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Physical health condition and physical organism readiness levels of sports veteran wrestlers

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Purpose: *study and an assessment of the physical state of health and the degree of physical fitness of the organism among active veteran wrestlers.*

Material & Methods: *participants: 16 active veteran athletes, 7 of them judoka and 9 sambo wrestlers aged 36–45. Sports qualification of athletes: MS – 10 people, MSIC – 6 people. The stability of the organism to the conditions of hypoxia and hypercapnia was assessed by the results of the Stange and Genci tests. To determine the statistical balancing, the Bondarevsky trial was used. The degree of physical readiness was evaluated by the results of the distance traveled on the treadmill of Kettler, comparing it with the Cooper table. To assess the level of physical state, the formula was used by E. A. Pirogova.*

Results: *investigation determined that the actions of the wrestlers – sports veterans of the body's resistance to the conditions of hypoxia and hypercapnia, as well as the indicator VC indices correspond young people. Indicators of statistical balancing among the acting veterans of judoists and sambo wrestlers corresponded to those of 20–30-year-old people. Level of physical condition (LPC) of health in 71,4% of veteran-judoists at the average level and only 28,6% is of a high level. Sambo veterans observed the following: 44,4% of sportsmen of the LPC are above the average; 33,3% have an average level of physical health; in 11,1% of athletes the average LPC and 11,1% of the judo veterans have indicators corresponding to the level below the average.*

Conclusion: *conducted step-by-step medical and pedagogical control allowed to reveal some violations of the adaptive mechanisms of the cardiovascular system, which once again confirms the possibility of using the data of heart rate, blood pressure, Cooper's test for studying and analyzing the physical state of health and the degree of physical preparedness, as well as forecasting the health status of veterans sports.*

Keywords: *veterans of sports, cardiovascular system, Cooper test, Bondarevsky test.*

Introduction

Modern sport, and in particular, the sport of veterans, is characterized by high training and competitive loads, which impose increased demands on all systems of the athletes body. The level of physical and psychological load, accompanying the preparation and participation of athletes in responsible competitions, is often on the verge of disrupting the functional capabilities of his body. In this regard, the search for objective criteria for determining the physical state of health and the degree of physical preparedness of athletes, and especially active veterans of sports, at different stages of the training process remains relevant [1; 2].

Sport practice shows that the potential of an athlete accumulated in the training process is realized with the preservation of a high level of all aspects of his preparedness, and the success of realizing the potential of an athlete's readiness for competitive activity is determined by the effectiveness of medical and pedagogical observations at different stages of training athletes. N. D. Graevskaya argues that the maintenance of a sports form is promoted by a good health condition, the variability of loads and switching, ensuring a full recovery, an individual approach, a healthy lifestyle, regular medical and pedagogical control [1].

To date, there is a sufficiently large number of scientific studies devoted to the study of medical and biological support of the training process in such types of wrestling as sambo and judo, but for the most part these works have a pedagogical orientation aimed at studying the structure of competitive and training activities, planning and organizing a year-long competitive training course for wrestlers, as well as increasing the level of special training of judo and sambo wrestlers. However, little attention has been paid in the literature to medical and pedagogical observations of active veterans of sports. Taking into account the specifics of this sport, it is necessary to develop and implement the most effective programs for examining veteran athletes as an important component of step-wise medical control [1; 3–7].

From the existing forms of medical examinations of athletes in more detail I would like to focus on the study of the functional state and physical fitness of veteran wrestlers, using the Cooper test, which is based on physical exertion, which presents sufficient requirements for the cardiovascular system. If the body copes well with such loads, we can talk about the good functional state of the cardiovascular system and its high resistance to the development of diseases [10; 14; 15]. And, on the contrary, if the body does not cope with these loads – it indicates insufficient training of the cardiovascular system and can contribute to the emergence of various diseases, and especially at the age of 35 years [8]. Loads in Cooper's test are so-called "global" in nature, that is, when they are put into operation, more than 2/3 of the muscle mass. Thus, these loads affect not only the muscular apparatus, but also the systems

that provide muscular activity, primarily on the cardiovascular and respiratory systems. With the help of Cooper's 12-minute running test, the physical fitness of the organism is estimated based on the distance (in meters) that a person can run (or pass) in 12 minutes Analyzing the tolerability of loads in the performance of the Cooper test, we can assess the functional state of the cardiovascular and respiratory systems [8].

The purpose of the research: to study and an assessment of the physical state of health and the degree of physical fitness of the organism among active veteran wrestlers.

Material and Methods of the research

Participants: 16 acting veteran athletes, including 7 and 9 judo wrestlers aged 36–45 years. Sport athletes qualifications: MS – 10 people, world-class athlete – 6 people.

The research was conducted on the basis of the problem scientific laboratory of the Kharkov State Academy of Physical Culture. When organizing the study, the following methods were used: morpho-functional indices (body length, body weight, heart rate, vital capacity, blood pressure, dynamometry), functional sample and tests (Stange sample, Genci sample, Bondarevsky sample, Cooper's test); methods of mathematical statistics.

Cooper Test conducted on a treadmill company "Kettler". Athletes for 12 minutes performed running, independently regulating the running speed (12–16 km·h^{-1}). Order of the studies included recording the heart rate (heart rate, 1 minute), BP measurement before the start of the run, at the 1st minute of recovery, then every next minute until complete recovery. Calculation of pulse pressure (PP). The degree of physical readiness was assessed by the results of the distance traveled, comparing it with the Cooper table.

To assess the level of physical condition (LPC) used the formula E. A. Pirogova [12]:

$$X = \frac{700 - 3 \times HR_r - 2{,}5 \times BP_{av} - 2{,}7 \times Age + 0{,}28 \times Weight}{350 - 2{,}6 \times Age + 0{,}21 \times Height},$$

where HR_r – heart rate (beats min^{-1}) at rest;
BP_{av} – BP average, calculated by the formula:
BP_{av} = BP diastolic + 1/3 x BP pulse;
BP pulse = BP systolic – BP diastolic.

Obtained value is evaluated in accordance with the data in the tables. Statistical analysis of the results was carried out using the EXCEL tables. For parameters that meet the criteria for normal distribution, parametric statistical methods were used. Thus calculated arithmetic mean – $\bar{X}$; average error arithmetic mean value – ±m [7].

Results of the research and their discussion

As a result of evaluation of morpho-functional indices, both groups were homogeneous (Table 1).

Stability of the organism to the conditions of hypoxia according to the results of the Stange sample was 645±6,65 s, to the hypercapnia conditions according to the results of the Genci test – 44,4±3,54 c

To determine the statistical balancing (SB) – the index of the state of the musculoskeletal system, the coordination of movements and the stability of the psychological attitude to achieve the best result, all athletes were tested Bondarevsky samples. Static balancing is one of the key tests in the method for determining biological age and characterizes the functional state of many body systems, as well as the interactions between them. Indicators SB in the acting veterans of judoists and sambo wrestlers corresponded to the indicators of 20–30-year-old people, namely the time of standing on one leg with the eyes closed was 35 to 40 seconds.

Table 1
Morpho-functional indicators of veteran wrestlers, $\bar{X}$±m

Indicators	Judo veterans	Sambo veterans
Height, cm	177,27±2,23	176,34±2,36
Weight, kg	72,45±2,12	73,28±2,18
BMI, kg·cm^{-2}	23,02±0,42	23,56±0,37
Dynamometry (right), kg	52,55±2,25	53,78±2,16
Dynamometry (left), kg	47,46±2,15	48,16±2,24
CE, cm	5,34±1,18	5,61±1,12
VC, ml	5050±0,08	5048±0,11

Cooper test all the athletes studied for 12 minutes run, independently adjusting the speed of run (12–16 km·h^{-1}), breaking the distance from 2390 to 2780 m, which according to the Cooper table for men aged 30 to 39 years corresponds to a good and an excellent degree of physical readiness.

Figure 1 shows the results of the Cooper test.

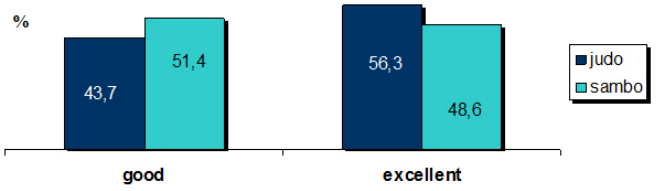

Fig. 1. Assessment of the degree of physical readiness of the acting veterans – judoists and sambo wrestlers (%)

During the Cooper load test, all veteran athletes did not make any complaints, but the analysis of the HR and BP measurement before the test, during the test, the recovery time of the HR and BP after the load, revealed the tension by the adaptation mechanism of these athletes. The obtained results once again confirm the importance of controlling HR and BP in the active wrestler's veterans of sports and allow them to recommend them for monitoring the functional state of the cardiovascular system during medical and pedagogical observations.

In our study, it was of interest to calculate the level of the physical state, for which the formula E. A. Pirogova was used by.

The obtained indicators are presented in Table 2.

The data in Table 2 indicate that 71,4% of the average LPC veteran athletes and only 28,6% have a high level of physical condition. Veteran sambo wrestlers observed the following: in 44,4% of athletes LPC are above average; 33,3% have an average level of physical health; 11,1% of athletes – the average LPC and 11,1% of the judo veterans have indicators cor-

Table 2

Indicators of BP and HR at rest, the level of physical health among wrestler's veterans

No.	HR_r (beats·min^{-1})	BP_{av} (mm Hg)	Means	Level of physical health (range of values)
Judo veterans				
1.	68	93	0,632	average (0,526–0,675)
2.	72	87	0,615	average (0,526–0,675)
3.	66	77	1,468	high (0,826 and above)
4.	78	88	0,552	average (0,526–0,675)
5.	81	80	0,604	average (0,526–0,675)
6.	76	86	0,596	average (0,526–0,675)
7.	66	78	0,779	high (0,826 and above)
Sambo veterans				
1.	72	70	0,788	above average (0,676–0,825)
2.	64	78	0,615	average (0,526–0,675)
3.	60	75	0,802	above average (0,676–0,825)
4.	68	86	1,077	high (0,826 and above)
5.	71	102	0,523	below the average (0,376–0,525)
6.	76	85	0,617	average (0,526–0,675)
7.	66	92	0,661	average (0,526–0,675)
8.	64	78	0,784	above average (0,676–0,825)
9.	70	73	0,771	above average (0,676–0,825)

responding to the level below the average.

Similar studies are often found in the scientific literature. Thus, I. E. Kumantsova (2009) investigated the features of the functional state of the cardiovascular system and the correction of its borderline changes in highly trained individuals using a diagnostic integrated approach, including the measurement of heart rate, blood pressure, resting ECG, and found that intense physical activity not only leads to physiological adaptation changes in the functioning of the cardiovascular system, but also to the expressed adaptation disorders.

A. H. Talibov (2011, 2013) studied the physiological parameters of hemodynamics in sports veterans depending on the motor activity and came to the conclusion that veterans of sports continuing to engage in age-related changes in the cardiovascular system are experiencing age-related changes, but there are still ways to adapt to physical load, as well as at a young age. What confirms the informative nature of heart rate and blood pressure monitoring [14].

L. V. Podrigalo, A. A. Volodchenko, O. A. Rovnaya, L. A. Ruban, K. M. Sokol (2017) confirmed the importance of using load tests and control of heart rate and blood pressure in athletes-athletes to assess the functional state cardiovascular system, the level of its adaptation and compliance with certain physical loads, which allowed to recommend them for monitoring the physical state of health [21].

Cemal Ozemek, Mitchell H. Whaley, W. Holmes Finch & Leonard A. Kaminsky (2017) used the results of load tests to assess the state of the cardiovascular system. In conditions of monitoring, the possibility of predicting the state of health according to the heart rate [20].

Conclusions

The conducted research has established that among active athletes-veterans of sports the resistances of the organism to the conditions of hypoxia and hypercapnia, as well as the index of VC correspond to those of young people. Indicators of the SB of the acting veterans of judo and sambo wrestlers corresponded to those of 20–30-year-old people.

Level of physical health in 71,4% of veteran-judoists at the average level and only 28,6% are of a high level. Sambo veteran wrestlers observed the following: in 44,4% of LPC athletes are above the average; 33,3% have an average level of physical health; in 11,1% of athletes the average LPC and 11,1% of the judo veterans have indicators corresponding to the level below the average.

Prospects for further research. Carried out a stage-by-stage medical and pedagogical control allowed to reveal some violations of the cardiovascular adaptation mechanism, which once again confirms the possibility of using the data of heart rate, blood pressure, Cooper's test for studying and analyzing the physical state of health and the degree of physical preparedness, as well as forecasting the health status of veterans of sports.

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