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SPECIAL-PREPARATORY MEANS OF FORCE DIRECTION IN THE TRAINING OF THE ROWERS AT THE GENERAL PREPARATION STAGE AT DEVELOPMENT OF SPECIAL ENDURANCE

***Berzan Serghei*[1],**
***Poburnyi Pavel*[2],**
[1,2]*The State University of Physical Education and Sport, Chisinau, Republic of Moldova*

Abstract. *The possibility of power and speed means with the structural similarity to canoeing with the development of local muscular stamina (LMS) at the general preparatory stage of the preparatory period of annual cycle of training had been methodically developed and scientifically substantiated.*
Keywords: *power and speed-power abilities, local muscular stamina, conjugation, the intensity of blood circulation, economization.*

Actuality. The current level of development of world rowing requires from athletes to develop a high degree of basic physical, special, technical and tactical, mental qualities and their ability to integrate effectively in competitive activities. The competitive activity of paddlers is carried out in rather rigid space-time and dynamic conditions with a high level of programmed as the structure of separate cycles of paddles, and their connection in integral motor acts with stable strong-willed tension for preservation of the optimum developed efforts to oar blades in the conditions of the increasing exhaustion at conditional body contact. The hydrodynamics of a canoe or a kayak will involve an analysis of how the shape of the hull (body of the boat) is impacted as it moves through or over the water [3, 6, 11].

Purpose of the study. Scientifically and methodically to prove the possibility of application of special and preparatory means of power orientation at development of special endurance in rowers at all-preparatory stage of training [3, 6,9].

Research methods. In the conditions of the natural forming pedagogical experiment we made pedagogical observations and complex testing of physical and functional preparedness of organism of oarsmen with high qualification for canoe (12 people), with application of a set of research methods widely used in physical education and sport [3, 4, 6, 7, 12].

Results of research and their discussion. In rowing, the competitive activity of paddlers is carried out in rather rigid space-time and dynamic conditions with a high level of programmed as the structure of separate cycles of paddles, and their connection in integral motor acts with stable strong-willed tension for preservation of the optimum developed efforts to oar blades in the conditions of the increasing exhaustion at conditional body contact and respectively boat course speed [3, 6].

It is known that increase in power component of special endurance is connected by growth in the contractile properties of the neuromuscular device. It leads to increasing of working effort, formation of rational phase structure of movements, to optimum ratio of rhythm and tempo parameters of working activity, which promote to increase in length of hire of the boat in cycles of paddles [3, 6]. Therefore, it leads to increase in average distance speed of movement [10].

Besides, for skeletal muscles, the adaptive inertia is more typical for vegetative systems and in order to develop the working groups of muscles, it is necessary to perform a volume ineffective operation at rowing in boats. This often leads to depletion of the adaptive reserve of vegetative systems, rather than to an increase in local muscular endurance [9].

For elimination of discrepancy between the functional capabilities of vegetative systems and the neuromuscular device, which determine lo-

cal muscular endurance, it is expedient in the preparatory period to intensify the regime of the main working muscular groups, bearing the main loading in rowing by means of specialized power, high-speed and power means with the maximum conjugation [2, 6, 9].

Winter due to the lack of open water and weather conditions we pay much attention to overall physical preparation which is aimed at the development of physical qualities, to eliminate shortcomings of physical development with passing strengthening of health. However, the influence of overall physical preparation on growth of sports results is ambiguous at stages of initial and preliminary basic preparation and according to V.N. Platonov (1988) carries more positive impact, and with growth of sports skill its influence decreases, up to negative [9].

We use the specialized rowing exercise machine for fuller compliance of power impact on the muscular groups involved in work in the preparatory period of training in national team of Moldova. It allows to carry out "dry rowing" at the maximum conjugation, i.e. compliance of indicators of the technique of rowing in natural conditions (in a boat) and on the rowing exercise machine.

According to the above mentioned at all-preparatory stage (5 months) we used concentrated and unidirectional exercises in combination with a complex form of means of power preparation. They were carried out both in separate occupations, and in micro and mesocycles which was a powerful stimulus for the growth of local muscular endurance. Kinematic and dynamic parameters of the technique of rowing in a canoe single in natural conditions are presented in table 1 and during the work on the specialized isokinetic rowing exercise machine with the maximum conjugation and reaction of cardiovascular system to active muscular work.

We have defined that at rowing in boats the parameters of working activity in conditions of growing fatigue from start to finish are more pronounced their decrease, than during the work on the specialized rowing exercise machine which allows to develop and steadily to support the developed efforts to "oar blades" with excess in comparison with rowing in natural conditions.

Table 1. The comparative characteristic of parameters of working activity in rowing in a single boat and during the work on the specialized rowing exercise machine

Loading periods	Parameters of the paddles				
	Fmax, kg	Fmoder, kg	I, impulse of force, kg/s	t cycle,s	Heart rate, beat/min
rowing in a single boat (2 min)					
start	21,3±4,8	15,1±3,6	15,9±5,1	1,05±0,3	96±8,3
250 m	17,5±3,6	13,4±3,2	14,5±4,5	1,08±0,4	-
500m(finish)	14,7±3,1	12,1±3,0	12,9±3,8	1,07±0,3	178±10,5
the work on the specialized rowing exercise machine (2min)					
Start	28,2±6,3	18,8±4,8	19,9±5,2	1,06±0,2	96±8,3
In 1 min.	25,4±5,6	16,5±4,1	17,8±4,8	1,08±0,3	-
In 2 min.-finish	26,7±5,1	17,4±4,6	18,6±4,9	1,07±0,3	185±12,3

Based on the capabilities of the specialized exercise machine (simulation of rowing in natural conditions), in lessons of selective form for the development of local muscular endurance of high-strength orientation, the loading was set in the mode of passing of 200-meter sprint competitive distance (40s). In these conditions the maximum efforts reached 30-35 kg, average 20-23 kg, impulse of force as ability to transfer the movement to other bodies reached on average 21.5 - 24.6 kg/s that considerably exceeds at rowing in natural conditions.

At development of local muscular endurance for passing 1000 meter distances (4 min) with primary manifestation of endurance by the contrast method carried out loading on the rowing exercise machine 3-4 approaches with the magnitude of the developed effort 75-80% from maximum in comparison from high-speed and power orientation with alternation of running loading 2-3 races for 4 minutes in the heart rate of 160-165 beats/min, for the purpose of increase in functionality of organism of oarsmen.

We also considered that when performing

exercises of power orientation, as a rule, the big muscular groups get the first into gear, leaving small muscular groups out of training influence. They compensate their inaction that in extreme conditions of competitive activity does not allow to mobilize all complex of the neuromuscular device and impossibility of achievement of the programmed result.

The rowers performed isometric work in the main working position while performing the "stroke" on the rowing machine for eliminate compensatory manifestations and mobilize small muscle groups as additional means of nurturing local muscular endurance. Thus, small muscle groups were activated, which affected the substantial increase and stability of the developed forces on the paddle blades in the testing load conditions.

Table 2 presents the component data reflecting the magnitude of the developing forces on the paddle blade in isometric mode.

Table 2. The results of the maximum efforts achieved by rowers in the working period in isometric mode

The phases of the stroke	Beginning of the stroke	Mid-stroke	End of the stroke
Efforts in kg on the paddle blade	45,0-40,0	40,3-39,0	28,2-27,1

In addition, we took into account the laws of functional specialization of the organism in rowing by canoe and evaluated the hemodynamic factor in the development of local muscular endurance. We determined that if the level of overall physical performance in terms of PWC170 and maximum oxygen consumption in the indicated training period increased by an average of 8.0 and 1.5%, respectively, then the regional blood flow response changes more significantly. In the upper muscles and working limbs, the intensity of the blood flow increased by 66.7%, simultaneously it decreases in the non-working lower limbs, by 33.4%, in the static state (Table 3).

Table 3. Dynamics of the parameters of functional readiness of highly qualified rowers

Stages of preparation	Parameters of functional readiness			
	PWC170, Kgm/min	MOC, l/min	Intensity of blood flow in the upper limbs	Intensity of blood flow in the lower limbs
Beginning of the general preparatory stage	1370±56	4,06±0,5	1,5±0,7	1,2±0,4
The end of the general preparatory stage (in 5 months)	1450±45	4,12±0,5	2,5±0,3	0,8±0,3

The results of the study confirm that the effect of training is not to increase PWC170 and maximum oxygen consumption, but to improve the hemodynamic functions of oxygen transport.

Consequently, with an increase in the strength of the neuromuscular apparatus, the redistribution of blood flow and the improvement of local vascular responses is an important factor in the development of local muscular endurance (8,1), which develops in conditions of motor-visceral reflexes.

Conclusion.

1. The important role at development of local muscular endurance belongs to functional readiness which is expressed in the adequate growth of indicators of physical working capacity, the maximum consumption of oxygen, volume of heart and systolic volume of blood at simultaneous rational redistribution of regional blood flow.

Redistribution of blood flow is characterized by significant increase in actively working muscular groups with simultaneous decrease in inactive muscular groups, thereby promotes significant increase in special efficiency of rowers.

2. Analysis of scientific and methodological materials and own data showed that at the present stage the development of special endurance in rowing sports experts see the main reserves of increasing the efficiency of training and further growth of sports results in increasing the power and speed-strength abilities of athletes.

Increasing the strength component of special endurance associated with the growth of the contractile properties of the muscular apparatus, which leads to an increase in the power of the working force, the formation of a rational stroke structure, to the optimum ratio of the length of the boat rental and the rate of rowing. Therefore, to increase the average distance speed of the boat.

3. For development of local (power) muscular endurance in rowing the most effective special and preparatory isokinetic exercises in couple and on specialized simulators. Isokinetic loadings are carried out with the maximum dynamic compliance to the chosen type of rowing, with constant speed and the set efforts on all range of stroke.

For more effective power filling of movement skill of rowing it is recommended to use isokinetic, spring and lever, and block exercise machines in complex with auxiliary exercises.

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