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THE EFFECTIVENESS OF TOOLS FOR DEVELOPING THE SPEED-STRENGTH ABILITIES OF HURDLERS

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Annotation. The article points out of speed- strength abilities importance in hurdles and their development means. Above-mentioned means divided on three parts, where the first are traditional, the second are special exercises which are with the help of pulling special equipments and third by using weightlifting means which are already proved their efficiency in training process.

Keywords: special physical training, speed-strength abilities, strength, hurdle, medicine ball, barbell, jerk.

Introduction. In our country today, special attention is being paid to the field of sports. Numerous efforts are being made to develop every type of sport, including track and field, and to attract young people to it. Track and field has now become the most popular sport. Our country's track and field athletes are achieving high results on the world stage. Many promising athletes are also emerging from the hurdling discipline of track and field.

While being one of the most spectacular events in track and field, hurdling is also considered one of the most technically difficult. This event demands physical qualities from the athlete such as speed, explosive strength, speed endurance, agility, strength endurance, flexibility, and coordination, as well as a strong athletic character [2].

The use of high-intensity loads in a hurdler's training increases the probability of over-fatiguing the athlete's body. Reducing the training volume leads to a decrease in general physical fitness, while increasing the body's high adaptability to training loads hinders the development of new athletic form. It is advisable to find the "golden ratio" between these factors. Improving technique, properly organizing rest intervals, and applying medical and psychological means of recovery are crucial aspects of improving a hurdler's performance and sustaining that result [1].

When preparing hurdlers for competitions, in addition to paying special attention to the aforementioned points, it is also important to use effective means of developing explosive strength, which is one of the key factors in clearing hurdles.

To develop the crucial physical quality of explosive strength for clearing hurdles, using jumping exercises, exercises performed with various resistance devices, and weightlifting equipment yields good results. Most importantly, selecting the most effective among these means and applying them in hurdlers' training sessions will produce the best outcomes.

Objective of the study. To select the most effective methods for developing the speed-strength qualities of hurdlers.

Tasks:

- to study existing literature and previous research on the selected topic;
- to identify methods for developing speed-strength qualities in the training of hurdlers;
- to select and implement the most effective methods for developing speed-strength qualities.

Research Results and Discussion. Speed–strength ability (also called *explosive strength*) is manifested in movements where an individual must produce **maximum force in the shortest possible time**.

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The forms in which speed-strength abilities are manifested depend on the characteristics of muscle exertion in a particular movement. These characteristics are reflected in the power increase during various movements, its magnitude, and the rate at which its duration develops. Therefore, for the manifestation of speed-strength ability, movement speed is considered essential, along with strength [3].

Speed-strength ability plays a crucial role in the training of hurdlers, enabling the effective execution of techniques for starting, running between hurdles, and clearing the hurdles.

When organizing the study, first, the means for developing speed-strength ability were compiled and divided into 3 groups. The first group included traditional means for developing speed-strength ability. These means consisted of the jumping exercises most frequently used in hurdler training (standing long jump, triple jump, bounding, depth jumps) and short-distance (30m) sprints. The second group included special exercises performed with various resistance devices: running with a sports rubber rope, jumps, throwing a medicine ball upwards from a half-squat position, jumping up an incline on both feet, and running in a special weighted vest. The third group included exercises performed with weightlifting equipment. For these exercises, jumping upward with a barbell on the shoulders, performing a snatch from a half-squat position, performing split jerks with a barbell on the shoulders, and lunging forward after a snatch from a squat position were selected (Table 1).

Over a 4-month period, the hurdlers involved in the study were divided into 3 groups of 15. The exercises selected above were applied separately to each group during their training sessions. The chosen methods for developing speed-strength abilities were used three times a week in the hurdlers' training during the preparatory period. Before and after the study, tests were conducted and compared to determine the development indicators of the hurdlers' speed-strength abilities. These tests included a 30m run, standing long jump, a forward underhand medicine ball throw with a jump, and hurdle attack distance (Figure 1) (Table 2).

Table 1

Methods and Application Norms for Developing the Speed-Strength Abilities of Hurdlers

т /p	**Traditional methods**	Daily training norm	**Special exercises performed with resistance bands (sports rubber rope)**	Daily training norm	**Weightlifting equipment**	Daily training norm
1	Standing long jump, cm	10-15 times	running with a sports elastic rope, m	4-6 times per 60m	Barbell jump squats (from a half-squat position), reps	barbell 30-40 kg, 8-10 times 4 series
2	triple jump, m	10-12 times	Skipping with a sports elastic rope, alternating feet, m	4-6 times per 60m	half-squat snatch, times	barbell 30-40 kg, 8-10 times 4 series

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3	60m shuttle run (hopping), sec.	4-6 times	two-footed jump onto a platform, m	4-6 times per 60m	jumping with a barbell on the shoulder, sec.	barbell 40 kg, 20-30 sec.
4	Jumping up, times.	4 series of 10-15 times	running with a special weighted suit, m	4 times per 50m	barbell lunges from a seated start	barbell 40-50 kg, 8-10 times 4 series
5	30m run, sec	4-6 times	throwing a medicine ball upwards from a half-squat position, times	4 sets of 15 reps with a 2 kg medicine ball		

Table 2

Results and growth indicators before and after the experiment (girls)

	Tests	**30m run, sec**			**Long jump from a standing position, cm**			**Standing long jump with a forward underhand throw of a medicine ball (2 kg), m**			**Take-off distance to the barrier, cm**		
		Traditional methods	Special exercises performed with resistance bands	Weightlifting equipment	Traditional methods	Special exercises performed with resistance bands	Weightlifting equipment	Traditional methods	Special exercises performed with resistance bands	Weightlifting equipment	Traditional methods	Special exercises performed with resistance bands	Weightlifting equipment
		Group 1	**Group 2**	**Group 3**	**Group 1**	**Group 2**	**Group 3**	**Group 1**	**Group 2**	**Group 3**	**Group 1**	**Group 2**	**Group 3**
	Average of pre-experiment results	4.8	4.9	**4.9**	210	208	**212**	8.5	8.6	**8.5**	170	169	**169**
	The average of post-experiment results	4.6	4.5	**4.4**	220	225	**245**	9.0	8.9	**9.6**	176	176	**184**
	Difference between results before and after the experiment	0.2	0.4	**0.5**	10	17	**33**	0.5	0.3	**1.1**	7	7	**15**
	Growth in %	4	8	**10.2**	4.8	8.2	**15.5**	5.9	3.5	**13**	4	4	**8.9**

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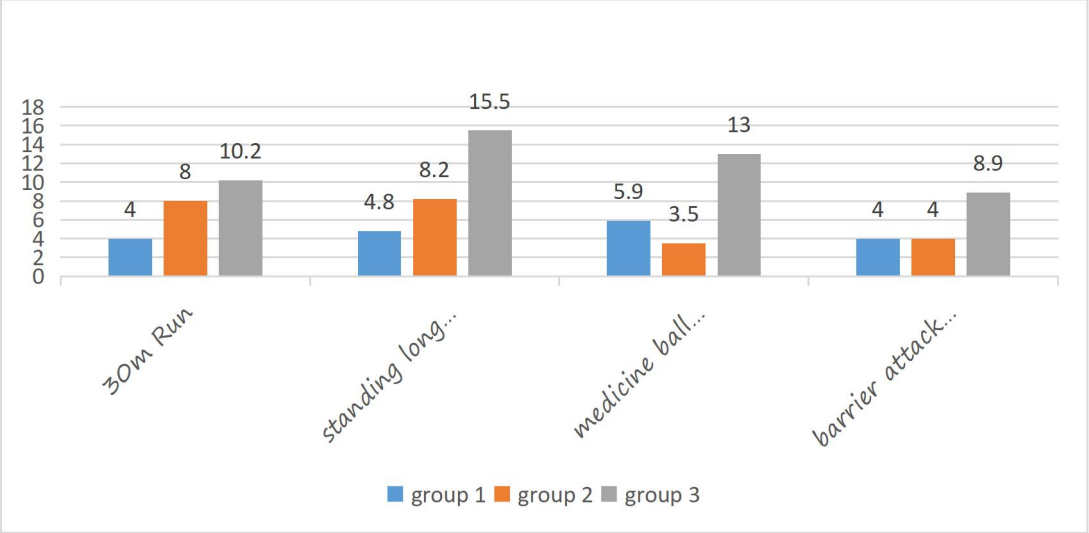


Figure 1. Growth indicator of results after the experiment

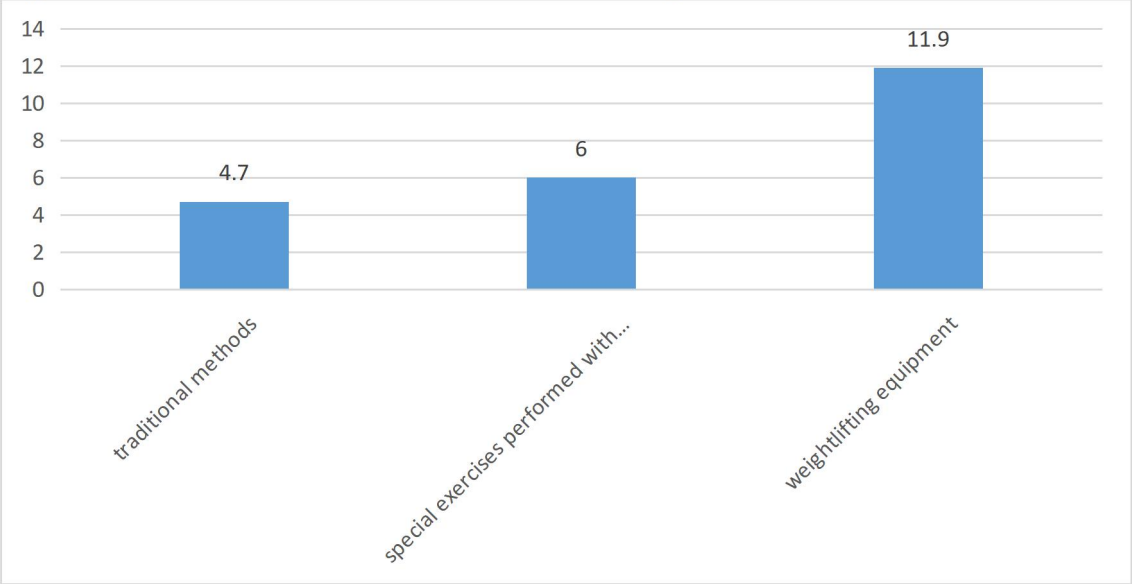


Figure 2. Efficacy index of methods for developing the speed-strength qualities of hurdlers (in percent)

Conclusion. The following conclusions were drawn from the experiment:

- In the training of hurdlers, using traditional methods resulted in a 4.7% improvement, special exercises with pulling devices led to a 6% improvement, and the use of weightlifting exercises improved results by 11.9% (Figure 2);

- Among the selected methods for developing speed-strength abilities, weightlifting exercises were found to be the most effective, proving 7.2% more effective than traditional methods and 5.9% more effective than special exercises performed with pulling devices;

- It was concluded that the greater the external resistance, the more powerful the movement becomes.

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