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Differences in neuromuscular fatigue after aerobic and anaerobic running loads

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The aim of the research was to establish some characteristics and differences in neuromuscular fatigue after different running loads. Seven well-trained runners performed two running tasks: an interval run of 5 x 300 m at sub-maximum speed with a one-min rest (100 m jogging) between individual runs, and a continuous 6-km run at the anaerobic threshold speed (criterion VOBLA). To measure the contractile characteristics of the femoris muscle quadriceps before and after a running load the following electrical stimulation (ES) tests were used: single twitch, low - and high-frequency stimulation, the maximum voluntary knee extension test and the muscle activation level test. The anaerobic interval runs caused a greater decline in maximum torque twitch ($p < 0.05$) and a greater decline in maximum muscular relaxation rate ($p < 0.05$) compared to the longer continuous run. The anaerobic interval load reduced muscle contraction at both low and high frequencies of ES, while the aerobic continuous run led to a lowering of muscle contraction force but only at low frequencies of stimulation. After both charges the decrease in ES-evoked muscle contraction was bigger than the decrease in torque at MVC. Both running loads caused peripheral fatigue. The lowering of muscular contractile ability after both loads was mainly the consequence of disturbance in the Ca transport system mechanism, while after the intensive interval runs this was also a result of disturbance in the spreading action potential across the sarcomere.

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