

## TEST BATTERY FOR COMPREHENSIVE CONTROL IN THE TRAINING SYSTEM OF HIGHLY SKILLED WRESTLERS OF KAZAKHSTAN ON NATIONAL WRESTLING “KAZAKSHA KURESI”

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The article provides some research materials proposing a test battery for comprehensive control in the training system of highly skilled Kazakhstani wrestlers practicing in national wrestling. Pedagogical experiment to define physical development and functional state of athletes included medical monitoring, anthropometric measurements, tapping test, etc. The basis of the most of the tests used in the research was motor activities. In the conducted studies the authors used a wide range of pedagogical tests and control tests that due to the lack of sufficiently strong control exercise best characterize the physical fitness. Therefore, complex tests assessing the quality of each consisted of a large number of exercises. Based upon that, 63 indicators were selected to assess various aspects of preparedness. A battery of tests was proposed for the most rational stepwise control of different sides of physically trained and skilled wrestlers of “Kazaksha Kuresi”.

**Keywords:** control test; training; wrestlers; comprehensive control; skilled athletes; national identity; physical fitness

### I. INTRODUCTION

Modern problems of Kazakhstan education set tasks of humanistic value for the higher school. This new function of the higher school which has found expression in the maintenance of the higher education as the main tutorial, education and development of the identity of a future coach instructor is brought to the level of the state policy in the field of the higher education the State Program of Education Development in the Republic of Kazakhstan for 2011-2020 (Presidential Decree No.1118, 2010) and formulated in the Law of the Republic of Kazakhstan “On Education”.

The content of the comprehensive test battery reflects the specific features of the activity. Based on the test results the participants were evaluated. The athletes’ current preparedness was assessed, as well as their skills level in comparison to other athletes.

Physical training in interrelation with the Kazakh national culture finds a humanistic orientation, as “Physical Culture” is a high school discipline, and national culture is an area of human activity. The use of the Kazakh national sports in educational process allows realizing the activity-related component presented in

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physical training, the informative component based on the knowledge of the Kazakh national culture and an emotional component connected with a subject basis of the Kazakh national sports [15].

Forming the students' readiness to develop physical culture is possible by means of the relevant organization of the educational process and design of innovative technologies of training with the use of elements of national sports [7; 9].

With the current requirements for the training of highly skilled athletes, the importance of comprehensive control force preparedness is actual.

The history of the traditional "Kazaksha Kuresi", or Kazakh wrestling is inextricably linked with the history of our people. As one of the types of single-combat, Kazakh wrestling has been well known since ancient times, that is, when our people were called Turks. We know now its ancient varieties such as, wrestling in nude to the waist, barefoot wrestling, wrestling in boots with long tops, anti-seizure below the knee, fist fighting. The traditional relationship between the people of tales, legends and epic poems – mighty strong men called Batyrs and today's famous wrestlers continue thanks to the national wrestling, "Kazakh wrestling". The legendary Kazakh strongman Baluan-Sholak, Hadiimukan, Borankul, Moldabay, Bitabar, Baigabyl, Ozaman-Sholak and many others showed unusually vivid examples of courage, incredible physical strength, enjoyed great respect among the ordinary people.

The peculiarity of Kazakh wrestling is that one can achieve victory only in the case when a large ingenuity and consummate skill combined with wrestler's enormous physical strength and lightning speed of action. In this fight, the match is stopped immediately after one of the contestants is put on the carpet by his rival, for "Kazaksha Kuresi" fighting is carried out only while wrestlers' are on feet [16].

Fighting in Kazakh wrestling is done in special jackets with a fabric belt. Over and above the waist belt resolve any seizures. The purpose of the fight is to throw the opponent on his back. Technique of "Kazaksha Kuresi" includes running board throws, sweep throws, shin hook throws, throws over the back, sloppy throws, hoisted throws, whirling throws, throws across the chest, rolling throws, twine throws.

Prior to the beginning of the twentieth century there was no rule of dividing wrestlers on the weight categories in Kazakh wrestling. So they fought on the principle of "The stronger is the winner." Wrestling according to weight categories and age began to be applied only in the 30ies of the 20<sup>th</sup> century. Wrestlers of "Kazaksha Kuresi" often take part in competitions in other kinds of wrestling, judo, sambo [10].

In 2000, the rules of Kazakh wrestling were approved [19]. According to the Rules, a competition is held in 7 weight categories (58, 65, 73, 82, 92 kg and over).

“Kazaksha Kuresi” is now recognized by many countries of the world. There is the National Federation for Kazakh wrestling in the republic of Kazakhstan. Nowadays Kazakh wrestling preserves elements of the national identity, and takes into account the progressive trends in the world art of wrestling which have a positive impact on its further development.

## II. METHOD

In the system of training highly skilled wrestlers, certain attempts have been made to test their preparedness [6; 2; 5]. However, none of these studies attempted to unite all the tests in one complex or a battery of tests, which will include only those tests that meet the requirements of validity, reliability and consistency. In the present study, the authors have compiled a set of tests the content of which includes tests mainly reflecting the specific activity of Kazakh wrestling. This is the essence of the conducted work.

The analysis of training of outstanding athletes of Kazakh wrestling allows selecting three main areas in which a technique of their training developed in the past 5 years:

- 1) low growth in the total volume of training work;
- 2) improvement of sports training based upon widespread use of new media training;
- 3) insufficient scientific and methodological support of training.

If the methods of training do not meet the essential requirements of competitive activity, the success cannot be expected.

According to Leontiev’s theory of activity, a competitive process should be divided into individual units – actions [8]. As well, the basic requirements are required for an athlete from the standpoint of technical and tactical, physical, psychological preparedness.

To draw up the training programs for highly skilled athletes, it is required to identify athletes’ features of speed and power abilities with a sufficient degree of objectivity taking into account their manifestation in the performance of technical activities, analysis of biodynamics is highly effective for this purpose. Deploying efforts displayed at the dynamometer enables to evaluate (in the presence of model parameters) the degree of “explosive” abilities. Based on this, a set of tools with certain directions is drawn up. This approach allows for the best use of tools, methods and time of training highly skilled wrestlers [13].

Control subsystem in the training of Kazakh wrestling sportsmen should, at least, meet the requirements of complexity, rating specialization (this does not imply the requirements of validity, reliability, consistency to be met by any tests).

At the present time and in the foreseeable future the occurrence of one standardized test which would adequately assess the overall readiness of an athlete is not expected.

The aim of the study is to identify the necessary set or battery of tests (a set of necessary and sufficient techniques) which would be useful in objective evaluation of athletes' preparedness and predict the future opportunities.

The content of the complex should include tests mainly reflecting the specific activity. With the help of the test results the current level of preparedness of the athlete should be assessed and compared to other athletes' skills level.

The motor task was a basis for the most of the tests used in this research. According to the classification proposed by V.M. Zatsiorsky, motor tests are divided into three categories [21].

*Test exercises* are those where the subject must show the highest result in completing standard tasks.

*Functional test* checks the reaction of athlete's organism on a standard load.

*Maximum functional test* reflects the maximum potential of an athlete in the performance of a given task.

The choice of parameters for the set of tests was carried out according to their logical information content with respect to various aspects of physical fitness. Defining researched indicators the following requirements were envisaged:

- Standard;
- Reliability;
- Validity in relation to the relevant factors of physical fitness;
- Availability and not burdensome;
- Compliance with all major factors of physical readiness;
- The same format for the set of tests for all stages of the competition period [21].

Pedagogical tests and exercises were applied to evaluate the physical fitness of highly skilled wrestlers of Kazakh wrestling. The choice of quantitative indicators was based upon literary data. In the studies the authors used a wide range of pedagogical tests and control exercises that is caused by the lack of sufficiently based control exercises, in the best way reflecting physical fitness. Therefore, complex of tests for evaluating each quality may be composed of a significant number of exercises. Based upon this, there were selected 63 indicators for evaluation of readiness of the various kinds:

- Indicators characterizing the rapidity with the release of elementary and complex forms of expression: reaction time (RT), ms; choice reaction time (CRT) ms; the frequency of the local movements (tapping-test); time of 10 pull-ups (on top grip) s; time of 10 front plank push-ups, s; time of 10 bench jumps (0.7 m height), s; time of 10 straight leg lifts to touch the carpet behind one's head, s; time of rope climbing (5 meters), s; time of 30 m sprints from the crouch start, s; time of 60 m sprints from the crouch

start, s; time of 100 m sprints from the crouch start, s; the number of squats within 20 seconds; number of dummy hip rolls for 20 s; time of 8 dummy suplexes, s; time of 30 rolls from the front stance to perform a backdrop, s;

- Indicators of strength preparedness: moment of force (MOF) of the right forearm flexor, nm; MOF of right forearm extensor, nm; MOF of left forearm flexor nm; MOF of left extensor forearm, nm; MOF of right hip flexor nm; MOF of right hip extensor, nm; MOF of left hip flexor, nm; MOF of left hip extensor, nm; torso unbending force, kg; force of the trunk flexors, kg; force of the left hand flexor, kg; force of the right hand flexor, kg; the number of pull-ups; the number of front plank push-ups; number of pull-ups at intervals of 3 seconds; the number of pull-ups at intervals of 10 seconds; 45-degree angle hold-on time, rear support, min; 90-degree angle hold-on time, elbow hang, s; number of sit-ups (feet anchored);
- Indicators of speed-strength preparedness: standing triple jump, cm; standing long jump with two feet and arm swing, cm; upward jump with hands at hips, cm; standing fourfold long jumping steps, cm; standing tenfold long jumping steps, cm;
- Indicators to assess coordination abilities: Romberg test, (complicated), s [17]; Yarotsky test, s [20]; trampoline front somersault pike, pedagogical points; trampoline back somersault pike, pedagogical points; wrestler's bridge (from the standing position), pedagogical points; upstart from the wrestler's bridge, pedagogical points; upstart from back lying position, pedagogical points; wrestler's bridge overhead transitions, pedagogical points; wrestler's bridge racing, pedagogical points.

As it is known, in the martial arts duration of a simple motor response is about 50% of the total time spent on exercises. In addition, the authors recorded a complex choice reaction to tactile stimulus characterized by the fact that the way to answer to the appropriate type of signal is unknown (such reactions are common to all kinds of wrestling, where the athlete's responsive motions are completely determined by the opponent's actions).

The time of simple and complex motor reactions to tactile stimuli was measured by F-209 electronic stopwatch (sensitivity 10<sup>-4</sup>) as an interval from the time of signaling before the response.

The reaction of choice was used as a complex of motor reaction. The situation of choice was created by striking (at random) or to the right or left thigh, which was responded by opening the contacts of the corresponding hand. When measuring a simple motor response only the right thigh was stricken. Before the actual hitting, prior "attention" command was given, the duration of each testee's examination lasted for 3-5 minutes, the number of measurements ranged from 25 to 30.

To perform tapping test CX-106P counter was used. It measured the maximum number of hand tappings within 40 seconds (4 series of 10 s).

Coordination abilities were determined based on five attempts of pedagogical evaluation (average) made by three experts.

In addition, in these studies 800 and 1600 m races were used to determine the anaerobic performance of athletes' bodies.

To determine the special endurance in this pedagogical experiment, athletes were tested by throwing a dummy, simulating an encounter with a wrestler, which resulted in the calculation of the endurance ratio. The essence of the test was to perform several suplexes with a dummy. The standard tempo (40-5 suplexes) was set, following by 8 suplexes performed by the wrestlers in the maximum rate. The process included six combinations of background suplexes with spurts. The duration of spurts is a variable value, the dummy weight and the number of suplexes within 40 seconds are constant values. At the same time, we proceeded from the assumption that the higher resistance of a wrestler in a motor hypoxia developing in spurts, the less time of spurts increases by the end of the test. Special endurance factor was determined by the formula proposed by M.Y. Nabatnikova [11].

Furthermore, to analyze the current state of an athlete SWR-2 test was used in its shortened version (3 min) SWR-1. In all the tests, the dummy weight was 1/3 of the athlete's weight.

The task of medical monitoring was to define physical development and functional state of athletes' bodies in the pedagogical experiment.

Anthropometric methods of research included measuring the length of extremities (forearm, hip), body weight, hand and torso dynamometry. All measurements were performed according to the method of V.V. Bunak [4]. The respiratory function was determined by the vital capacity of lungs (VCL), and also Stange test (inspiratory breath-holding) and Hench test (expiratory breath-holding) were used [1]. The selection of these tests is conditioned by the specifics of competitive activity in the Kazakh wrestling related to breath-holding (static stress, "straining").

Recently the prospects of using seismic cardiogram (SCG) to assess the mechanism of the athletes' circulatory system adaptation were proved. Heart rhythms were recorded in the middle of the sternum in the athlete's standing position by a seismic sensor (C-130) through the 14 T "Baby" electrocardiograph at a rate of 50 mm/s in the II lead. The average duration of the intervals (R1 - R7) was measured manually and processed by continuous recording of 5-7 cycles. SCG was recorded before loading and immediately after (CWS-1), which allowed adequately characterizing adaptation of the cardiovascular system to specific use.

To determine the physical performance controlled activity tests are widely used in recent years. PWC170 test is the most widespread in this group; it can be calculated using the following formula:

$$PWC170 = N + (N2-N1) (170-f1) / (f2-f1),$$

where:

*PWC170* - physical performance (kgm / min at a pulse of 170 beats/min);

*N1* and *N2* correspond to the power of the first and second workloads;

*f1* and *f2* - heart rate at the end of the first and second workloads.

In these studies PWC170 was determined by means of Monark cycle ergometer. PWC170 values were also used for general determination of the maximum oxygen consumption (MOC), as they have direct positive relationship ( $r = 0.703$ ). To calculate MOC the following equation was applied:

$$MOC = 2.2 \times PWC170 + 1070.$$

Circulatory apparatus performance was determined with the help of cardiac minute output (CMO) in l/min. Knowing the value of the work performed, one can get an idea of CMO without making any special measurements:

$$IOC = 0.012 \times PWC170 + 7.$$

With the current requirements for the highly skilled athletes' training the importance of comprehensive control over strength fitness is highlighted.

To solve the problems of this study the authors used a poly-dynamometer developed by A.V. Korobkov, G.I. Chernyaev, modified by G.D. Savichev and manufactured by the Research Institute of Sporting and Engineering Products VISTI, Moscow, Russia [3].

The poly-dynamometer measurements were made by stoop and stretch of corresponding parts of the body (90-degree angle), each measurement consisted of three attempts; the best result was ranked.

### III. RESULTS

The reliability of all the indicators initially selected for characteristics of physical fitness was estimated starting from "satisfactory" and above until the "excellent", so most of the indicators were "admitted" to the next stage of selection. The exception applied to 4 parameters reflecting the speed qualities: the number of sit-ups within 20 seconds; number of suplexes within 20 s; the number of burpees (kicking feet back from squat to plank position) within 20 seconds; rope climbing (5 meters). However, they were excluded rather for other reasons than because of their unreliability: these indicators were less interesting in terms of content.

Of the 20 indicators initially selected for characterizing strength qualities, 2 were excluded while taking into account the reliability and content value. These include primarily sit-ups (feet anchored) and pull-ups at intervals of 3 seconds. In turn, it was logical to leave the 18 parameters of strength fitness, as it is not improbable that these parameters are highly valid in respect to basic factors of physical fitness.

A set of speed and strength indicators was not subject to severe reduction, because they all were reliable, though having different coefficients of correlation.

However, the authors found it necessary to exclude tenfold jumping steps from the jump tests because of their sharp difference (in terms of stability) from all others for the worse.

The indicators characterizing the coordination abilities were also reduced. Specifically, wrestler's bridge overhead transitions and upstart from back lying position were (for the same reason).

Indicators characterizing endurance were not reduced, but it should be noted that stability SWR 2 test was "excellent" and SWR-1 demonstrated only "satisfactory" results.

Aware that most of the functional fitness tests have low chances of getting into the final set of measurements, the authors nevertheless felt it necessary to admit them all, without exception, to the next stage of tests in view of their substantial value.

Table 1 shows the indicators which were selected from the originally recorded list in accordance with the requirements set forth above.

TABLE 1: INDICATORS SELECTED FOR PHASE MONITORING OF THE PHYSICAL PREPAREDNESS OF HIGHLY SKILLED WRESTLERS FOR KAZAKH WRESTLING

<i>Indicators</i>	<i>Stability</i>	<i>Factor descriptiveness</i>	<i>Input to ODV corresponding factor</i>
PWC170a6c.	-	0.969	I. Physical operability(20.4%)
The reaction time	0.854	-0.646	
Explosive strength(deflection roll)	-	0.717	
Technical action strength fitness(16.6%)	-	0.903	II. Special speed-strength
Dummy transfer height		0.531	
SWR-1 (ped. points)	0.864	0.510	
Lifting unbending from wrestler's bridge	0.833	0.718	
Left forearm extensor MS	0.988	0.834	III. Special strength abilities of rotator belts (15.6%)
Right forearm extensor MS	0.922	0.823	
Right flexor forearm	0.978	0.736	
		<i>Time for 8 manikin suplexes</i>	
SWR-1 (con. units)	0.964	0.569	IV. Special endurance(11.6%)
The cardiac cycle duration of under load	-	0.994	
Trampoline back flip (ped. points)	0.854	0.920	V. Special coordination abilities (11.1%)
Wrestler's bridge race(ped. points)	0.837	0.547	
Time for 30 suplexes	0.954	-0.863	
Tapping-test (4 times/10 s)	0.878	0.826	
Time for 60 m sprints	0.906	-0.935	VI. Speed-strength indicators for leg muscles(9.1%)
Time for 10 0.7-m high jumps	0.841	-0.831	
The strength of right arm flexor	0.854	0.817	VII. Hand Strength(7.1%)
The strength of left arm flexor	0.862	0.816	
Time for 10 pull-ups	0.824	-0.837	

#### IV. CONCLUSIONS

From the metrological point of view the used tests are rather reliable and convenient in terms of organization. The proposed battery of tests is the most rational for the stepwise control of different sides of physical fitness of highly-skilled wrestlers of “Kazaksha Kuresi”.

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