競泳競技のインターバルトレーニングにおける運動強度とその実施順序の違いが生理的応答に及ぼす影響に関する事例研究

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キーワード: 水泳, 酸素摂取量, 心拍数, 血中乳酸濃度, 高強度

【要 約】

本研究では, 水泳のインターバルトレーニングにおける運動強度とその実施順序の違いが泳者の生理的応答に及ぼす影響について調査し, 競泳競技の選手やコーチがインターバルトレーニングを実施する際の実践的な活用方法の提言を目的とした. 実験は, 大学生男子競泳選手 4 名を対象に, 実験用回流水槽にてクロール泳で実施した. 実験に先立ち, 最大酸素摂取量($\dot{V}O_2max$)計測を行い, 各対象者における $\dot{V}O_2max$ 出現時の泳速度の 100%($v100\%\dot{V}O_2max$), 90%($v90\%\dot{V}O_2max$), 80%($v80\%\dot{V}O_2max$)の 3 つの泳速度を設定した. さらに, 3 つの泳速度を組み合わせることで, 以下の 3 条件を設けた. ①$v90\%\dot{V}O_2max$ の後に $v90\%\dot{V}O_2max$(90-90 条件), ②$v100\%\dot{V}O_2max$ の後に $v80\%\dot{V}O_2max$(100-80 条件), ③$v80\%\dot{V}O_2max$ の後に $v100\%\dot{V}O_2max$(80-100 条件). 実験中の泳速度は回流水槽の流速を変化させることで調整し, 強度によって泳時間と休息時間を増減させる実験プロトコルを採用した. その結果, 全ての対象者の酸素摂取量と心拍数の平均値が 100-80 条件で最も高い値を示した. 血中乳酸濃度は 80-100 条件で最も高い値を示され, 90-90 条件で最も低い値が示された. 以上のことから, 競泳でインターバルトレーニングを行う際に, 運動強度とその実施順序の違いが有酸素性及び無酸素性の代謝に影響を与える可能性が示唆された.

スポーツパフォーマンス研究, 13, 462-471, 2021 年, 受付日: 2021 年 4 月 24 日, 受理日: 2021 年 7 月 15 日

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A case study of the effect of interval swimming training intensity and its sequence on physiological responses

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Key words: swimming, oxygen uptake, heart rate, blood lactate concentration, high intensity

【Abstract】

The purpose of this study was to examine the effect of exercise intensity and its sequence on physiological responses during interval swimming training and to suggest practical interval training methods for swimmers and coaches. Four male college swimmers participated and swam front crawl swimming in a swimming flume. For each swimmer, the maximal oxygen uptake ($\dot{V}O_2max$) measurements were conducted prior to the experiment, and three swimming speeds were obtained, which were 100% (υ100%$\dot{V}O_2max$), 90% (υ90%$\dot{V}O_2max$), and 80% (υ80%$\dot{V}O_2max$) of the swimming speed at which $\dot{V}O_2max$ was observed. By combining those three swimming speeds, the following three conditions were established: a) υ90%$\dot{V}O_2max$ followed by υ90%$\dot{V}O_2max$ (90-90 trial), b) υ100%$\dot{V}O_2max$ followed by υ80%$\dot{V}O_2max$ (100-80 trial), and c) υ80%$\dot{V}O_2max$ followed by 100%$\dot{V}O_2max$ (80-100 trial). The swimming speed was controlled by changing the flow speed in the flume, and the exercise duration and rest interval were adjusted depending on the combination of the intensities. For all swimmers, the highest averaged oxygen uptake and heart rate were observed in 100-80 trial. The swimmers' blood lactate concentration was highest in 80-100 trial and lowest in 90-90 trial. These results suggested that differences in exercise intensity and its sequence during interval swimming training could affect aerobic and anaerobic metabolism.