

SPECIFIC CHARACTERISTICS OF PHYSICAL FITNESS AT WORK ANAEROBIC ENDURANCE TYPE OF ROWERS IN CANOE

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Annotation. *Purpose:* to determine the effect of the reactive properties cardiorespiratory system to a special performance by canoe paddlers who specialize in the 200 m. *Material:* The study involved 22 paddler aged 18 - 29 years. *Results:* there were significant indicators of the reaction due to pulmonary performance and efficiency of anaerobic metabolism. The range of correlation coefficients (r) was $-0.54 - 0.77$ ($T_{50} V_E$) and $0,55-0,71$ (V_E). *Conclusions:* It was found that the optimization of the reactive properties of the cardiorespiratory system to realize the potential impact endurance rowers when using anaerobic nature. The greatest number of significant connections were indicators of efficiency and response of pulmonary ventilation. This allowed the evaluation of the functional improve information security work and increase specialized training sessions focus in the development of anaerobic endurance while working character in canoeing.

Keywords: canoe, sprint, endurance, anaerobic capacity, cardiorespiratory system.

Introduction

Introduction of new competition program – 200 meter canoe rowing- in pre-Olympic training puts forward new requirements to level of functional provisioning of rowers' special endurance. It is well known that dominating abilities for this distance are sprinter skills and strength of rowers [1,2]. Time of competition distance's passing by highly qualified rowers is about 40 seconds. High rate of rowing, which it is necessary to maintain during all period of distance causes significant tension of organism's functions and puts increased requirements to realization of anaerobic mechanism [8]. In this connection orientation of training process is connected with application of training loads, ensuring the fullest mobilization of anaerobic alactate and lactate responses of energy supply [15]. To realization of this direction recent works have been devoted [6,13,14].

Alongside with it, it was shown that identical programs of trainings caused different energy supply responses and, as a result, differences in effectiveness of training process [9]. There appeared an idea that in process of training, oriented on development of rowers' functional potentials, specific features of organism acquire special importance, features, which influence on realization of accumulated potential [3,7].

In special literature on cyclic kinds of sports, devoted to rowing in particular, it was elucidated that problems of realization of potential in process of training and competition functioning depend to large extent on organism's individual responsiveness of sportsman [4,9]. At the same time it was shown that optimization of physiological responsiveness, considering specific requirements of special endurance, depends on system of training influences, which include modes of work, stimulating responsive of organism [5,11]. Especially important is the fact that optimization of responsive features of sportsmen's organisms influences on increasing of degree of mobilization and, as a result, realization of anaerobic glycolytic energy supply in process of competition functioning [6].

Researches in this direction (canoe rowing) are paid insignificant attention to. Most of works are devoted to stating of the problem [1,2]. Clear methods of its solution are insufficient in special literature. It determines urgency of researches in this direction, including in the context of the present work.

Thus, it has become evident that it is necessary to conduct special analysis of workability's quantitative and qualitative indicators in their interconnection with indicators of cardio-respiratory system (CRS). It will permit to determine those sides of organism's responsive features, which influence on realization of rowers' endurance, when they fulfill anaerobic work. On this base it is possible to improve evaluation of special endurance of rowers-sprinters, to determine directions of rising of sport training's effectiveness.

Purpose,, tasks of the work, material and methods

The purpose is to determine responsive properties of cardio-respiratory system and their influence on canoe rowers' special workability, specializing in 200 meters distance.

The methodic of the research: the researches have been conducted on the base of laboratory of functional diagnostics of Ukhan institute of physical; culture. 22 rowers - winners and prize winners of China championship and Asian province Khubay participated in the research. The age of sportsmen was from 18 to 29 years old.

Indicators of rowers' workability were evaluated for 60 second of maximal test. We evaluated response of lung ventilation, O_2 consumption, speed of progressing of O_2 consumption, HBR and lung ventilation (by time of achieving of 50% of response – T_{50}) [12]. We also measured maximally accumulated O_2 deficit (MAOD) We measured in special conditions MAOD (combination of step-by-step increasing load and 60 seconds of work at level of $уровне 115\% VO_2 max$) [10].

The following research apparatus were used: research complex for metabolism's researches Oxycon Pro; sport-tester "Polar"; laboratory complex for determination of blood lactate LP 400, "Dr Lange"; rowing ergo-meter

«Paddlelite». Processing of experimental material was carried out with the help of integrated statistical and graphic packages MS Excel-7, Statistica.

Results of the research

In table 1 we have presented correlation connections of indicators of CRS response and rowers' workability. We used indicators, which, with evaluation of levels, had high model values, in compliance with requirement of functional fitness of highly qualified rowers and low level ($CV < 15\%$) of individual differences in rendered characteristics.

Table 1

Correlation connections of workability's indicators, anaerobic metabolism and cardio-respiratory system of qualified canoe rowers, specializing in 200 meters distance μ

Indicators	V_E , l.p.min ⁻¹	VO_2 , ml.p.min ⁻¹ .kg ⁻¹	$T_{50} VO_2$, sec.	$T_{50} HR$, sec.	$T_{50} V_E$, sec.
W av., БТ	0.67	0.33	-0.11	-0.49	-0.61
W av. 25-30 sec., БТ	0.71	0.21	-0.21	-0.59	-0.77
La, m.mol ⁻¹	0.55	0.22	-0.39	-0.57	-0.54
MAOD, ml.p.kg ⁻¹	0.59	0.61	-0.51	-0.51	-0.58

In the table it can be seen that the highest correlation connections of special workability's indicators and anaerobic metabolism with indicators of CRS response were registered by indicators of lung ventilation (V_E , $T_{50} VO_2$). At the same time we noted that indicators of power and kinetic of anaerobic energy supply (VO_2 , $T_{50} VO_2$) had confident connections only with indicators of maximal accumulated O_2 deficit of MAOD, which is connected with response of CRS and ensures effectiveness of anaerobic energy supply at longer segments of distance. In this connection role of energy supply from the point of view of realization of special workability at distance is rather vague. Alongside with it we should not deny role of power, kinetic and other anaerobic energy supply components in the process of training work, considering importance of aerobic metabolism for optimization of sportsmen's functional state. It is especially important in period of fulfillment of great training loads, including with training of special endurance with anaerobic work [9]. The trend to connection of speed of HBR progressing indicators is connected with high tension of organism's functions and only indirectly determines responsive potentials of rowers (aerobic metabolism or response of lung ventilation).

Significance of ventilation response was proved during analysis of response's dynamic of rowers, who had high and reduced indicators of workability in the process of testing. In fig.1 we can see dynamic of lung ventilation response (by mean indicators 10 seconds of work's segments) of three rowers, who had the highest ($W_{av.} = 247.3 \pm 1.1$) and the lowest ($W_{av.} = 236.2 \pm 1.1$) indicators of workability in one minute maximal test.

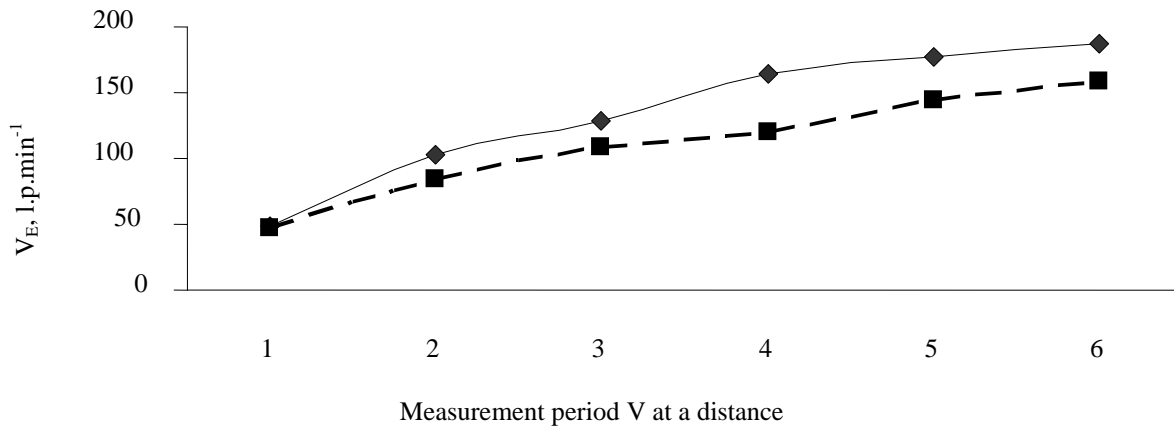


Fig.1. Dynamic of lung ventilation's response in process of 1 min. Test with work of maximal intensity (average indicators of three rowers, who had the highest (continuous line) and the lowest (dotted line) indicators of workability:

1,2... 6 – average indicators V_E : in measurement period: 1–10, 11–20, 21–30, 31–40, 41–50, 50–60 seconds of work

In the figure one can clearly see difference between responses of lung ventilation in period of test work's fulfillment. Rowers with highest level of workability showed increased level of lung ventilation response at all distance. Also attracts attention the fact that start point of non-linear deviation of response is characteristic for forth 10 seconds segment in 30-40 seconds work. It is connected with organism's response to maximization of anaerobic glycolytic energy supply, increasing of speed of accumulation of excessive CO_2 in period from 25 to 30 seconds of work [8]; in special literature this property is related to one of effective criteria of compensation, increasing of academic shifts and manifestation of organism's responsive properties in conditions of tensed physical loads, including loads during work for endurance of anaerobic character [1,6]. It is necessary to note that rowers, who had increased level of responsiveness of CRS we registered higher rate of restoration responses (by HR up to 120 b.p.m⁻¹). HBR indicators of both groups' rowers were accordingly within 70–90 seconds and 80–140 seconds.

The supplied data witness about significance of organism's responsive potentials for realization of sportsman's potential in conditions of anaerobic training loads, including with progressing of specific endurance's manifestations in sprinter disciplines in cyclic kinds of sports. It implies not only formation of appropriate evaluation system of rowers' special fitness, but also development and foundation of means of practical realization of specialized training means, oriented on increasing CRS's responsive properties, considering targeted influence on increasing of lung ventilation response.

Realization of such direction of researches seems to be a perspective one in system of special fitness improvement of canoe rowers, specialized in 200 meters distance.

Conclusions:

1. It has been established that there is influence of CRS's responsive properties on canoe rowers' workability in the process of improvement of anaerobic endurance.
2. We determined confident connections of indicators of lung ventilation with indicators of workability and anaerobic metabolism. The range of correlation coefficients (r) was $-0.54 - -0.77$ ($T_{50} V_E$) and $0.55 - 0.71$ (V_E). Rowers, who had increased level of response during 60 seconds fulfillment of maximal test task at ergo-meter «Paddlelite» had higher level of workability.
3. We determined pre-conditions for foundation of training means, oriented on stimulation of CRS's responsive properties and their implementation in training process of sprinter canoe rowers.

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