

## ON THE IMPROVEMENT OF THE CONTROL FORCE READINESS OF STUDENTS ENGAGED ARM SPORT

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**Annotation.** *Purpose:* to identify the most informative tests and test exercises to assess force readiness athletes. *Material:* the study involved 23 students of mass sports categories. Ascertaining experiment involved testing athletes force readiness, analysis of their competitive activity and determination of strength and reliability of correlation tests with the results of the competition. There were 19 trials and two anthropometric measurements. *Results:* it was found that traditional tests to determine the strength abilities athletes enough authentic. A significant positive correlation with the results of competitive activity indicators carpal dynamometry (in two different weight classes, and on both hands in the categories of more than 85 kg). And pull-ups on the maximum number of times. A high degree of correlation between the results of competitive activity and holding a dumbbell on a special bench capture below. This exercise is effective for assessing the level of preparedness of special strength in the weight category up to 80 kg and 85 kg. *Conclusions:* the most informative tests and benchmarks to determine the exercise of power readiness 1-2 athletes in sports categories arm sport.

**Keywords:** arm wrestling, tests, testing, correlation, strength, student.

### Introduction

Growing of arm-wrestling's popularity goes ahead of scientific-methodic accompaniment of training and competition functioning, in particular, control of sportsmen's physical fitness's improvement. Questioning of advanced coaches of Russia, Ukraine, Byelorussia and Kazakhstan showed that the most important physical qualities of arm-wrestler are speed-power abilities, maximal strength and power endurance [1]. The most important factor of determination of sportsman's strong and weak sides and obtaining initial information by coaches for formation of individual training programs is testing [5, 7, 9]. There is a problem of determination of effective evaluation criteria for physical fitness [4, 6, 8, 10-15], because physical qualities are specific in their manifestation in competition functioning of arm-wrestling. Traditional tests and control exercises, which are widely used in different power kinds of sports and martial arts, do not permit to effectively use test profile of power fitness in arm-sport.

### Purpose, tasks of the work, material and methods

*The purpose of the research:* is to determine the most informative motion tests and control exercises for evaluation of power fitness of arm-wrestlers.

*The tasks:*

1. To select test exercises and work out control exercises for evaluation of level of general and special power fitness of arm-wrestlers.
2. To ground information content of tests and control exercises for determination of arm-wrestlers' power fitness.

In the course of the research we used methods of mathematical statistics in order to determine coefficient of range correlation [2].

For checking up of informational level of standard tests as well as control exercises, worked out by us, from May to December 2012 we carried out pedagogic experiment, in which 23 arm-wrestlers took part. Experiment was conducted on the base of NRU "BelGY" (Russia, Belgorod). All participants of experiment were university students with qualification 1<sup>st</sup>-2<sup>nd</sup> sport grade. The experiment included testing of general and special physical fitness of arm-wrestlers, analysis of their competition activity and determination of correlation of tests with competitions' results.

In the research we used:

#### 1) standard test:

- Hand dynamometry;
- Back strength dynamometry;
- Press in lying position;
- Chin ups;
- Pressing ups on parallel bars;
- Pressing of weight in lying position (quantity of times with weight equal to body mass);

#### 2) special control exercises:

- Hand dynamometry with bent arm (sportsman takes dynamometer and place arm, like in wrestling, bends completely hand and presses dynamometer with maximal force);
- Chin ups for 10 sec.;
- Pressing up on parallel bars during 10 sec.;
- Climbing on rope without help of legs for quickness (length of rope- 4 meters);

- Bending of arms with maximal weight up to angle of 90 degrees between arm and forearm (during exercise the tested choose maximal for him weight, stands with back to wall and shoulders resting on wall and lifts weight up to crossing of horizontal plane by forearms);
- Hanging on bent arm (fulfilling this exercise, athlete makes one chin up with grasp from below and releases one arm. His task is to keep position as long time as possible; is athlete descends lower than level of eyes, timer stops), pronation of forearm, loaded with weight on belt;
- Supination of forearm, loaded with weight on belt;
- Pulling with neutral grasp (pulling of back strength dynamometer with bent at right angle arm);
- Pulling with grasp from below;
- Holding of dumbbell with grasp from below on Scott's bench (dumbbell's weight = 50% of body weight);
- Holding of dumbbell with neutral grasp on Scott's bench (dumbbell's weight = 33% of body weight);
- Bending of hand with one arm with weight bar (forearm and hand are on horizontal bench);

With choosing of test and control exercise, we considered specificity of competition functioning, feasibility, easiness of collecting and analyzing of data [5].

### Results of the research

Comparing of testing results with results of competitions permitted to determine such tests and exercises, which to the largest extent correlate with results of competition functioning in arm-sports.

The experiment, carried out by us, showed that many tests do not correlate with competition functioning, i.e. they are not informative for arm-sport.

High correlation was found between competition results and bending of arms with weight bar in standing position. For all weigh categories coefficient of correlation was higher than critical indicator. It proves high significance of arm biceps' maximal strength in arm-sports.

Table  
*Determination of range correlation coefficient between competition results and bending of arms with weight bar (up to 86 kg, left arm) (rkpum.)=0.829)*

Respondents (n=6)	Lines of measurements		Range numbers		Difference of files	
	place	Test (kg)	Range of place (A)	Range of test (B)	d = A-B	d <sup>2</sup>
1.	1	68	1	2	-1	1
2.	2	75	2	1	1	1
3.	3	60	3	3	0	0
4.	4	58	4	4	0	0
5.	5	40	5	5	0	0
6.	6	35	6	6	0	0
Sum of squares						2
Coefficient $r(\text{actual}) = 1 - \frac{\sum d^2}{n(n^2-1)}$						0.94

Control exercise – pressing ups on parallel bars dor maximal quantity of times showed positive correlation with competition result only in one weight category, both for right and left arms; that is why it would be incorrect to regard this exercise as indicator of special power fitness in arm-wrestling. Nevertheless, level of dynamic power endurance is of certain importance for arm-wrestler.

Comparison of competition result with indicators of exercise “Pronation of forearm” in weight category higher than 85 kg showed rather expressive positive connection. With it in two other categories, both for left and right arms, indicators of correlation were close to confident and varied from 0.78 to 0.82 with critical value – 0.829. This fact permits for us to make conclusion that pronation of forearm reflects level of arm-wrestler's special fitness with high objectiveness.

Circumference of arm is an anthropometric indicator, which positively correlates with result of competition activity at 5% level of confidence in every weight category.

We also found positive connection of competition results with indicators of hand dynamometry in two weight categories (and on both arms in categories higher than 85 kg) and chin up for maximal quantity of times.

Supination of forearm is exercise, which confidently correlates with results of competition functioning of heavy weight category. In weight category up to 85 kg we determined high, but not confident correlation of this exercise with competition functioning in wrestling of one of arms (coefficient equals to 0.77 with critical value 0.829).

High level of correlation connection was found between results of competition functioning and keeping dumbbell by gasp from below on special bench. This exercise is rather effective for evaluation of special power fitness in weight categories up to 80 and up to 85 kg. With it, confident correlation was registered between results for every

arm. In weight category higher 85 kg correlation was not registered. Probably it is connected with holding of weight, which equals to 50% of body mass. In category higher 85 kg differences in body masses of sportsmen are rather significant.

Between circumference of arm and competition results we registered correlation connection only among sportsmen in category up to 86 kg f (left arm wrestling).

Control exercise "Pulling by grasp from below" confidently correlates with competition result only in category up to 85 kg for both arms.

Chin ups for quickness during 10 seconds correlate at confident level of significance with competition results in category up to 80 kg (for both arms).

Quantity of pressing ups during 10 seconds is an exercise, which correlates with competition result in two weight categories, but only for one arm.

Holding of dumbbell (33% from body mass) with neutral grasp in static position showed confident positive correlation with competition result in one weight category – up to 85 kg. With it in two other categories correlation turned out to be rather high, though not confident. Correlation coefficient in categories up to 80 kg and over 85 kg was 0.71 with critical value 0.829.

It is also important to note pressing of weight bar in lying position. In this exercise, with weight bar, which is equal to body mass, we registered high, but not confident correlation with competition result. In categories higher 85 kg coefficient was 0.71 (for right arm) and in category up to 86 kg – 0.78 (for right arm) and 0.81 (for left arm). Critical value was 0.829.

Also pressing for maximal quantity of repetitions showed high correlation with competition results. In categories more than 85 kg correlation coefficient was 0.64 and 0.67 accordingly for left and right hands; in category up to 85 kg in right arm wrestling – 0.81.

Control exercise "pulling in horse stand" confidently correlates with competition result in categories more than 90 kg (left arm wrestling). In categories up to 80 kg and 85 kg we registered high, but not confident, correlation. Correlation coefficient was 0.74 and 0.8 accordingly, with critical value 0.829. These indicators permit to affirm that exercise "pulling in horse stand" are rather informative for evaluation of special physical fitness in arm-sport.

Hanging on bent arm positively correlates with competition result only for weight category up to 80 kg (for left arm wrestling), where we registered strong but not confident correlation.

Control exercises: dynamometry of bent hand, climbing on rope for quickness, bending of hands with weight bar in sitting position did not show strong and confident correlation connection. Probably these exercises can strongly correlate with competition functioning in lighter weight categories or in qualified sportsmen.

#### **Conclusions:**

1. In arm sports not only static strength and power endurance are important but also dynamic power endurance. It is possible that these results can be related only to sportsmen of mass sports grades.

2. Considering specificity of competition functioning in arm-sports, for evaluation of special physical fitness it is purposeful to use tests and control exercises, which characterize level of strength of arms and girdle muscles.

3. The most informative tests for determination of mass grade sportsmen's special fitness in arm sport are the following: bending of arms with weight bar of maximal weight with grasp from below; pressing of weight bar with maximal load in lying position; the same with load equal to body mass for maximal quantity of repetitions; pulling with grasp from above; pronation of forearm; hand dynamometry; holding of dumbbell with grasp from below and with neutral grasp.

The prospects of further researches will be connected with studying of power fitness' control of qualified arm-wrestlers in wide range of weight categories as well as other kinds of physical fitness.

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