Peculiarities of functional mobility and strength of nervous processes in armrestlers of different level of sportsmanship

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Abstract

Objective of the study was to determine the indicators of functional mobility and the strength of nervous processes in armwrestlers of various levels of sportsmanship.

Methods and structure of the study. The experiment involved arm wrestlers with the qualification "Master of Sports of Russia" (n=12), "Master of Sports of Russia of international class" (n=2) and "Honored Master of Sports" (n=1) in the amount of 15 athletes and engaged in mass sports arm wrestling. ranks from the third to the first - 15 people. The study used testing using the psychophysiological testing device UPFT-1/30 "Psychophysiologist". Testing of psychomotor abilities included the following indicators: functional mobility of nervous processes (FMNP), speed of nervous processes by measuring the dynamics of the pace of hand movement (tapping test).

Results and conclusions. An analysis of the data on the functional mobility of the nervous processes of highly qualified athletes specializing in arm wrestling showed a significant predominance of indicators compared to arm wrestlers of mass sports categories. All examined highly qualified armwrestlers showed a very high functional mobility of nervous processes, the average score was 9.9. 50% of athletes of mass categories showed a very high functional mobility of nervous processes, the rest from very low to medium. The average score is 7.2. Data on the strength and lability of nervous processes by measuring the dynamics of the pace of hand movement showed an unreliable advantage in favor of qualified athletes, especially pronounced in the left hand.

Keywords: *arm wrestling, highly qualified athletes, mass category athletes, functional mobility of nervous processes, strength of nervous processes, tapping test.*

Introduction. The main properties of nervous processes, such as strength, lability, mobility, dynamism, largely determine the psychological readiness for training and competitive activities, determine the characteristics of the athlete's individual behavior in different sports situations [2, 6]. The results of the properties of the nervous system of qualified athletes can be used as model characteristics of motor abilities, allow you to identify the strengths and weaknesses of the athlete's preparedness, to form corrective and control training actions [6, 8].

An increase in the functional mobility of nervous processes, i.e. the ability of the nervous system to consistently switch between excitation and inhibition for a long time in accordance with the requirements of the activity performed, contributes to the effective training of functions not only of concentration, but also of cognitive skills [2].

The specificity of the competitive activity of martial arts imposes increased requirements on the neuro-emotional sphere of athletes, implies a significant mobility of nerve centers. In martial arts, including arm wrestling, psycho-physiological qualities come to the fore, which determine the ability to quickly perceive emerging situations, make and implement creative decisions [1]. However, the analysis of scientific and methodological literature showed a lack of scientific research devoted to the

study of the psychophysiological functions of athletes in arm wrestling.

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The study used testing using the psychophysiological testing device UPFT-1/30 "Psychophysiologist". Testing of psychomotor abilities included the following indicators: functional mobility of nervous processes, speed of nervous processes by measuring the dynamics of the tempo of hand movement (tapping test). According to E.P. Ilyin (2001), in athletes, according to the tapping test, one can judge not only the speed of nervous processes, but also assess the strength and mobility of the central nervous system [3]. The rate of movements is an integral parameter of the rotation of the stages of inhibition and excitation of the CNS [4].

Method for determining the functional mobility of nervous processes. The athlete was asked to press certain buttons on the UPFT remote control in response to the lighting of LEDs of different colors on the psychomotor test module. "When the red color turned on, the armwrestler had to press the "YES" button on the remote control with his right hand, when the green color turned on, the "NO" button with his left hand. And do not respond to the appearance of a yellow stimulus" [1].

The functional mobility of the nervous processes was assessed based on the results of an adaptive increase in the frequency of the stimulus, depending on the correctness of the previous task. The rate of signal presentation was automatically adjusted depending on the accuracy and speed of the subject's motor reactions.

The tapping test methodology was based on determining the dynamics of the maximum rate of hand movement. A special tapping platform and a probe were connected to the device. The athlete must hit the stylus on the court with the maximum frequency. The experiment was carried out sequentially, first with the right and then with the left hand [7].

Statistical processing was carried out using the program Statistica 13.0. Significance of differences was tested using Student's t-test. To characterize the studied indicators, the arithmetic mean of the sample population (M) was calculated. As an indicator of the variation of the obtained results, m was the error of representativeness.

Results of the study and their discussion. All examined highly qualified armwrestlers showed a very high functional mobility of nervous processes, the average score was 9.9. Only 50% of athletes of mass categories showed a very high functional mobility of nervous processes, the rest from very low to medium. The average score is 7.2. Significant differences were found in favor of qualified athletes in terms of the number of incentives and the right incentives. The number of incentives for highly qualified armwrestlers turned out to be 10.8% more, including the correct ones by 8.1%.

No significant differences were found in the indicators of the tapping test, which indicates the strength and mobility of nervous processes. In the characteristics obtained by us, confirmation of the direct relationship of data with the success of competitive activity has not yet been established. A higher average value of indicators was established in favor of the group of qualified athletes by 6.2% on the left hand and 3.1% on the right.

The results of a comparative analysis of the indicators of functional mobility and the strength of the nervous processes of armwrestlers of various levels of sportsmanship

Index	Qualified, M±m	Mass discharges, M±m	Difference	Difference, %	t	p
Number of incentives, pcs.	254,6±6,4	227,0±10,9	27,6	10,8	2,4	<0,05
Number of correct stimuli, pcs.	136,0±3,5	125,0±5,5	11,0	8,1	2,3	<0,05
Number of erroneous stimuli, pcs.	115,7±2,9	102,0±9,5	13,7	11,8	1,4	>0,05
Tapping, left hand, pcs.	212,7±7,6	219,4±8,4	11,3	6,2	0,9	>0,05
Tapping, right hand, pcs.	183,0±8,7	194,3±9,5	6,7	3,1	0,6	>0,05

Conclusions. An analysis of the data on the functional mobility of the nervous processes of highly qualified athletes specializing in arm wrestling showed a significant predominance of indicators compared to arm wrestlers of mass sports categories. The study did not determine the unambiguous relationship between strength and mobility indicators of nervous processes in armwrestlers of higher qualification. Data on the strength and lability of nervous processes by measuring the dynamics of the pace of hand movement showed an unreliable advantage in favor of qualified athletes, especially pronounced in the left hand.

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