

# ORGANIZATIONAL-METHODOLOGICAL ASPECTS OF CONSTRUCTING THE PRE-COMPETITION TRAINING OF MANY- OARED ROWING CREWS (BY THE EXAMPLE OF DRAGON BOAT CREWS)

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**Abstract:** *The research topicality is due to the fact that the theory and methodology of the rowing sport has insufficiently studied the issue of warm-up organization as a factor regulating the pre-start state of an athlete. The existing recommendations are rather specific and cannot offer a comprehensive approach to the problem solution. The lack of data referring to preparing the dragon boat crews for important competitions determines the topicality of such research, their novelty and significance. The rationally designed pre-start preparation provides the high efficiency of the crew, increases the probability of winning, while the mistakes made at this stage may, on the contrary, undo the preceding training. Thus, the paper is devoted to the issue of optimizing the pre-start preparation of dragon boat crews. The authors propose the methodological approach based on using the consequential complexes of training programs for rowers. The article presents the complexes implying specialized motion activities with regulated space-time and space-dynamic parameters. The efficiency of the pre-start preparation (PSP) program is confirmed by the reliable differences in indicators of rowing obtained during competitions of highly qualified athletes at 500- and 1000-meters races.*

**Keywords:** *dragon boat, rowing crew, pre-start preparation, training load, planning, sports results.*

## INTRODUCTION

As the number of sports competitions increases, athletes try to take part in many of them. The prolongation of a competing season, on the one hand, and the necessity to maintain and develop one's competition form, on the other hand, result in sophisticated structure of an athlete's competitive period. Today it includes the stages of pre-start preparation for the main competitions, aimed at successful adaptation for the coming competitions, and the active improvement of the athlete's qualities and skills. Practically, organization of these stages presents duplication, in a brief form, of the preparation period, or a combination of specific and non-specific training exercises according to various patterns on a "swinging" principle [3, 5]. In the latter case, the organization of pre-start preparation depends on the kind of sport and the level of the athletes' preparation.

In team sports, the requirements to the pre-start preparation are complicated by the necessity to involve the collective of athletes into the training process; for instance, the dragon boat crew consists of 20 rowers. The rationally organized pre-start preparation provides high efficiency of the crew, increases the probability of winning, while the mistakes made at this stage may, on the contrary, undo the preceding training. The theory and methodology of the rowing sport has insufficiently studied the issue of warm-up organization as a factor regulating the pre-start state of an athlete. The existing recommendations are rather specific and cannot offer a comprehensive approach to the problem solution. The lack of data referring to preparing the dragon boat crews for important competitions determines the topicality of such research, their novelty and significance. Today, introduction of new methods of sports training leads to unification of complex of physical training and to achieving the approximately equal of preparedness. During the immediate preparation for competitions, the insufficient optimization of the training regime increases the probability of reduced sports result [6]. One of the conditions providing the high sports results of the rowers is the optimal distribution of the training load by micro-cycles at the terminal stage of preparation [4]. It is very important to optimize the planning of this stage and the selection of means to enhance the rowers' preparedness without significant increase of the volume and intensity of training. In the rowing sport, there are several variants of distributing the load at the terminal stage of preparation before competitions [21, 24]. The analysis of dynamics of the training load and the rowers' functional state at pre-start stages, the character of their achieving the peak of competition form, prove that the most optimal is a three-week pattern consisting of three micro-cycles. These data were also confirmed by the poll of 20 trainers, carried out in the course of the present research. Unfortunately, this pattern of pre-start preparation cannot always be implemented, as the majority of dragon boat rowers also participate in other kinds of rowing sports (canoeing and kayak-paddling), as well as due to financial difficulties related to organizing the training session of large crews (up to 26 athletes) at modern rowing training centers. Hence, we elaborated the mode of efficient pre-start preparation organized as two micro-cycles. We have not found any similar patterns in the available scientific-methodological literature on cyclic sports. Only one of the fundamental works, devoted to the theory of sports and its practical application, mentions the practice of two-week pattern of preparation for major competitions, when training sessions are organized as pre-start meso-cycles [8, 12]. As we have not found any detailed explanations of the content of this training pattern, we have to follow the general recommendations of L. P. Matveev (1977), who wrote that it is most expedient to try all existing patterns without violating the rules of optimal preparation of athletes for major competitions, and to determine the conditions under which a particular pattern is most efficient [9, 10].

## METHODS

In the course of research, we applied: the analysis of information sources, pedagogical experiment implying video analysis and time study, and the methods of mathematical statistics for data processing. The experimental group consisted of rowers (n=20), 24.6 y.o. on average, with the sports qualification not less than master of sports. During the experimental year cycle, the crew performed средний возраст которых составлял pre-start preparation to three major competitions of a season according to the

training program with two micro-cycles. The rowers arrived to the geographical zones of competitions, differing from the pre-start sessions, 5–6 prior to the competitions, which corresponds to the established recommendations [7, 11]. To confirm the high efficiency of the proposed pattern of pre-start preparation, we performed a comparative analysis of the indicators of training and competitive activity, as well as of the results of testing the cardiovascular system during the experimental season and the same indicators obtained during the previous season, when pre-start training was performed according to the traditional pattern.

## RESULTS

We proceeded from the assumption that the immediate pre-start preparation of highly-qualified dragon boat rowers to the major competitions of a sports season will be the most efficient if its duration is two micro-cycles, while the methodological approach is based on consequential implementation of programs including specialized training activities with regulated space-time and space-dynamic parameters (exercises with increasing and decreasing resistance of aquatic environment). Various specialized exercises, voluminous and intensive training load, rational programming of the training process by periods and stages of preparation are necessary conditions for implementing the functional reserves of the athlete's body [25]. To enhance these means, it is expedient to systemically combine and contrast them, providing the additional stimulation of the functional reserves of the body and leading to the maximal mobilization of energy metabolism and, consequently, to the growth of sports results. Basing on the testing, polling, analysis of the trainers' working documentation on the training planning, and the athletes' journals, we determined the organizational-content features of the traditional three-cycle pattern of rowers' preparation for the major competitions of a season; we disclosed the dynamics of their morphological-functional indicators and the space-time parameters of motion activity. Guided by the obtained data, we substantiated the content of the pattern of terminal preparation for the competitions, consisting of two week-long micro-cycles, as it better complies with the features of training of dragon boat crews. The first micro-cycle was "intensified", 7 days long. In compliance with the average data of the three micro-cycles of this type, implemented within three competitions of the experimental period, the total duration of training was 15 hours and the total rowing distance – 108.3 km, including 40.7 km of high-speed load. In the sports practice, the "intensified" micro-cycles are used if the time for preparation to a certain competition is limited, and an athlete must quickly reach a certain level of adaptation. The intensifying element can be the load volume or intensity, the concentration of technically and psychologically more complicated exercises, or the experimental conditions of the environment. The second micro-cycle, also 7 days long, was "lead-in". The total duration of training reduced to 12 hours and the total rowing distance was 94.3 km on average, including 30.3 km of high-speed load. The content of the "lead-in" micro-cycles depends on the system of the athlete's preparation for the particular competitions at which these micro-cycles are aimed. The load in such micro-cycles is reduced, but in highly-intensive loads the intense high-speed regimes prevail. In compliance with a non-standard approach to a training session structure, theoretically substantiated by Professor I. P. Ratov (1982, 1983) and later efficiently used by his disciples (A. N. Maystruk, 1983; V. G. Tyutyukov, 1985; G. I. Popov, 1992), into the content of the intensified micro-cycle we

included speed training, which ensures achieving the rhythmic-speed parameters of activity exceeding the competition indicators [13, 14, 15, 18]. In the next, lead-in, micro-cycle, the conditions were created for “filling” the formed high-speed motion structure with power content. The biochemical and morphological specificity of the effect of power exercise is that, if they are not accompanied with sufficient power parameters, then the generating of myo-stromines is decreased which provide the durability and elasticity of the myocyte carcass, as well as other substrates ensuring the high performance of the muscle system [1, 2]. This is why the first, intensified, micro-cycle includes rowing with facilitating leading, and the second micro-cycle includes rowing with weight (by numbers) and rowing with hydraulic brake, when the speed reduction was not to exceed 3.0–5.0%. This corresponds very well with the data of L. P. Matveev (1999) on the criteria of progress and stability of competition form [9, 10]. Using the facilitating leading (towing) in rowers’ preparation provides the dominating impact on improving the torso performance and the characteristics of water “grip”, increasing the use of inertial force [16, 19]. Using the external hydraulic brake on the boat hinders its float up to its complete elimination; the dynamic accent of a stroke shifts towards the grip. On short sections of outburst character (up to 50 meters), the hydraulic brake ensures the increase of the maximal exertion on a paddle, preserving the duration of a rowing cycle. On long sections (over 300 meters), the exertion does not exceed that at competitions, but the duration of a stroke increases, which facilitates solving number of technical problems under significant power load [17]. We applied rowing by numbers (by 4, 6 and 10 rowers, by even and uneven pairs) for purposeful power impact onto the working muscle groups in all phases of a rowing cycle. This effect can be achieved both by increasing the time of retaining an oar blade in water, and by increasing the impulse [20]. The data reflecting the efficiency of the experimental pattern of pre-start training programs consisting of two micro-cycles are presented in Table 1.

Table 1. Dynamics of the indicators of physical state and motion activity of highly qualified dragon boat rowers during the experiment compared to the data of the previous season (%)

No.	Indicators	I stage of PSP		II stage of PSP		III stage of PSP	
		%	p	%	p	%	P
Functional							
1	Heart rate (HR) at rest (bpm)	0.73	>0.05	2.69	<0.001	- 0.90	>0.05
2	Systolic pressure (mm Hg)	1.02	>0.05	1.46	>0.05	2.08	>0.05
3	Diastolic pressure (mm Hg)	2.35	>0.05	2.50	>0.05	1.58	>0.05
Tempo							
4	Average tempo of rowing at the distance of 500 m	1.02	>0.05	0.86	>0.05	6.41	<0.001
5	Average tempo of rowing at the distance of 1000 m	3.21	<0.05	1.34	>0.05	0	>0.05
6	Tempo of rowing at the start of the distance of 500 m	6.9	<0.001	3.11	<0.05	0.23	>0.05
7	Tempo of rowing at the start of the distance of 1000 m	11.6	<0.001	7.16	<0.001	7.65	<0.001

8	Tempo of rowing in the middle of the distance of 500 m	-0.53	>0.05	3.28	<0.05	2.04	>0.05
9	Tempo of rowing in the middle of the distance of 1000 m	-0.84	>0.05	3.06	>0.05	5.71	<0.001
10	Tempo of rowing at the finish of the distance of 500 m	-1.79	>0.05	-2.66	>0.05	0.12	>0.05
11	Tempo of rowing at the finish of the distance of 1000 m	-3.06	<0.05	3.88	<0.05	3.28	>0.05
Speed							
12	Average speed of rowing at the distance of 500 m	3.20	<0.001	2.39	<0.01	5.45	<0.001
13	Average speed of rowing at the distance of 1000 m	1.50	>0.05	2.23	<0.05	7.23	>0.001
14	Speed of rowing at the start of the distance of 500 m	0.69	>0.05	3.41	<0.001	2.96	>0.001
15	Speed of rowing at the start of the distance of 1000 m	0.70	>0.05	1.86	>0.05	2.08	>0.05
16	Speed of rowing in the middle of the distance of 500 m	0.50	>0.05	0.99	>0.05	2.49	<0.001
17	Speed of rowing in the middle of the distance of 1000 m	2.58	<0.05	2.85	<0.001	0	>0.05
18	Speed of rowing at the finish of the distance of 500 m	3.30	<0.001	2.80	<0.05	4.21	<0.001
19	Speed of rowing at the finish of the distance of 500 m	2.67	<0.05	3.61	<0.001	4.29	<0.001
Calculated							
20	Index of special endurance	-0.90	>0.05	1.77	> 0.05	- 1.56	>0.05
21	Float value at the distance of 500 m	-2.15	>0.05	-8.44	<0.001	3.37	<0.05
22	Float value at the distance of 1000 m	28.60	<0.001	17.56	<0.001	0.58	>0.05
23	Technical skill coefficient 500 m	4.44	<0.05	8.22	<0.001	3.10	<0.001
24	Technical skill coefficient 1000 m	-23.46	<0.001	15.22	<0.001	- 4.25	<0.001

The presented indicators show that the functional state of the rowers did not change significantly after different patterns of pre-start preparation consisting of three or two micro-cycles. The experimental pattern showed only the reliable increase of heart rate (HR) at rest by 2.7% during preparation for the second major competition (II stage of PSP). This was probably due to a certain disruption of the adaptive capabilities of the rowers.

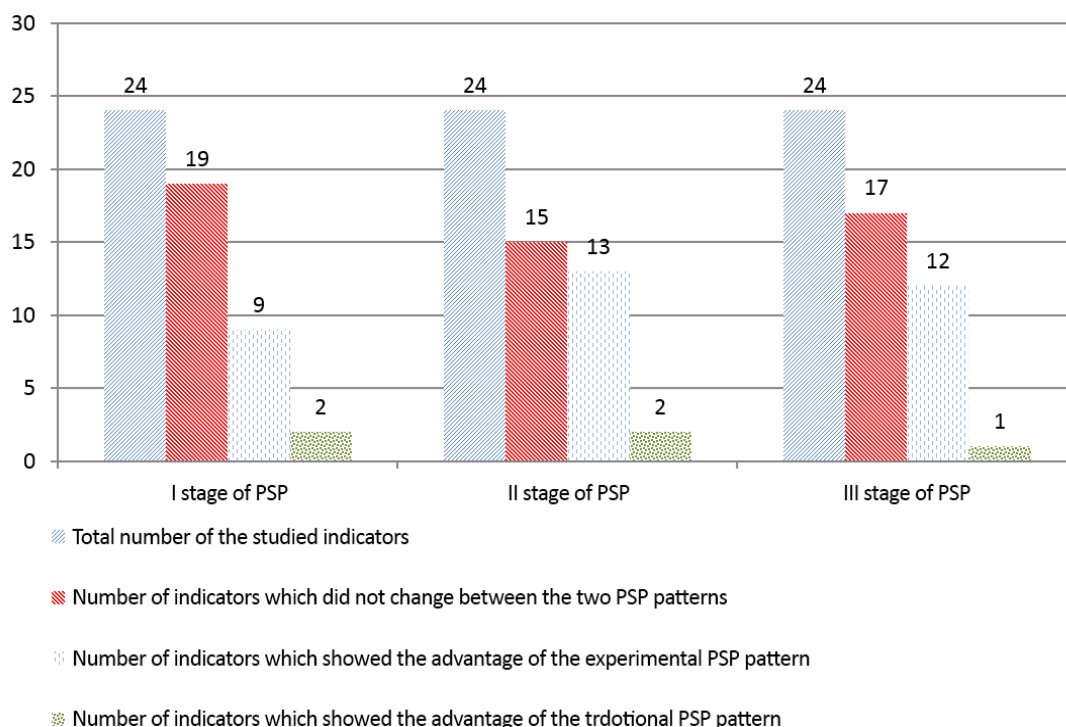


Fig. 1. Comparative analysis of the efficiency of the traditional and experimental PSP patterns

Reliable positive dynamics of 41.6% of tempo indicators was observed. Among the speed characteristics, 70.8% showed reliably significant positive dynamics within the experimental year cycle. It was found that, among the calculated characteristics, 73.3% indicators changed under the experimental PSP pattern, and 60.0% of these changes were positive. The results of comparative analysis of the studied indicators are shown on the diagram, by the stages of preparation for three major competitions in experimental and previous seasons (Fig. 1).

Table 2. Comparative analysis of the efficiency of training and competition activity of dragon boat rowers during the pedagogical experiment

Pattern	Distance (m)	Compared stages of PSP								
		I-II			II-III			I-III		
	Difference of results (sec)	t	P	Difference of results (sec)	t	P	Difference of results (sec)	t	P	
Traditional	500	2.9	2.96	<0.05	0.2	0.21	>0.05	2.7	2.5	<0,05
	1000	4.4	4.58	<0.01	0.4	0.51	>0.05	4.8	4.37	<0,01
Experimental	500	3.7	3.09	<0.05	5.1	4.44	<0.001	8.8	6.82	<0,001

	1000	2.8	2.1	<0.0 5	7.4	5.8 1	<0.00 1	10.2	7.5	<0.00 1
Difference of results between traditional and experimental PSP patterns										
Distance 500 m		2,4	2.1 4	<0.0 5	2.3	1.9 2	>0.05	7	5.4 3	<0.00 1
Distance 1000 m		4,4	3.7 2	<0.0 1	4.7	3.6 1	<0.01	12.6	9.2 6	<0.00 1

The diagram shows that at the I stage 19 out of 24 studied indicators did not differ reliably both under the traditional and experimental PSP pattern. At the same time, 9 indicators reliably exceeded the data of the previous season, while 2 indicators were lower than under the traditional PSP pattern. At II and III stages, the results of experimental season reliably exceeded the data of the “traditional” season in 13 and 12 indicators out of 24, respectively. Thus, the comparative analysis confirmed the high efficiency of the proposed pattern of pre-start preparation, characterized by shorter duration and higher competition efficiency (Table 2). The indicators shown in Table 2 confirm the increased efficiency of the rowers’ motion activity during competitions. During three major competitions of the experimental season, the results in rowing at the distance of 500 m improved from 120.2 to 111.4 seconds, and at the distance of 1000 m – from 238.4 to 228.2 seconds.

## CONCLUSION

Thus, the growth of results during a sports season was 7.32% and 4.28% respectively, which confirms the efficiency of the proposed patter of pre-start preparation, characterized by two micro-cycles and the specific content of training: first, special (facilitated) conditions for improving the rhythm-speed skill of the advanced motion ability, and then adding the power component to it (weight rowing). The deeper research of the content and structure of pre-start preparation of a large rowing crew leads to reevaluation of the traditional patterns of the training process and is a topical issue in the rowing sport nowadays. Dragon boat rowing becomes more popular today due to the absence of age restrictions and rigid requirements to specific motion skills [22, 23]. Over 200 crews from different countries take part at annual international competitions in dragon boat rowing. The proposed pattern of pre-start preparation allows increasing the rowers’ results. The efficiency of the PSP experimental application was confirmed by successful performance of the Russian rowers in the World Championship in Moscow in 2016, when the Russian national team won 32 gold, 8 silver and 7 bronze medals.

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