INDIVIDUALITIES IN GAS-EXCHANGE AND CARDIORESPIRATORY RESPONSES AT EXERCISE ONSET RELATED TO ATHLETES’ SPECIAL WORKING CAPACITY

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Primary kinetics of oxygen uptake for relatively short-term high intensity load influences on endurance capacity (1). Such effects were more pronounced for maximal workload duration about 1 to 6 min (2). Cardiorespiratory (CRS) response delay at the onset of high-work intensity exercise was related to a lot of the factors (3). The suggestion was that individualities primary CRS and gas-exchange responses related to athletes special working capacity. The purpose of the study was to determine the range of individual differences in the primary CRS and gas-exchange responses kinetics in homogeneous group of high performance athletes and its relation to special working capacity.

In 12 elite cyclists (pursuit and 1 km races) aged 21-26 «time constant» (T63) was determined under standard load (at specific ergometers: Spin Trainer – Technogym) 65% of Vo2 max at constant speed of race – cyclists – 100 revolution per min, rowers – 32 strokes per min). Half-time of response – T50 (all-out type test – 60s, 115% Vo2 max ) for simulated competitive loads 4min – track pursuit 4 km) for Vo2, Vco2, VE in a mode breath by breath and HR were determined during 8 weeks of precompetitive period of training .

Athletes of group has been selected according to similarity in Vo2 max (71,0-73,1 mlkg-1min-1) and (MAOD 115% Vo2 max – 49,0-54,1 mlkg-1). Linear monoexponential function were applied.

The results showed high range of individualities in primary CRS and gas-exchange responses kinetics. At 115% Vo2 max mean, SD and max-min T50 for Vo2, VE, Vco2 and ?R in cyclists were, respectively: 22,8?1,8 (16,2-34,6)s, 33,2?3,0 (25,6-50,3)s, 32,0?2,9 (24,1-49,2)s and 14,3?1,2 (12,5-23,2)s. Three measurements of individual differences of «time constant» and T50 during 8 weeks of precompetitive period of training showed the stable hyper- and hypokinetic types of CRS responses. The negative interrelation of T50 for Vo2, VE, with distribution of workload capacity in primary (60s) and other part of 4 min work-out exercise test were observed (r=-0.59 and 0.62 at p<0.05). The individual character of T50 for Vo2, VE, Vco2 and ?R was maintained at various exercise tests and at repeated measurements in the large cycles of training. The changes T50 Vco2 and VE for 8 weeks of precompetitive period of training were in negative relation ( r=-0.51 and –0.49) to MAOD.

The conclusion was that wide range of individual differences in the primary CRS and gas-exchange responses kinetics were existed in homogeneous group of high performance athletes. Primary CRS and gas-exchange responses at high intensity load were related to athletes spe-