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METHODOLOGY OF IMPROVING STRENGTH TRAINING OF QUALIFIED HANDBALL PLAYERS

Sh. K. Pavlov
Doctor of Philosophy (PhD) in Pedagogical Sciences, Associate Professor
Uzbek State University of Physical Culture and Sports
Chirchik, Uzbekistan

R.I. Isroilov
Uzbek State University of Physical Culture and Sports
Chirchik, Uzbekistan

ABOUT ARTICLE

Key words: Sports, training process, special physical training, skilled handball players, functional capabilities, strength, explosive power, strength qualities of handball players, coordination of movements.

Abstract: In this article, tools and methods for improving strength training of skilled handball players, information on scientific researches and scientific theories of scientists, and the results of research works based on them are highlighted.

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Introduction

Sport has become one of the most important factors in achieving not only physical but also spiritual perfection of a person. The prospects of each sport depend on the scientific research being conducted today, the experience and skills gained in the field of sports, and the personnel we train in the sport of handball. At the current stage of sports development, we see such features that seriously affect the process of training athletes and set new and more complex tasks and assignments for the coach and athlete, which, in turn, call for the search for the most appropriate forms and methods of organizing the training process. The process of increasing the effectiveness of general and special physical training of qualified handball players on a global scale is becoming one of the priority areas today. The creation of a scientific and technological school specialized in training skilled, talented and competitive handball players, the rational use of the methodology of applying training loads depending on the age, gender, functional and physical capabilities of the players, the introduction of advanced innovative technologies into the educational and training process are among the requirements of the time. It is advisable to increase the volume and intensity of training loads from year to year not in a “step-by-step” manner, but in a “wave-like” manner. Therefore, the organization of each coach, especially team coaches, on a scientific basis is one of the fundamental aspects of the problem of training qualified athletes. In particular, the search for modern means and methods of improving the quality of strength in qualified handball players and increasing the level of training with the help of special game exercises is one of the urgent problems today.

At the modern stage of handball, experts believe that the level of strength is an important factor in the physical training of handball players. According to the observations of V.Ya. Ignatieva, the average attack duration of skilled handball players does not exceed 22.5 seconds, and 86% of the total number of attacks in the game is performed at speed. The results of numerous experiments conducted during the study show that without good comprehensive preparation, it is impossible to fulfill the requirements set for modern handball. The most important role in this is given to the level of development of speed-strength qualities, which suggest the manifestation of great force in a short time not only due to physical strength and

coordination of movements, but also due to the speed of muscle contraction when overcoming a constant mass of resistance. It follows that in order to increase the speed of the body, it is necessary to increase the duration and intensity of the movement or reduce body weight. However, the athlete cannot reduce the weight of his own body or the weight of a standard sports equipment (handball) and the time of movement. Therefore, to improve strength qualities, it is necessary to increase the “explosive force” of the muscles [4].

The strength qualities of handball players are determined by the characteristics of movements that are associated with some resistance in a minimal time interval. Such resistance movements include

a) overcoming the athlete's own body weight, throwing the ball, passing the ball, taking the ball from the goalkeeper, sharp starts and changes in direction during movement, etc.

b) capture the force associated with throwing the ball, passing the ball from the sideline.

c) overcoming the opponent's resistance force [4].

Sh.K. Pavlov's studies show that the intensity of the work performed during the game fluctuates from average to maximum, with the work of a power nature constituting the main part of the load [8].

A.O. Abdalimov's studies revealed some aspects of the relationship between the strength and technical training indicators of qualified athletes. In a training session conducted using control exercises before the game, the authors found a correlation between the indicators of long-term possession of the ball and strength training. Theoretical and experimental studies of recent years show that in sports related to the art of movement, it is closely related to the athlete's strength training [1].

The purpose of the study is to improve the strength training of qualified handball players using innovative tools and methods and to control it during the experiment. 1) study of scientific literature and scientific research and practical experience of domestic and foreign scientists on the topic. 2) study and analysis of the scientific-theoretical aspects of training loads during annual training. 3) control the growth rate of strength qualities of qualified handball players during training and substantiate the effectiveness of the methods used in

pedagogical experience. To solve the research tasks, research was carried out with the participation of 20 handball students of the UzZhTSU "SKUF" men's handball team. The research was conducted during 2023-2024. In this case, 10 handball players were selected for the experimental group and 10 for the control group, and the experiment was conducted.

During the pedagogical observation period, the strength training of handball players aged 18-22 was monitored. The experiment used generally accepted methods and conducted pedagogical observations during the training process. Its purpose was to determine the strength abilities of handball players.

Research materials and methods. Usually, strength exercises are combined with exercises aimed at increasing joint mobility and relaxation. To improve strength, the “as much as possible” and “maximum effort” methods are used. In the “as much as possible” method, exercises are performed for a long time with infrequent breaks. In this case, the weight of the load should be average (50-60% of the maximum load). There are three options for using this method:

a) perform the exercise with a constant amount of weight or resistance (requires great effort and willpower, at a moderate pace until noticeable fatigue appears;

b) perform the exercise at a fast pace, increasing the rest interval between each exercise, i.e. perform as many sets of movements as possible in a short time (0.5-1.5 min);

c) each time the exercise is repeated, gradually increasing the weight or resistance, reducing the rest (pause) and reducing the speed.

The “maximum effort” method is used to improve the strength of players without requiring them to build large muscle mass. It consists of performing resistance exercises with a minimum of repetitions of the maximum weight (85-95%) close to the maximum load and with a short break (for example, lifting the barbell 2-3 times in one exercise; performing 5-7 times with a 3-4 minute break after each exercise) [12]. In the weekly training cycle, strength exercises should be included on the first day of training. In this case, they are most effective, since they are performed against the background of an optimal state of the central nervous system, without fatigue from previous exercises. The frequency of “strength” exercises depends

on the contingent of those involved and the tasks of the training process. During the preparatory period, 4-5 exercises can be performed in a weekly cycle. During the competition period, the volume of strength exercises decreases, and this mainly depends on the density of the competition schedule [3]. Skilled handball players should be developed on the basis of a set of strength exercises that focus on strength, speed and agility. Strength training, as a rule, should be combined with exercises aimed at increasing joint mobility and relaxation. Thus, all the considered methods of training ability can be successfully used in the training of qualified handball players.

An important condition for success in improving strength is to relax the muscles before repeating the exercise. The most common and simple means of improving strength is stretching. In the process of using them, the main technological factor is the effort not to increase the speed and power of movement. There are two important conditions to keep in mind when improving maximum speed and explosive power.

1. Each athlete should take into account his initial physical and especially strength training and, based on this, choose exercises with a certain effect. It should be taken into account that if the effect of the exercises is high, the damage to the body is low, and it may not be effective at all.

2. Muscles should be quickly prepared for new loads to get rid of high speed, effective explosive loads, and get rid of specific fatigue. For this, it is necessary to constantly and purposefully perform exercises for flexibility, to fill the breaks with various stretching, stretching, circular movements, which are of great importance in training high-quality handball players as an integral, comprehensive and deep essence of appropriate content [2].

Discussion of research results. According to the test results, athletes were divided into 2 groups: those with high and low strength qualities. That is why the training program was developed.

Athletes with a high level of strength training were trained according to a generally accepted program, and athletes with a low level of development were offered a special program with attention to unusual means of developing strength qualities. There are differences in

means and methods for developing and improving military readiness. The above stylistic considerations called for a pedagogical experiment in this direction with the participation of handball players.

Indicators of the level of strength training of qualified handball players of the control and experimental groups according to special tests (before and after the experiment, n=20)

Statistical analysis of the indicators of the control tests was carried out between the experimental and control groups examined in the pedagogical research. At the beginning of the experiment, the average indicator of the control group's handball throwing distance was 35.4±2.18 meters, and the experimental group's was 37.3±1.37 meters, the level of reliability was equal to (t=2.33; p>0.05). meter, the level of reliability was equal to (t=2.20; p<0.01). At the beginning of the experiment, the average indicator of the results of the control group was 25.8±1.32 meters, and the experimental group was 27.2±1.86 meters, and the level of reliability was equal to (t=2.06; p<0.05). 30.1±2.15 meters, the level of reliability was equal to (t=3.42; p<0.001). For left-handed swing, at the beginning of the experiment, the average indicator of the results of the control group was 15.2±1.69 meters, and in the experimental group it was 16.1±1.39 meters, the level of reliability was equal to (t=1.35; p<0.1), and at the end of the experiment, the average indicator of the results of the control group was 16.2±1.74 meters, and in the experimental group it was 17.6±1.25 meters, the level of reliability (t=2.26; p<0.01) was equal to At the beginning of the experiment, the average result of the control group was 9.5±2.82 meters, and the experimental group was 10.2±1.58 meters. 12.8±2.05 meters, the level of reliability was equal to (t=2.37; p<0.01). At the beginning of the experiment, the average indicator of the results of the control group was 19.2±1.87 times, and the experimental group was 21.8±2.7 times, the level of reliability (t=2.66; p>0.05) was the same as that of the control group. 21.7±2.5 times, and 23.6±1.84 times in the experimental group, the level of reliability was equal to (t=2.12; p<0.01). At the beginning of the experiment, the average indicator of the results of the 3-fold standing jump test in the control group was 737±16.3 cm, and in the experimental group it was 754.2±10.9 cm, the level of reliability was equal to (t=2.85; p>0.05), and at the end of the experiment, the average indicator of the results of the control

group was 749.4±14.5 cm, and in the experimental group 761.9±8.15 cm, the confidence level was equal to (t=2.60; p>0.001). According to the "Abalakov" method, at the beginning of the

experiment, the average indicator of the results of the control group was 24.4±3.15 cm, in the experimental group it was 27.1±4.56 cm, the level of reliability was (t=1.64; p<0.1), and after the experiment, the average indicator of the results of the control group was 26.1±2.54 cm, and in the experimental group it was 32.4±4.86 cm, reliability level was equal to (t=3.98; p<0.01).

Figure 1. At the beginning and end of the pedagogical experiment, the statistical characteristics, relative differences, and percentages of the results shown by the examinees of the NG and TG groups on the selected tests.

These indicators indicate that, according to the results at the beginning of the experiment, the strength training between the experimental and control groups was almost equal, but at the end of the experiment, it was observed that the results of the experimental group significantly improved and the level of strength training increased by a certain amount.

Statistical data were collected on the results of the control group at the beginning and at the end of the experiment. At the beginning of the experiment, the average indicator of the results of throwing the handball ball was 35.4±2.18 meters, and at the end of the experiment it was 37.6±1.58 meters, the level of reliability was equal to (t=2.58; p<0.01). At the beginning of the experiment, the average result of the test of throwing a ball weighing 1 kg with the right

hand was 25.8±1.32 meters, and at the end of the experiment it was 27.6±1.34 meters, the level of reliability was equal to (t=3.03; p>0.01). The average indicator of the result of performing this test with the left hand at the beginning of the experiment was 15.2±1.69 meters, and at the end of the experiment was 16.2±1.74 meters, the level of reliability was equal to (t=1.30; p<0.1). According to our same test, the average result of the test was 9.5±2.82 meters at the beginning of the experiment, and 10.7±2.28 meters at the end of the experiment. The reliability level was equal to (t=1.05; p<0.1). The next indicator was 19.2±1.87 times at the beginning of the study and 21.7±2.5 times at the end of the experiment, the level of reliability was equal to (t=2.53; p>0.05). The average result of the standing 3-step jump test at the beginning of the experiment was 737±16.3 cm, and at the end of the experiment was 749.4±14.5 cm, the level of reliability was equal to (t=1.80; p<0.05). The average result of the height jump test at the beginning of the experiment was 24.4±3.15 cm, at the end of the experiment was 26.1±2.54 cm, the level of reliability was (t=1.33; p<0.1).

In the course of the experiment, we observed that, over time, all the indicators of the control group, which had traditionally conducted training, changed compared to the initial results, while significant differences were observed in all the indicators of the experimental group.

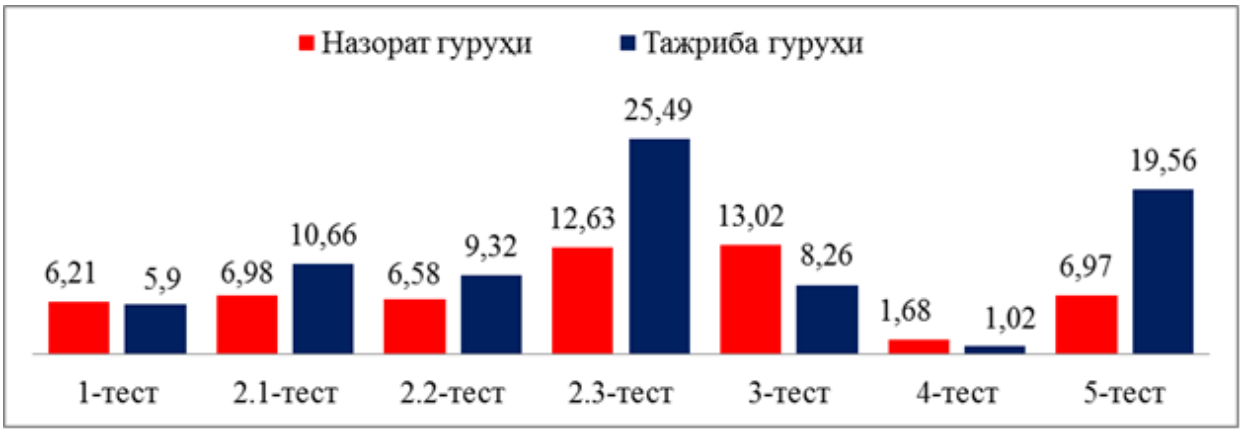

Figure 2. The relative increase in the results of the control and experimental groups on the selected tests, in %.

The results of the experimental group at the beginning and at the end of the experiment were compared. At the beginning of the experiment, the average indicator of the results of the handball ball passing test was 37.3±1.37 meters, and at the end of the experiment was 39.5±2.54 meters, the level of reliability was equal to ($t=2.41$; $p<0.01$). The average indicator of the results of the test of throwing a ball weighing 1 kg with the right hand at the beginning of the experiment was 27.2±1.86 meters, and at the end of the experiment was 30.1±2.15 meters, the level of reliability was equal to ($t=3.23$; $p<0.001$). The average indicator of the results of this test performed on the left hand at the beginning of the experiment was 16.1±1.39 meters, and at the end of the experiment was 17.6±1.25 meters, the level of reliability was equal to ($t=3.23$; $p<0.001$). When the same test was performed with both hands on the back, the average result at the beginning of the experiment was 10.2±1.58 meters, and at the end of the experiment was 12.8±2.05 meters, the level of reliability was equal to ($t=3.18$; $p<0.001$). The next indicator was 21.8±2.7 times at the beginning of the study, and 23.6±1.84 times at the end of the test, the level of reliability ($t=1.74$; $p<0.05$). The average result of the standing 3-step jump test in the experimental group was 754.2±10.9 cm, and in the experimental group it was 761.9±8.15 cm, the level of reliability was equal to ($t=1.79$; $p<0.05$). According to the "Abalakov" method, the average result of the height jump test at the beginning of the experiment was 27.1±4.56 cm, at the end of the experiment was 30.2±4.86 cm, the level of reliability was ($t=1.47$; $p<0.01$).

It is clear from the obtained results that the research conducted in the experimental group gave its results. We can see that the relative growth efficiency of all the tests used in the study is high in the experimental group. We can see that the relative difference of the statistical characteristics of the tests in the experimental group has improved by 11.46% compared to the beginning of the experiment.

Conclusion. The developed set of exercises was used during the training of qualified handball players, and as a result of the experiments, the statistical characteristics of the test results conducted in NG and TG at the beginning and at the end of the experiment, and the statistical reliability of their changes during the pedagogical experiment, evaluated on the basis

of the "Student distribution t" critical values, showed that the changes in TG are less reliable. Compared to the control group, the average relative growth rate of each test and results in the experimental group is relatively high and statistically reliable positive changes are a confirmation of the effectiveness of the introduction of significant corrections to the normative part of the training program in the experimental group and the proportionality of the time given to the general and special movement training.

Based on the above ideas, the use of handball sports and its elements will closely help in the complex improvement of physical fitness. In improving physical fitness, a long part of each physical quality is based on a specific set of exercises. Therefore, in improving any physical qualities, it is necessary to pay attention to coordination of exercises in the front positions. For this reason, if more serious attention is paid to this issue when teaching children basic physical exercises, complex development will be achieved in relation to age.

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Table 1

Methods for improving the strength training of skilled handball players through weight training

Methods for improving strength	Direction of strength improvement methods	Composition of the application component					
		Relative weight, maximum %	The number of repetitions of the exercise	Number of approaches	Rest, minute	Speed of movement	Exercise speed
Maximum movement method	Maximum strength development	100 and more	1-3	2-5	2-5	Slowly	Independent
	The development of maximum strength with an increase in muscle mass	90-95	5-6	2-5	2-5	Slowly	Independent
	Simultaneous growth of strength and muscle mass	85-90	5-6	3-6	2-3	Average	Average
Normalized iterative infinite motion method	Maximal strength increases with muscle mass at the same time	80-85	8-10	3-6	2-3	Average	Average
	Reducing the fat component of body weight and increasing endurance	50-70	15-30	3-6	3-6	Average	From the top to the maximum

Table 2

Indicators of the level of strength training of qualified handball players of the control and experimental groups according to special tests (before and after the experiment, n=20)

№	Test			Control group n=10		Experiment group , n=10		relative difference, %	t	P
				$\overline{X}$ ±σ	B, %	$\overline{X}$ ±σ	B, %			
1.	Handball throwing distance (m)		T/o	35,4±2,18	6,16	37,3±1,37	3,67	5,36	2,33	>0,05
			T/к	37,6±1,58	4,20	39,5±2,54	6,43	5,05	2,20	<0,01
2.	Throw a ball weighing 1 kg to a distance (m)	Right hand	T/o	25,8±1,32	5,12	27,2±1,86	6,84	5,42	2,06	<0,05
			T/к	27,6±1,34	4,86	30,1±2,15	7,14	9,06	3,42	<0,001
		Left hand	T/o	15,2±1,69	11,12	16,1±1,39	8,63	5,92	1,35	<0,1
			T/к	16,2±1,74	10,74	17,6±1,25	7,10	8,64	2,26	<0,01
		Back with both hands	T/o	9,5±2,82	29,68	10,2±1,58	15,49	7,36	1,66	<0,1
			T/к	10,7±2,28	21,31	12,8±2,05	16,02	19,63	2,37	<0,01
3.	The number of times a ball weighing 3 kg can be hit on the wall with both hands in 30 seconds (distance 1.5 m)		T/o	19,2±2,82	9,74	21,8±1,87	12,39	13,54	2,66	>0,05
			T/к	21,7±2,5	11,52	23,6±1,84	7,80	8,76	2,12	<0,01
4.	3 steps away from the place of residence (cm)		T/o	737±16,3	2,21	754,2±10,9	1,45	2,33	2,85	>0,05
			T/к	749,4±14,5	1,93	761,9±8,15	1,07	1,67	2,60	>0,001
5.	Height increase (cm) in the "Abalakov" method		T/o	24,4±3,15	12,91	27,1±4,56	16,83	11,06	1,64	<0,1
			T/к	26,1±2,54	9,73	32,4±4,86	15	24,14	3,98	<0,01

Table 3

Indicators of strength training level of Malakali handball players according to special tests (control group and experimental group n=20)

№	Test			The beginning of experiment		The end of experiment		Relative growth, %	t	P
				$\overline{X}$ ±σ	B, %	$\overline{X}$ ±σ	B, %			
1.	Throw the handball ball to a distance (m)		Н/г	35,4±2,18	6,16	37,6±1,58	4,20	6,21	2,58	<0,01
			Т/г	37,3±1,37	3,67	39,5±2,54	6,43	5,9	2,41	<0,01
2.	Throw a 1 kg stuffed ball a distance, (m)	Right hand	Н/г	25,8±1,32	5,12	27,6±1,34	4,86	6,98	3,03	>0,01
			Т/г	27,2±1,86	6,84	30,1±2,15	7,14	10,66	3,23	<0,001
		Left hand	Н/г	15,2±1,69	11,12	16,2±1,74	10,74	6,58	1,30	<0,1
			Т/г	16,1±1,39	8,63	17,6±1,25	7,10	9,32	3,23	<0,001
		Back with both hands	Н/г	9,5±2,82	29,68	10,7±2,28	21,31	12,63	1,05	<0,1
			Т/г	10,2±1,58	15,49	12,8±2,05	16,02	25,49	3,18	<0,001
3.	Throwing a ball weighing 3 kg to the target on the wall with both hands in 30 seconds (distance 1.5 m)		Н/г	19,2±1,87	9,74	21,7±2,5	11,52	13,02	2,53	>0,05
			Т/г	21,8±2,7	12,39	23,6±1,84	7,80	8,26	1,74	<0,05
4.	3 steps away from the place of residence (cm)		Н/г	737±16,3	2,21	749,4±14,5	1,93	1,68	1,80	<0,05
			Т/г	754,2±10,9	1,45	761,9±8,15	1,07	1,02	1,79	<0,05
5.	Height increase (cm) in the "Abalakov" method		Н/г	24,4±3,15	12,91	26,1±2,54	9,73	6,97	1,33	<0,1
			Т/г	27,1±4,56	16,83	32,4±4,86	15	19,56	2,51	<0,01