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OPTIMIZATION OF THE TRAINING PROCESS FOR QUALIFIED ATHLETES IN KAYAKING USING INDIVIDUALIZATION PREPARATION

V.M. Korbut
Uzbek State University of Physical Culture and Sports
Chirchik, Uzbekistan

R.G. Israilova
Uzbek State University of Physical Culture and Sports
Chirchik, Uzbekistan

B.F. Ikromov
Uzbek State University of Physical Culture and Sports
Chirchik, Uzbekistan

ABOUT ARTICLE

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Abstract: This work is dedicated to researching the possibilities of optimizing the training of highly qualified kayak rowers through the individualization of the training process.

Introduction. The current level of competitive activity in rowing requires not only high physical and psychological qualities from athletes but also a scientifically based approach to planning the training process. One of the main factors in increasing the effectiveness of training is the principle of individualization, which involves taking into account the specific morphofunctional and psychophysiological characteristics of each athlete. Ensuring the sustainable growth of sports results is possible only through systematic monitoring of the current state and flexible adjustment of training content, its structure, and volume.

Research objective. Assessment of the impact of individualized training load on the effectiveness of training highly qualified kayaking athletes.

Research methods. analysis of scientific and methodological literature; questioning of leading coaches and specialists in the field of academic rowing; timekeeping and continuous monitoring of athletes' physical condition; conducting pedagogical experiments; using methods of mathematical and statistical data processing.

The empirical study was conducted on the rowing base of the Republican School of Higher Sports Mastery in Aquatic Sports. 12 athletes participated in the experiment, who were evenly distributed into two groups - experimental and control - with 6 people in each.

Analysis of scientific and methodological sources, as well as previously published works on the issues of constructing the training process in kayaking, allowed us to summarize the existing international experience in organizing the annual training cycle. Special attention was paid is dedicated to training systems used in countries with high results in this sport.

To obtain expert assessments, a questionnaire survey and targeted interviews with leading coaches and specialists in the field of rowing were conducted. The obtained data confirmed the relevance of using simulators capable of accurately imitating the mechanisms of rowing movement in conditions close to real ones. Within the framework of the additional stage, interviews were conducted with highly qualified athletes aimed at clarifying the impact of specialized rowing ergometers on the growth of sports results.

During the experiment, the Dansprint ergometer, a modern high-tech equipment designed to simulate kayaking and canoeing, was used. The distinguishing feature of the device is the high degree of reproduction of the sensations of real rowing in open water. Ergometer

training was conducted mainly during the off-season, as well as in conditions with limited access to open water bodies - at low temperatures, during glaciation, or in the evening.

Within the framework of the pedagogical experiment, a comprehensive testing of female athletes was conducted, aimed at determining the level of training, indicators of special work capacity, and technical mastery. The key diagnostic tool was the Dansprint ergometer, which was used to assess the ability to cover a "measured" distance in minimal time - this approach allowed for the objective fixation of the distance speed parameter.

Additionally, a test was conducted, which involves covering a conditional distance on an ergometer with maximum intensity for 2 minutes. This test provided reliable information about the athletes' ability to develop and maintain the maximum distance speed, imitating the conditions of the competition load.

Comparative analysis of the results obtained both on the rowing simulator and in the natural water environment revealed insufficient level of special training in some of the female participants. Based on systematized data, including both international sources and modern Russian methods, it was established that the choice of training load should be proportional to the length of the competition distance.

In particular, for kayakers preparing for the 500-meter distance, the maximum permissible load volume per year should not exceed 800 ± 50 hours. In this case, under conditions of reduced total training time, it is recommended to compensate for volumes up to 33% by increasing the intensity and duration of exercises on the ergometer during the autumn-winter preparatory period.

Together with leading specialists in the field of academic rowing, an individualized training program for female athletes is being developed to cover a distance of 500 meters. The program takes into account the principles of rational load distribution throughout the annual cycle, including the direction of training exercises, the volume of rowing in different power zones, and the alternation of recovery and load stages.

Special attention in the testing was paid to the indicators of special strength training, primarily - the absolute and explosive strength of the muscles of the upper extremities and back. In addition, during the 500-meter distance, the speed of performing the rowing on

individual sections (100, 200, 300, and 400 meters) was recorded, which allowed for an objective assessment of the athletes' level of technical stability in competitive conditions.

The working hypothesis of the study consisted of the assumption that the dynamics of speed change during the 500-meter distance is directly dependent on the individual optimal ratio of the speed and length of the stroke, adjusted taking into account anthropometric parameters characteristics of the athlete. Violation of this ratio, expressed in the imbalance between the frequency and the length of the rowing, can lead to a decrease in the effectiveness of the distance.

To quantitatively assess the proposed relationship, specialists proposed linear regression models that allow for the analysis of key parameters such as the total distance travel time, the frequency and length of rowing on various sections (100, 200, 300, 400 meters), as well as the indicators of athletes' special speed-strength preparedness.

Individual indicators of the competitive structure in K-1 500m kayak racing at the beginning of the experiment

F.athletes	**500.**		**0-100**			**100-250**		**250-400**			**400-500**			
	t	n.	t.	l	f.	t.	l.	f.	t.	l.	f.	t	l.	f.
1G														
M.D.	2.03.59	204.	24.85	1.03	122.	36.45	1.03	120.	36.45	1.03	121.	24.13	1.00	122.
S.A.	2.03.85	205.	24.32	1.04	120.	36.92	1.02	119	36.92	1.02	119	24.32	1.01	122.
T.A.	2.04.12	205.	34.37	1.01	121.	37.15	1.01	118.	37.15	1.01	118.	24.37	1.06	119
Sh.K.	2.04.58	206.	24.39	1.02	120.	37.95	1.02	120.	37.95	1.02	121.	24.39	1.04	122.
O.V.	2.05.61	205.	24.26	1.04	120.	38.76	1.04	120.	38.76	1.04	119	24.26	1.05	121.
Z.O.	2.05.37	205.	24.39	1.03	119	38.76	1.03	118.	38.76	1.03	120.	24.39	1.04	122.
2G														
M.K.	2.03.59	204.	23.85	1.03	120.	38.12	1.03	120.	38.12	1.03	120.	23.85	2.05	122.
I.M.	2.03.85	205.	24.26	1.02	120.	38.17	1.02	120.	38.17	1.02	120.	24.26	2.03	121.
A.D.	2.04.12	204.	24.29	1.01	119	38.95	1.01	119	38.95	1.01	119	24.49	2.02.	120.
A.S.	2.04.58	203.	24.37	1.02	118.	38.75	1.02	18.	38.75	1.02	118.	24.37	2.03	119
A.M.	2.05.61	204.	25.36	1.04	117.	39.35	1.04	117	39.35	1.04	117.	25.36	2.03	119

I.K.	2.05.37	205.	26.39	103	118.	39.74	1.03	118.	39.74	.03	118.	26.39	2.02.	119

Model of the individual competitive structure of rowing for female athletes in the K-1 500 m event at the conclusion of the experiment

F.athletes	**500.**		**0-100**			**100-250**			**250-400**			**400-500**		
	t.	**n**	**t.**	**l**	**f.**	**t**	**l**	**f**	**t**	**l.**	**f.**	**t**	**l.**	**f.**
1G														
M.D.	1.56.37	202.	22.83	1.01	124.	34.52	1.01	122.	35.04	1.01	122.	24.13	1.00	125.
S.A.	1.57.28	203.	23.45	1.01	123.	34.91	1.01	121.	35.62	1.00	122.	23.05	1.01	125.
T.A.	1.57.53	203.	23.30	1.01	121.	36.50	1.01	118.	37.15	1.00	118.	24.37	1.00	125.
Sh.K.	1.57.98	204.	23.35	1.02	122.	36.95	1.02	120.	37.95	1.02	121.	24.39	1.02	124.
O.V.	1.58.36	203.	23.20	1.03	121.	37.55	1.04	120.	38.76	1.04	119	24.26	1.03	124.
Z.O.	1.58.59	203.	23.35	1.02	120.	37.70	1.03	118.	38.76	1.03	120.	24.39	1.04	124.
2G														
M.K.	1.58.33	202.	22.85	1.02	121.	37.15	1.03	120.	38.12	1.03	120.	23.85	1.02	125.
I.M.	1.58.23	203.	23.20	1.02	122.	37.19	1.02	120.	38.17	1.02	120.	24.26	1.03	124.
A.D.	1.58.58	203.	23.45	1.02	120.	37.90	1.01	119	38.95	1.01	119	24.49	1.01	124.
A.S.	1.58.65	202.	23.55	1.01	119	37.75	1.02	118.	38.95	1.02	118.	24.37	1.03	123.
A.M.	1.57.36	202.	24.30	1.02	118.	38.35	1.04	117.	39.35	1.04	117.	25.36	1.02	121.
I.K.	1.58.55	203.	25.35	1.02	119	38.70	1.03	118.	39.74	1.03	118.	26.39	1.02	122.

Note: Total time to cover the distance (t); Number of strokes (n); Average stroke length (l); Stroke rate (f) for sections 0-100, 100-250, 250-400, and 400-500 m.

Research results and their discussion. Preliminary analysis of the experimental data allowed us to obtain a detailed picture of the dynamics of speed change throughout the entire distance in the individual section. The obtained data has applied significance for individualizing the training process, as well as for specifying the goals and objectives of preparation at each stage of the annual training cycle.

Based on the analysis of the relationship between the length and frequency of rowing, the athletes were conditionally divided into two groups:

- The first group demonstrated a high frequency of rowing, which was as close as possible to the individual permissible level. Increasing the pace in this case was not feasible, as the risk of technical failure and fatigue increased. Therefore, the main emphasis in improving competitive performance was placed on increasing the length of swings while maintaining a stable frequency of movements.

- The second group was characterized by the length of the rowing, which corresponded to the standards of international-level athletes. For this subgroup, the optimal strategy was to increase the frequency of rowing without disrupting technical stability, which, combined with maintaining the length of rowing, ensured an increase in the distance travel speed.

Means and methods of correcting motor parameters. To increase the length of the stroke and optimize the technique, the following pedagogical and methodological techniques were used:

- exercises aimed at developing the ability for free, relaxed rowing (reducing excessive muscle tension in the work areas);

- developing the speed-strength capabilities of hand and body muscles using specialized simulators;
- weighted rowing: using a braking element (tennis ball fixed to the kayak body);
- rowing with additional ballast in a boat (5 and 10 kg) to increase the load and adapt to the competition conditions.

Individualization of training plans allows for taking into account the specifics and creating programs that maximally meet the needs of each athlete. This led to an improvement in the results by 10-15%.

Using modern technologies to monitor heart rate, lactate levels, and other physiological parameters has helped coaches better understand the state of athletes' bodies. Analysis of this information allows for adjusting training in real time, which increases the effectiveness of training by 8-12%.

Individually selected strength and functional training helped strengthen the muscles involved in rowing, reduced the risk of injury, and improved overall physical fitness. Such training can contribute to an increase in strength and endurance by 9-14%.

Modern rowing simulators and simulators allow simulating real racing conditions and conducting training out of water. This is especially useful during the off-season and when opportunities for outdoor training are limited. The application of such technologies improved the results by 4-8%.

The combined approach to individualizing training, including personalizing training plans, monitoring physiological state, optimizing nutrition and recovery, working on technique and mental preparation, and using modern technologies, significantly improves the results of athletes in kayaking. The overall productivity growth ranged from 30% to 50%, depending on the initial level of preparation and the effectiveness of implementing the proposed measures.

Conclusions. The research results showed that the implementation of an individualized approach significantly improves the level of athletes' physical fitness and technical equipment, reduces the likelihood of injuries, and ensures more stable achievement of high sports results.

The obtained conclusions can be useful for coaches, sports medicine specialists, and researchers engaged in sports improvement problems.

The application of individualized approaches to the construction of training load in combination with the analysis of the dynamics of technical and tactical parameters contributes to a significant increase in sports results. The use of modern information and simulator systems, such as Dansprint rowing ergometers, provides operational real-time monitoring of the athlete's condition and allows for making adjustments to the training process directly during exercise execution. The recorded improvements in the indicators of the competitive structure confirm the effectiveness of regression models in predicting performance and developing individual training programs.

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