

## Features of the training process of freestyle wrestlers in the pre-competition stage

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### Abstract

As a kind of sport, wrestling is characterized by a complex compositional nature of preparing, which requires equal attention to the development of the physical and functional qualities of an athlete. The aim of the study is to optimize the mode and algorithm of training loads of a competitive nature in the period of preparation. The effectiveness of the training process was evaluated by functional indices and blood lactate level not only at the end of training load, but also in the recovery period. In the process of the study also, pedagogical analysis was carried out, anthropometric parameters and analysis of body components were determined. The results of the study indicate the need for regular monitoring of the regime of loads in order to timely correction of the training process, taking into account the individual characteristics of wrestlers at the stage of pre-competition preparing.

Keywords: competitive wrestling; freestyle wrestling; functional preparation; lactate; training process.

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## **1. Introduction**

Modern wrestling is part of the Olympic program. As a kind of sport, wrestling is characterized by a complex compositional nature of preparing, which requires undoubtedly equal attention to the development of the physical and functional qualities of an athlete. Competition conditions dictate the need to constantly make quick and effective tactical decisions, changing the direction and level of applied efforts from maximum to full relaxation, while not losing the highest level of accuracy. In addition, changes in competition rules actualize the spectacularity of competitive bouts, which requires an increased level of active actions of wrestlers, which, according to scientists, is associated with the development and improvement of special motor qualities (Karpinsky, 1975; Sydykov & Kulbayev, 2019).

In this connection at a stage of preparation of freestyle wrestlers for the most important competitions special importance is acquired by planning of training loads of competitive character directed on primary development of special endurance of wrestlers and, as consequence, effective performance of technical and tactical tasks (Podlivaev, 2010; Shiyan, 2010; Rakhat et al.,2021). Stress estimation implies revealing the reaction of an athlete's organism to the work performed and this can be judged by various indices characterizing the degree of activity of functional systems that predominantly ensure the performance of a given work. Such indicators include motor reaction time, heart rate, blood lactate concentration and many others.

As a result of the ranking of bioenergetic functions in the development of special performance in martial arts, anaerobic energy supply is dominant (Podlivaev, 2010; Shiyan, 2010; Aarabi, Abdi & Heydari, 2018). Integral criteria of anaerobic performance, summing up the changes at the level of individual cells and tissues in the organism, are the indicators of maximum oxygen debt and maximum accumulation of lactic acid in blood. It is known that the more an athlete can "endure" high concentration of lactic acid in blood when performing extreme loads, the more anaerobic capacity he has (Volkov , 1990; Lai & Zou, 2018). Along with the indicators carrying information about the immediate effect of the load, manifested in changes in the state of functional systems immediately during work and immediately after its completion, data on the nature and duration of the course of the recovery period can be used (Platonov,1997; 2015;2017; Andreyev et al.,1974; Celebi & Hasirci, 2020). An athlete who reached the finals holds 4-6 fights in one day and in this regard, the recovery rate between fights is important. According to experts, the recovery rate depends on the effectiveness of building a training process of a competitive nature.

### **1.1. Purpose of study**

The aim of the study is to optimize the mode and algorithm of training loads of a competitive nature in the period of preparation for the main starts. Objectives of the study includes developing a training process program in the pre-competition period in order to increase the level of special performance and technical-tactical skills; determining the parameters characterizing the level of preparedness of special work capacity and technical-tactical skills of freestyle wrestlers.

## **2. Materials and Methods**

### **2.1. Data collection instrument**

The following methods were used in the study: analysis of scientific and methodical literature, methods of medical and biological nature: to measure height and body weight we used standard stadiometer and body composition analyzer TANITA DC-360, to determine vital capacity of lungs (VCL) and calculation of vital index (VI) we used spiograph SMP-21/01-"r-d". To evaluate the ability to mobilize anaerobic glycolysis mechanisms during training simulating the conditions of competitive activity, as well as its utilization ability, we determined blood lactate content using a portable lactometer Lactate-plus Nova-Biomedical. Blood sampling was done immediately at the end of the competitive bout (10th sec), as well as at 3min, 5min, and 7min of the recovery period.

## 2.2. Participants

Pedagogical observations (method of video analysis, shorthand notes), mathematical processing of results. Under observation were athletes in freestyle wrestling of various qualifications (n=23) with sports experience 7-10 years. The average age of the athletes was 20 years.

## 2.3. Data analysis

During the analysis of scientific and methodological literature, we identified theoretical and methodological prerequisites in the organization of training process based on scientifically based regulation of technical and tactical training. We analyzed textbooks, teaching aids, scientific and methodological articles, training plans of wrestling, which addressed the problems of functional preparing and technical-tactical preparedness of wrestlers and the use of their results for the correction of the training process.

## 2.4. Procedure

Pedagogical observations were carried out during the educational-training process and competitive fights. To registration technical and tactical actions, the method of video analysis was used.

Pedagogical observations included taking into account the time of each training task and the heart rate (HR), which was recorded during the first 10 seconds after the end of the exercise. Heart rate monitoring was performed at every training session in order to determine the intensity of training sessions and the athletes' body reaction to the performed loads. Intensity of training loads was carried out according to the system developed by Andreyev et al., (1974), which is widely used in wrestling and martial arts (Table 1).

**Table 1:** Correlation between intensity in points and HR. Sytnikov V.I.

Intensity	Points	Heart rate in 10 sec.	HR per 1 min
Maximum	8	32	192
	7	30-31	180-186
Large	6	28-29	168-174
	5	26-27	156-165
Middle	4	24-25	144-150
	3	22-23	132-138
Small	2	20-21	120-126
	1	18-19	108-114

## 3. Results

Based on the presented Table 2 the results of anthropometric measurements showed that the mass-growth index or body mass index (BMI) corresponds to the normal values and by the degree of variation of this parameter (C%) this group of athletes is homogeneous. As for the vital capacity of the lungs and the vital index, athletes differ (C% -15-16%), which must be taken into account and individual correction must be made to increase the level of the vital capacity of the lungs of individual athletes.

**Table 2:** Indicators of physical development and body composition of freestyle wrestlers

Biometrics indicators	Age, years	Body weight, kg	Height, cm	BMI, g/cm	VCL, ml	VI, ml / kg	Muscle mass		Fat mass		Water	
							%	кг	%	кг	%	кг
(n=23)												
X	20	68	170,5	23,4	4,3	64,2	51,4	34,8	8,9	6,1	65	44,2

m(x)	0,4	1,5	1,4	0,3	0,14	2,1	0,3	0,9	0,4	0,4	0,3	0,8
S	1,9	7,4	6,7	1,5	0,7	9,9	1,1	4,4	2,2	2	1,8	4,2
C%	9,5	10,9	3,9	6,4	16,3	15,4	2,1	12,6	24,7	32,8	2,8	9,5

The indices of muscle mass and their percentage content correspond to the level of qualification. The percentage of water in the bodies of the athletes studied was normal. The average index of the fat component in the group within the model, but the degree of variation indicate significant individual differences, which should be taken into account by the coaching staff and regulate not only the intensity of training, but to control the diet.

Table 3 presents the characteristics of the training process. Analysis of training loads showed that the athletes during the 14-day mesocycle in 12 training days had 24 training sessions (2 days of rest).

**Table 3 : Characteristics of training loads at the pre-competition stage of freestyle wrestling preparing**

Number of days		Number of trainings	Actions	Intensity zones	HR, beats/min	Volume, min	Total time, min
Work	Rest						
12	2	24	general	aerobic	126-150	240	310
			developmental exercises	mixed	156-174	70	
			Special preparatory exercises	aerobic	132-150	120	160
			improvement of technical-tactical skills in a standing position	mixed	156	40	
			improving technical-tactical skills in the stalls	aerobic	144-150	35	260
			Special exercises (fights)	mixed	150-180	145	
			Sports games	anaerobic	192	80	
				aerobic	130-138	20	150
				mixed	156-180	80	
				anaerobic	186-192	50	
				mixed	162-180	20	80
				anaerobic	186-210	60	
				aerobic	126-150	50	150
				mixed	156-174	100	
Total							1110

The first micro cycle consisted of six training days and one rest day. A total of 12 training sessions were held. In the first micro cycle, the work was directed to the individual work on the task, fighting in various competitive situations. Perfection of technical-tactical actions was carried out with various opponents on the level of preparedness, in various competitive situations and positions, with the set time intervals. During training the coaching staff together with the athletes analyzed various competitive situations and positions, improved the technique of fighting in a parterre and in a standing position. Worked on their own mistakes by analyzing previous competitions. Developed wrestling tactics individually for each athlete, taking into account their style of wrestling with different opponents. We analyzed the actions and tactics of wrestling on the edge of the mat. The coaching staff controlled the corrections of mistakes in technical actions, and gave recommendations for the effective execution and realization of holds, grapples, defensive actions and hold-downs. Performed general developmental exercises (160 min), of which 6.5% in the middle zone of intensity (mixed

aerobic-anaerobic) 19.3% in the low zone of intensity (predominantly aerobic). Special preparatory exercises in pairs and with elements of wrestling (80 min, 13%) of them 6.5% aerobic and 6.5% in the middle zone of intensity (mixed aerobic-anaerobic). Improved technical-tactical skills and technical actions in the rack (160 min, 25.8%), of which 4% in the low, 19.3% in the middle and 2.5% in the high intensity zone. They improved technical-tactical actions in the ground (90 min, 14.5%), 9.6% of them in the middle and 4.8% in the high intensity zones. Conducted sports games: soccer and basketball without rules (80 min) 14.5% in the low and medium zone of intensity.

The second microcycle consisted of six training days and one rest day. In total 12 training sessions were carried out. In the second microcycle the following work was performed: perfection of technical-tactical actions in a standing position was (100 min, 19,6%), from them 2% of aerobic and 17,6% of mixed work, and also perfection of technical and tactical actions in a parterre (60 min) which was 11,7% from total work. Training-competitive bouts (80 minutes, 7,2%), taking into account the rules of competition (3 minutes of wrestling, 30 seconds rest, 3 minutes of wrestling) were carried out. Systematic training bouts as part of a training session have a positive effect on improving the wrestling technique of an athlete and the development of special endurance. The blood lactate of the athletes was determined at the training session. Such an approach to planning allowed the athletes to perform training loads in full without compromising the health of the athletes. General developmental exercises (150 min) 5.8% in the middle zone, 23.5% in the low intensity zone, special preparatory exercises (80 min) 15.7% in the middle zone, sports games: soccer and basketball without rules (70 min, 17.6%) 5.9% in the low zone and 11.7% in the middle intensity zone.

Thus, the volume of general exercises amounted to 41.4% (460 minutes), and the share of special preparing amounted to 58.6% (650 minutes). Approximately such a ratio of general and special preparing at the pre-competition stage is typical for many types of martial arts. At this stage of preparations aerobic work (465 min) amounted to 42%, mixed work (455 min) - 41% and anaerobic work (190 min) - 17% of the total volume of the executed work. As a result, a significant amount of training loads were performed, which included the use of a variety of means and methods of preparing.

Competitive activity in freestyle wrestling, lasting 6 minutes, requires energy supply mainly due to the anaerobic mechanism, which is necessary both to maintain a high intensity of wrestling, and for cases of high-intensity motor actions associated with the recruitment of glycolytic muscle fibers, with the formation of lactic acid, here aerobic opportunities are needed to eliminate lactate and hydrogen ions in mitochondria of oxidative muscle fibers of active skeletal muscles, heart and respiratory muscles at moments of decrease in the intensity of motor actions in a fight.

The effectiveness of the proposed program of training sessions in the pre-competition period for the performance of competitive fights was judged by the level of lactate concentration and its utilization during rest. So, the results of the analysis of indicators of the concentration of lactate in this group of wrestlers, reflecting the degree of stress in the anaerobic and aerobic capacity of athletes varied within wide limits, as evidenced by the data presented in table 4.

**Table 4:** Indicators of blood lactate during training sessions of a competitive nature among freestyle athletes.

No n/n	The surveyed	Test Conditions													
		rest		fights				Recovery, 3 min.				Recovery, 7 min.		Recovery, 20 min.	
				1 period (3 min) 10-20 sec.		2 period (3 min) 10-20 sec.		Recovery, 5 min.							
		HR, beats/ min	lactate, mmol/l	HR, beats/ min	lactate, mmol/l	HR, beats/ min	lactate, mmol/l	HR, beats/ min	lactate, mmol/l	HR, beats/ min	lactate, mmol/l	HR, beats/ min	lactate, mmol/l	HR, beats/ min	lactate, mmol/l
1	B.M.	56	1,8	162	12,9	180	14,5	150	14,3	120	12,9	114	11,6	-	-
2	C.A.	50	1,5	168	6,1	180	6,6	126	7,9	114	7,2	114	6,4	-	-

3	K.E.	56	1,6	180	12,0	186	15,8	126	9,1	120	8,3	102	6,2	-	-
4	E.A.	58	1,8	180	10,0	186	13,0	144	13,5	114	12,0	84	11,4	-	-
5	D.Қ.	58	1,8	192	7,8	180	6,9	144	5,9	108	4,4	90	4,0	-	-
6	A.D.	82	2,6	192	9,9	180	9,5	126	9,1	114	7,5	102	6,8	-	-
7	E.D.	64	1,8	186	8,6	192	12,1	126	11,6	114	10,4	108	10,0	-	-
8	A.E.	52	1,2	192	11,9	192	12,2	132	11,6	114	10,9	102	10,2	-	-
9	A.A.	58	1,6	180	10,2	180	11,9	126	11,4	114	9,8	108	8,7	-	-
10	A.A.	54	1,5	174	6,9	192	7,4	132	6,5	120	5,5	84	5,5	-	-
11	G.B.	64	1,7	192	10,8	186	16,0	156	16,5	120	13,3	114	11,8	72	8,2
12	B.D.	64	2,0	186	12,5	192	14,2	138	13,5	114	11,9	96	13,3	72	7,3
13	M.N.	60	1,9	180	14,5	192	14,5	144	11,5	126	10,5	114	10,1	72	2,7
14	K.Zh.	72	1,3	192	13,0	192	16,3	144	12,9	114	12,2	102	11,2	84	7,7
	X	60	1,7	182	10,7	186	12,2	136	11,1	116	9,8	102	9	75	6,4
	S	8,4	0,3	9,6	2,8	5,5	3,4	10,3	3	4,5	2,8	10,6	2,8	6	2,5
	m(x)	0,6	0,1	2,6	0,7	1,5	0,9	2,7	0,8	1,2	0,7	2,8	0,7	3	1,25
	C%	14	17,6	5,3	26,1	2,9	27,9	7,6	27	3,9	28,6	10,4	31,1	8	39,1

#### 4. Discussion

The dynamics of the average heart rate during fights was within 182-186 bpm, which indicates insufficient tension of the cardiovascular system (mean age -20 years). It also follows from Table 4 that HR recovery during the recovery period was also ambiguous. It follows that individual measures of recovered means are necessary for optimal recovery of cardiovascular system function (Seluyanov, 1997; Shiyan, 1999; Bekembetova et al., 2020).

We should also say that the maximum lactate values in some wrestlers in the first and second periods of the bout were noted for 10-20 seconds after the bout, which should be taken into account in such studies. In general, the maximum values both in the first and the second periods and in the third minute of the recovery period ranged from 6,1 to 16,3 mmol/l. Judging by the degree of variation of this index in both the first and the second periods of the bout indicates a significant difference in anaerobic capacity of the examined athletes (Shepetyuk, 2019; Kulbayev et al., 2020).

Consequently, the proposed pre-competition training program has an ambiguous effect on the speed and strength qualities of athletes, which requires an individual approach to training loads. The dynamics of lactate recovery on the fifth and seventh minutes of recovery indicates the need to increase the proportion of aerobic work in the training process.

#### 5. Conclusions

1. Training loads in the pre-competition period, where the share of anaerobic work was 17%, has an ambiguous effect on the level of special working capacity of wrestlers.

2. Peak indices of lactate, characterizing the anaerobic capabilities of the organism, were observed only in 50% of the examined athletes. An individual approach is required when developing a training program at the pre-competition stage. The dynamics of lactate indicators during the recovery period indicates a low level of utilization, which indicates an insufficient level of aerobic work capacity.

The rate of utilization of lactate from working muscles is one of the indicators of the high aerobic capacity of the body.

#### 6. Practical recommendations:

When planning the training process at the stage of preparing for the upcoming competition, it is necessary to take into account not only individual characteristics, but also the weight categories of athletes. To increase the effectiveness of the training process based on the set goal and task, it is

necessary to control the mode of the assigned loads, not only in terms of heart rate but also in terms of lactate level, since lactate is a system-forming factor.

In conclusion, it should be noted that in order to develop individual recommendations for optimizing training loads, which ensure an increase in anaerobic capabilities and special working capacity of wrestlers, it is necessary to systematically monitor the body's response not only to training loads, but during important competitions.

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