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Forecasting the prospects of female judoists of youth age based on indicators of their functional state

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Abstract
Purpose: To justify the prediction by long-term training in women's judo. The article presents a functional analysis of the problem of the prospects for the development of female judoists of 17-18 years of age. The content of the presented work is fundamentally different from most generalizing works. The material of general scientific and special nature is presented, providing an individual approach to forecasting, working capacity and restoration of physical fitness of athletes. The content of the article is based on the research of female judoka in the period of the formation of sportsmanship.
Methods: Harvard step test - to determine the general and special athletic performance of female athletes; MOC – maximum oxygen consumption; MVBC - minute volume of blood circulation after the first and second loads; Heart rate – heart rate before and after exercise; SV - systolic volume before and after exercise; The strength qualities of judoists were determined by dynamometry;
Results: The Harvard step test was 81.25±13.75%.
MOC ranges from 52.4 ml/kg/min to 71.0 ml/kg/min,
The systolic values at the first load were 87.6±12.8 ml, and at the second load 94.3±13.5 ml. The breath holding during inhalation, at the age of 17 it was 64.3 ± 3.3, at the age of 18 it was 70 ± 3.4 s. The heart rate at rest was 73.4 ± 10.7, after the first load the heart rate was equal to 133 ± 17.9, and after the second load the heart rate reached 152 ± 10.03. Dynamometry showed that the average value was 27±6.6 kg for the right hand, and 23.9±5.9 kg for the left hand. The asymmetry between the right and left hands was 5.3%. Stange's test ranged from 98 s to 40 s.
Conclusion: In the work, an assessment of the physical development and functional state of female judoists was carried out, on the basis of which the following parameters were identified. In particular, the starting capabilities, the level of physical performance, strength and aerobic capabilities of the energy supply system, allowing to focus on the prospects of judo classes. Thus, the conducted research confirms the expediency of using cardiorespiratory system indicators to assess the functional state of judoists and can also be successfully used as additional criteria for determining the level of fitness, sports orientation in the selection of gifted athletes, as well as for correcting the training process at various stages of training judoists.

Keywords: Judoist, cardiorespiratory system, perspective of female athletes, functional state, reserve capabilities, physical performance, aerobic capabilities.

Introduction

In recent years, consistent measures have been taken in the republic to popularize physical culture and sports, promote a healthy lifestyle among the population, create the necessary conditions for the physical rehabilitation of people with disabilities and ensure a decent performance of the country in the international sports arena. At the same time, there is a need to put into practice specific programs in the field of physical culture and sports that promote the health of the population, the broad involvement of young people in sports and the selection of talented athletes among them, the formation of national teams by master athletes who provide high results in sports, and the creation of additional conditions for coaches of PD № 5924 of January 24, 2020.

Forecasting as a way of foreseeing the ways of developing the prospects of judoists is reduced to identifying the probable development of that particular phenomenon that would most correspond to scientific knowledge, determines the process and the achievement of a given effect. It is closely related to the management of sports training, as it creates prerequisites for making managerial decisions in the field of sports training and competitive activities.

The special relevance of the forecasting problem at the current stage of sports development is due to a number of circumstances: a significant increase in the socio-political prestige of higher sports achievements and, consequently, increased competition in the international sports arena; increased uncertainty of the outcome of the struggle between the main rivals; the increasing role of science in the practice of training athletes, which requires a prognostic assessment of the consequences of the introduction of new developments; by increasing the requirements for the quality of management and the scientific validity of management decisions in the field of sports, which is possible only with a comprehensive prognostic analysis of various options for the consequences of their implementation.

Each forecast should contain a set of indicators and qualitative characteristics that are

designed to provide an "exit" to the final model characteristics of athletes. In a number of studies, an increase in the accuracy of the forecast is associated with taking into account the growth rates of indicators at certain stages of preparation, the ability to progress during training.

The development of a system for predicting the future sports results of young athletes is often associated with the study of the problem of sensitive periods in the development of the body. Focusing on these periods, it is necessary to take into account the data obtained by VG Pashintsev about the possibility of some shift in the time of the onset of sensitive periods in adolescents with different rates of physical development (Pashincev, 2016). The use of data on critical periods will significantly increase the reliability and effectiveness of forecasting and highlight the time stages of a reliable forecast. It follows from this that the prediction of young judoists is a complex and lengthy process, and not a local one-time examination.

One of the main conditions for the high efficiency of the training system for young female judokas is the strict consideration of age and individual morphological and functional characteristics, characteristic of certain stages of development of novice athletes. Such an approach makes it possible to correctly solve the issues of choosing adequate means and methods of training for the tasks of sports selection and orientation of students, dosing training and competitive loads, forecasting sports achievements (Nerobeev, 2013).

Methods

Analysis and generalization of scientific and methodological literature; anthropometry; pedagogical observations; pedagogical experiment; instrumental method; methods of mathematical statistics.

To assess the level of functional condition, 16 qualified female judoists were examined by medico-biological testing methods, aged 17-18 years, with sports qualifications - 5 first category athletes, 9 CMS and 1 master of sports of international class, training at the Dynamo sports complex in Tashkent. When choosing research methods to assess the physical fitness of athletes, the need to use the most currently available devices and techniques that allow the coach to conduct observations in various conditions was taken into account. On the basis of functional tests, the physical performance of female judoka was determined:

1. Harvard step test - to determine the duration of work performed at a heart rate of 150-170 beats /min.
2. MOC - maximum oxygen consumption.
3. MVBC - minute volume of blood circulation after the first and second loads.
4. Heart rate before and after exercise.
5. SV - systolic volume before and after exercise.
6. Manual dynamometer - the strength qualities of female judoists were determined.
7. Stange's test - breath holding was measured during inspiration.

Results and discussion

According to the performance indicators of the cardiorespiratory system before and after the load, the stability of the studied parameters was noted. All parameters of the assessment of the general and special physical performance of judoka indicate high starting capabilities, as well as manifestations of physical effort in dynamic and mixed training.

In the examined group of female judoists, the resting heart rate was 73.4±10.7 beats/min. After the first load, the heart rate was equal to - 133±17.9 beats /min, and after the second load, the heart rate reached 152±10.03 beats /min, which indicates a good adaptation of the girls' body to physical exertion. The other two informative signs indicate the minute volume of blood circulation (MVBC) and the activity of the heart (SV). So the indicators of SV (systolic volume) at the first load were 87.6±12.8 ml., And at the second load 94.3 ± 13.5 ml.(see table 1). The MVBC indicators also revealed a positive trend in response to the first and second loads amounting to 12.056±2.91 and 14.331±2.32, respectively. The minute volume of blood circulation (MVBC) is an integral indicator of the pumping function of the heart and largely depends on the heart rate and systolic blood volume, (SV) determined by the Starr formula. It is known that with age and development of the body, as well as in the process of systematic muscle training, the value of the MVBC increases (Pashincev, 2016).

Thus, the female judoists revealed the same magnitude and direction of the MVBC reaction to the performance of the first and second muscle load. However, the values of the MVBC, both after the first and after the second

muscle loads in judoists occur more intensively, which is possible, are associated not only with the high adaptation of the body of judoka to perform muscle loads, but also depend on the level of athletic fitness.

Indicators of physical performance obtained in training conditions by the method of the Harvard step test can also be considered as an analogue of indicators of the manifestation of special motor qualities in competitive conditions. That is, the test results are reflected in the results of competitive activity.

Indicators of the assessment of the level of physical performance above the average were established: female judoists 17-18 years old after the test was 81.25±13.75% (see table 2). However, in addition to the average data, we should note separately promising judoists who showed high indicators of physical performance – these are M. Khakimova (CMS), Khuzhamberdieva (CMS), Naimova (1st category) Shoimova (CMS), Esonova – 1st category.

Studies of SV and MOC have shown that judoists in the process of age-related development had a positive increase in the increase in breath-holding time. So, if the respiration delay during inhalation in 17-year-old athletes was 60.8±4.1 seconds, then by the age of 18 the increase in this indicator was 70±3.4 seconds. The established dynamics of chest excursion indicators in 17-year-old judoists was 6.2±1.2 cm, in 18–year-olds - 7.2±1.2. SV of 17 year old female judokas was 3.0±1.4, and in 18 year old girls 3.5±0.35 l / min.

A tendency was found to increase the level of development of the main respiratory muscles that provide inhalation and exhalation. As a result, it can be characterized as an adequate adaptive response to training influences of judo specialization. This means that when building a training program, it is necessary to take into account not only the passport, but biological age, which really reflects the level of physical and functional development.

In the judoists examined by us, the relative values of MOC range from 52.4 ml/kg/min to 71.0 ml/kg/min, however, 3 athletes have low values of MOC, so they are recommended aerobic muscle loads, long-distance running, cross.

The strength qualities of judoists revealed by dynamometry showed that the average value was 27±6.6 kg for the right hand, and 23.9±5.9 kg for the left hand. The asymmetry between

Table 1. Hemodynamic indicators of female judoists after standard loads.

Full name	Category	Heart rate			SV		MVBC		Dynamometry of the right hand		Dynamometry of the left hand		Stange test
		before	N_1	N_2	N_1	N_2	N_1	N_2	N_1	N_2	N_1	N_2	
Khodjayeva H	1st category	72	108	156	109.0	111.4	11.77	17.378	26	27	25	24	88
Abduxo-va G	1st category	75	128	156	100.5	105.5	12.86	16.458	20	25	25	20	90
Muftayeva M	CMS	73	164	168	88.0	116.4	14.432	19.555	18	22	18	20	55
Choriyeva K	CMS	73	148	156	106.4	98.0	15.74	15.288	15	16	16	14	56
Khujam-va	CMS	73	144	156	84.6	93.0	19.18	14.58	20	26	19	24	80
Khakimova M	CMS	72	132	144	75.3	69.4	9.93	9.993	35	35	30	30	98
Ergasheva M	CMS	74	120	148	84.6	93.0	10.15	13.764	34	25	24	25	95
Abdur-va Sh	CMS	72	148	156	85.5	79.6	12.65	12.417	30	25	22	20	70
Nurkulova S	1st category	73	132	152	71.2	90.0	9.39	13.680	30	30	30	32	77
Esanova B	1st category	75	144	160	75.0	77.5	10.80	12.400	30	28	28	26	50
MAmad-va N	1st category	74	136	148	101.4	106.4	13.79	15.747	20	25	25	25	40
Shoimova S	CMS	73	100	136	101.0	106.4	10.10	14.470	20	18	18	20	40
Botirova G	CMS	74	108	160	75.0	85.9	8.10	13.744	40	40	35	35	52
	CMS	73	124	128	74.4	98.7	9.22	12.633	33	37	42	37	40
Rahimova G	Max	72	148	156	82.7	84.6	12.23	13.197	26	23	24	20	80
	1st category	74	144	152	86.8	92.7	12.49	14.090	35	30	33	30	43
$\bar{x} \pm \sigma$		73.4±10.7	133±17.9	152±10.03	87.6±12.8	94.3±13.5	12.056±2.91	14.337±2.32	27±7.4	27±6.6	25.9±6.9	23.9±5.9	62.4±18.44

Table 2. Indicators of functional and physical performance of judoists 17-18 years old after standard loads.

	Judoists – EG n-16	SV, l	Power of load I (W)	Power of load II (W)	Harvard Step test (%)	MVBC (l)		
						Absolutely	Relatively	Grade
1	Naimova K	3.500	797.9	1150.4	88	3.825	62.7	Good
2	Khujayerova H	3.200	632.7	854.1	85	3.1912	61.3	Good
3	Abduhalikova H	3.300	624.6	880.1	81	3.287	58.6	Medium
4	Muftulayeva M	3.000	705.7	803.0	89	3.211	67.8	Excellent
5	Choriyeva K	3.900	682.2	852.7	82	3.380	58.2	Medium
6	Khujamberdiyeva	3.100	735.1	940.9	88	4.121	71.0	Excellent
7	Khakimova M	3.500	862.4	1228.5	86	4.400	61.9	Good
8	Ergasheva M	3.200	714.4	738.1	71	3.380	58.2	Satisfactory
9	Abdurakhmonova	3.200	713.8	851.1	84	4.400	61.9	Good
10	Nurqulova C	3.500	760.5	803.0	80	3.520	58.6	Medium
11	Esonova B	3.200	679.3	849.2	72	3.515	52.4	Low
12	Mamadal-va N	3.200	748.3	790.9	67	2.897	48.2	Low
13	Shoimova C	3.400	882.2	1076.8	74	3.520	58.6	Medium
14	Botirova G	3.300	852.6	870.4	76	3.860	58.3	Medium
15	Sultonova S	3.900	922.7	1180.0	92	4.519	71.5	Excellent
16	Rakhimkulova J	4.000	766.5	849.6	85	3.800	62.0	Good

the right and left hands was 5.3%, which is an acceptable value for the asymmetry indicator. A higher percentage of asymmetry is considered evidence of the presence of a "genetic load" in an individual or at the level of the whole population.

The endurance of the respiratory muscles of the chest was diagnosed using the Stange test. The average value of breath holding on inspiration was 62.4 ± 18.44 sec. However, it is necessary to note the spread in the indicators of this test. The fluctuation of the values ranged from 98 s to 40 s.

Conclusion

In the work, an assessment of the physical development and functional state of female judoists was carried out, on the basis of which the following parameters were identified. In particular, the starting capabilities, the level of physical performance, strength and aerobic capabilities of the energy supply system, allowing to focus on the prospects of judo classes. Thus, the conducted research confirms the expediency of using cardiorespiratory system indicators to assess the functional state of judoka and can also be successfully used as additional criteria for determining the level of fitness, sports orientation in the selection of gifted athletes, as well as for correcting the training process at various stages of training judoka. The development of qualitative and quantitative criteria for the functional state of female athletes, allow predicting the success of a competitive result in a chosen sport, in particular, in junior judo.

The significant achievements of our junior judoka are the result of a competently staged training process in the Dynamo sports complex. There is no doubt that the planned sports training has led to high performance and achievement of athletic form, and the values of structural and functional indicators form a platform for the development of general physical and special motor qualities and can serve as reliable and objective criteria for predicting their success in prestigious international competitions.

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