations to swim training are determined by the form of the training stimulus. The training volume, intensity and frequency are in constant change as the competitive season goes by.

EARLIER FINDINGS: Few longitudinal studies were conducted regarding the adaptations on national and/or international level swimmers throughout a conventional training periodization. Training induced slight increases in swimming speed at sub-maximal blood lactate concentrations over the season, whereas the performance remained unchanged during such period (Pyne et al., 2001; Costa et al., 2011).

HYPOTHESIS: It was hypothesized a slight changes, elite swimmers demonstrate high stability in their performances and energetical profile throughout one single season. Further research should focus on analyzing individual trends in order to facilitate the adequate training prescription for new adaptations.

SUBJECTS: Nine elite male swimmers (2143±30 years of age; 1.80±0.06 m of body height; 74.49±6.74 kg of body mass) volunteered to serve as subjects.

STUDY DESIGN: Swimmers completed a full training preparation (Figure 1) during the 2010-2011 season. They were evaluated in three different time periods: December (TP1), March (TP2) and July (TP3). At the end of each time period an incremental set of 7x200 m Front Crawl was performed on a long course pool, applied to collect blood samples and oxygen uptake data for further energetical analysis. Measurements were made of velocity at the 4-mmol of lactate concentration (La4, v) and the lactate threshold in world ranked international level swimmers. Can J Appl Physiol 2004; 29(Suppl 1): S27-S28.

DATA COLLECTION: The V4 was obtained by linear interpolation considering the lactate values measured immediately before and after of the 4 mmol.L-1 reference. The TP1 was estimated using the backward extrapolation of the O2 recovery curve (Laffite et al., 2004). The TP4 was calculated in the last 200 m trial based on its metabolic elements in terms of aerobic (Aer) and anaerobic (AnS) contributions:

\[ F_{\text{tot}} = \text{Aer} + \text{AnS} \]

The \( F_{\text{tot}} \) was calculated as the ratio between \( E_{\text{tot}} \) and the average velocity. The \( F_{\text{tot}} \) was obtained according with the equation (Zamparo et al., 2005):

\[ \eta = \frac{1}{2} \pi \cdot \frac{v}{4} \cdot \frac{\text{SF}}{1} \]

\[ \text{TP1} = 1 \]
\[ \text{TP2} = 0.89 \]
\[ \text{TP3} = 0.73 \]
\[ \text{TP4} = 0.68 \]

\[ \text{TP1} = 1 \]
\[ \text{TP2} = 0.63 \]
\[ \text{TP3} = 0.67 \]
\[ \text{TP4} = 0.60 \]

\[ \text{TP1} = 1 \]
\[ \text{TP2} = 0.40 \]
\[ \text{TP3} = 0.55 \]
\[ \text{TP4} = 0.60 \]

RESULTS

CONCLUSIONS

It can be concluded that, despite slight changes, elite swimmers demonstrate high stability in their performances and energetical profile throughout one single season. Further research should focus on analyzing individual trends in order to facilitate the adequate training prescription for new adaptations.

REFERENCES


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