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USING THE METHOD OF CIRCUIT TRAINING IN THE DEVELOPMENT OF HIGH-SPEED AND POWER ABILITIES OF 15-16-YEAR-OLD BASKETBALL PLAYER

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Purpose: to determine the effectiveness of using a set of high-speed and power exercises by the circular training method in the training process of 15-16-year-old basketball players.

Material and methods: two groups of 15-16-year-old basketball players of Kharkov BC "Junior" in the total number of 20 sportsmen (control group, n=10, experimental group, n=10) took part in the research. The pedagogical experiment lasted 2 months and consisted of the introduction in the educational and training process of the experimental group of specially selected exercises which were used by means of the method of circuit training. The set of exercises included jumps through a gymnastic bench, jumps out from a deep squat, jumps in-depth, throwing of a stuffed ball sitting and standing, jumps up with reaching out the suspended ball. The offered set of exercises was applied on each training classes at the beginning of the main part. The total number of training classes in a week of control and experimental group equaled four lasting 135 minutes.

Results: introduction to the educational and training process of experimental group of 15-16-year-old basketball players of specially selected exercises aimed at the development of high-speed and power abilities with using the method of circuit

training, was revealed the reliable improvement of indicators of test exercises: standing long jump ($t=2,13$; $p<0,05$), standing high jump ($t=2,14$; $p<0,05$), high jump from running start ($t=2,24$; $p<0,05$). The reliable difference wasn't revealed in the test "Throwing of a stuffed ball weighing 1 kg, standing" ($t=0,86$; $p>0,05$).

Conclusions: the improvement of manifestation of indicators of high-speed and power abilities of 15-16-year-old basketball players of the experimental group after the introduction of specially selected exercises with using the method of circuit training was: in the test "Standing long jump" – 2,73%, "Standing high jump" – 5,54%, " High jump from running start" – 6,32%, "Throwing of a stuffed ball weighing 1 kg, standing" – 7,62%.

Keywords: basketball players, high-speed and power qualities, method of circuit training.

Introduction

A significant manifestation of high-speed and power abilities is characterized by competitive motor activity in sports games [9].

About 70% of all movements of a basketball player are high-speed and power nature in basketball. This is because the basis of a basketball player's competitive motor activity is made up of various types of running, jumping, throwing the ball - motor actions that, in conditions of earth gravity and opponent's opposition, require the manifestation of significant muscle strength at short intervals. In this regard, high-speed and power training of basketball players was paid and is paid a lot of attention [18].

Some specialists in sports games indicate that high-speed and power exercises are the basis for mastering some techniques of the game [11, 14, 20].

The authors propose to use a variety of jumps, throwing stuffed balls [19], exercises with a resistance of partners and exercises with stuffed balls [10], jump exercises on sand [1], jump exercises in combination with elements of the technique [12], etc.

In our previous researches, indicators of high-speed and power abilities of basketball players [17], high-speed and power preparedness of pupils of the vocational institution were considered [5]. It was found that the state of high-speed and power abilities of student basketball teams have a rather high level at the end of the school year. This indicates that physical exercises that are used in the training process of basketball players positively affect high-speed and power abilities [17]. The results of our past researches made it possible to establish the influence of specially selected complexes of exercises with a resistance of partners and exercises with aggravation on the indicators of high-speed and power preparedness of 17-20-year-old basketball players [12]. Based on the results of our previous researches, we found a reliable improvement in the results in throwing a basketball ball and a ball weighing 2 kg per range, the result of standing jump up, the amount of lifting the torso sitting from the lying position in 15 seconds. Earlier, we conducted researches of the indicators of high and speed power abilities of 14-15-year-old beach handball players, the developed by us system of specially directed exercises on sand reliably influenced the indicators of standing jump, standing jump up, standing jump up with a turnover of 180° [12]. The obtained results are a fairly reliable basis for our approaches for this research.

A significant number of authors indicate that one of the effective methods for developing high-speed and power abilities of basketball players is the method of circuit training [4, 13, 15, 16].

We suggested that using the method of circuit training with specially selected exercises can increase the performance of high-speed and power abilities of 15-16-year-old basketball players.

Connection of the research with scientific programs, plans, topics. The research was carried out by the theme of the research plan of Kharkiv state academy of physical culture “The improvement of the educational and training process in sports games” for 2019-2023.

The purpose of the research is to determine the effectiveness of using a set of high-speed and power exercises using the method of circuit training in the training process of 15-16-year-old basketball players.

Research tasks:

1. To conduct the analysis of scientific-methodological literature on the development of high-speed and power abilities among young basketball players.

2. To prove experimentally the effectiveness of using the method of circuit training to develop high-speed and power abilities of basketball players.

Material and Methods of research

Two groups of basketball players of BC "Junior" in Kharkiv at the age of 15-16 years in the total number of 20 people (control group, n = 10, experimental group, n = 10) took part in the research. To determine indicators of the manifestation of high-speed and power abilities, tests were used: standing long jump, standing jump up, running jump up, and throwing a stuffed ball weighing 1 kg, standing. The pedagogical experiment lasted 2 months and consisted of introducing into practice specially selected exercises of the experimental group that were used using the method of circuit training. The set of exercises is shown in Figure 1.

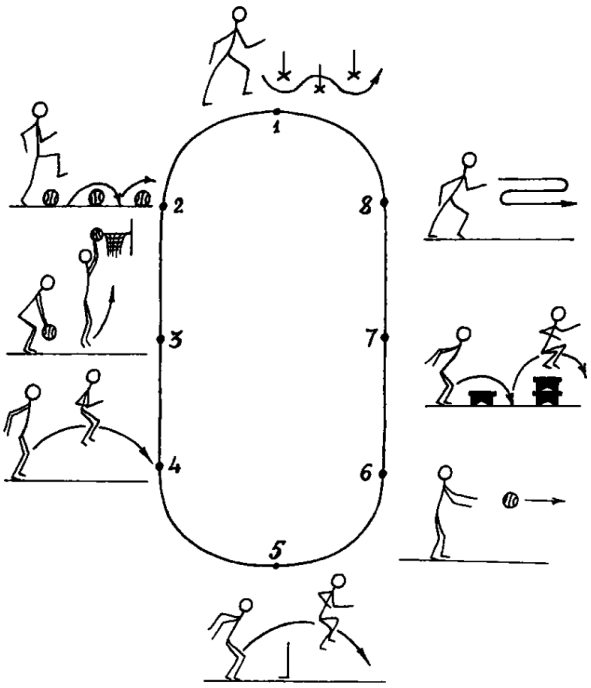

Fig. 1. The example of exercises included in the experimental program using the method of circuit training

The complex of exercises included running zigzag around the stands, jumps through stuffed balls, jumps up with finishing the ball in the shield, jumping out of the squat, jumps through barriers, throwing the stuffed ball, standing, jumps through tumbles of different heights, speed up. The proposed complexes of exercise were used at each training session at the beginning of the main part. The total number of training sessions per week of the control and experimental groups was four for 135 minutes.

The following research methods were used the research: analysis of scientific-methodological literature, pedagogical testing, pedagogical experiment, methods of mathematical analysis.

To analyze the obtained information, the application package Microsoft Excel was used, the validity of the discrepancies was established based on the calculation of Student criterion, at $p<0,05$.

Results of the research

At the beginning of the pedagogical experiment, the control and experimental groups probably didn't differ from each other in all indicators of testing the manifestation of high-speed and power abilities (Table 1).

Table 1

The comparison of indicators of high-speed and power abilities of 15-16-year-old basketball players of experimental and control groups before the pedagogical experiment

Tests	Indicators $\bar{X} \pm m$			
	EG(n=10)	CG(n=10)	t	p
Standing long jump (cm)	222,8±2,04	225,5±2,30	0,88	>0,05
Standing jump up (cm)	53,25±1,12	54,12±1,25	1,12	>0,05
Running jump up (cm)	60,1±1,27	59,7±1,34	0,22	>0,05
Throwing a stuffed ball weighing 1 kg, standing (m)	10,5±0,71	10,7±0,80	0,19	>0,05

After experimenting, comparing the test results in the experimental group, the reliable improvement in the results of the tests was revealed: standing long jump, standing jump up, running jump up ($p<0,05$). A probable difference wasn't found in

the test throwing a stuffed ball weighing 1 kg, standing (p>0,05). The results of the changes are shown in Table 2.

Table 2

Indicators of the manifestation of high-speed and power abilities of 15-16-year-old basketball players of the experimental group before and after the pedagogical experiment

Tests	Indicators $\bar{X} \pm m$			
	Before the experiment (n=10)	After the experiment (n=10)	t	p
Standing long jump (cm)	222,8±2,04	228,9±2,01	2,13	<0,05
Standing jump up (cm)	53,25±1,12	56,20±0,80	2,14	<0,05
Running jump up (cm)	60,1±1,27	63,9±1,12	2,24	<0,05
Throwing a stuffed ball weighing 1 kg, standing (m)	10,5±0,71	11,3±0,60	0,86	>0,05

The improvement in the manifestation of the high-speed and power abilities of 15-16-year-old basketball players of the experimental group was: in the test "Standing long jump" – 2,73%, "Standing jump up" – 5,54%, "Running jump up" – 6,32%, "Throwing a stuffed ball weighing 1 kg, standing" – 7,62% (Fig. 2).

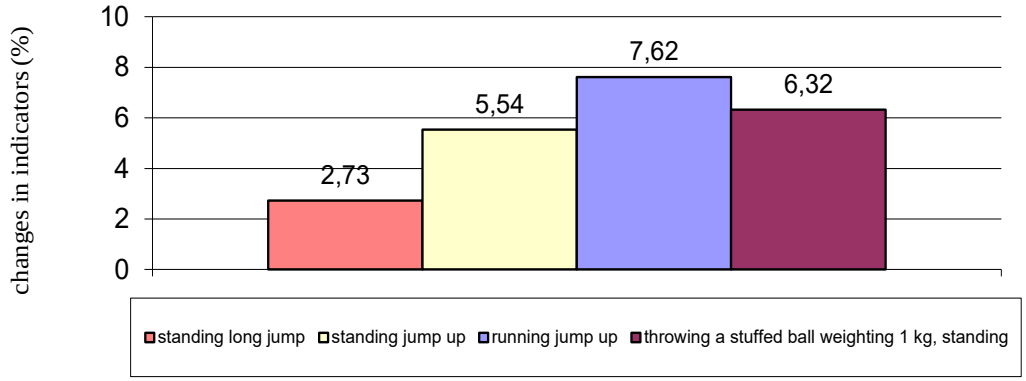

Fig. 2. Qualitative indicators of changes in the manifestation of high-speed and power abilities of 15-16-year-old basketball players of the experimental group after the pedagogical experiment (percentages)

It should be noted that the largest changes in indicators of the manifestation of high-speed and power abilities of 15-16-year-old basketball players of the experimental group occurred in the indicators of running jump up.

Conclusions / Discussion

Our research was carried out based on recommendations of specialists in sports games on the need to preserve and increase the level of physical fitness of young sportsmen, including high-speed and power abilities, which are the basis for mastering the techniques. Kaftanova T.V., Husakovskyi A.V. proposed the methods for the development of high-speed and power abilities of basketball players of the student team. The data of the authors' pedagogical experiment show the significant improvement in results of the test "pull-up" by 22,8%, in the test "lifting the torso from the lying position" by 34,7%, in the test "knee extension" by 55%, in the test "raising the legs to the crossbar" - by 36,8%, in the test "throwing a stuffed ball" - by 36,1% [6].

Vorontsov N. D., Pavlov P.V., Zhelezniakov A. G., applying the method of circuit training in physical training of basketball players of the sports section of the university, noted the dynamics in the results of basketball players of the experimental group in throwing a stuffed ball from behind the head by 15,7%, in standing jump up by 7,7%. [3]. Bondar A. A. came to the conclusion that specially selected exercises inserted into the complex of the circuit training have a positive effect on special physical training, as evidenced by a reliable improvement in indicators of jump up [2].

The results of our research continue several works to study and improve the methods for the development of high-speed and power abilities of basketball players. The results of our research are consistent with the data of other researchers [2, 3, 7]. The authors note that regular physical exercises using the method of circuit training positively affect the manifestation of high-speed and power abilities of basketball players [6, 8].

So, the complex of developed by us exercises, which were carried out by the method of circuit training, improved the indicators of the manifestation of high-speed and power abilities of 15-16-year-old basketball players of the experimental group. This is expressed in the reliable improvement in results of the tests: standing long jump, standing jump up, running jump up ($p<0,05$). The results of our research allow

us to recommend to coaches to improve the manifestation of high-speed and power abilities to use the method of circuit training in the training process of basketball players using a set of high-speed and power exercises.

Prospects for further research. Further research is planned to focus on determining the effectiveness of using the method of circuit training in developing other physical qualities of basketball players.

Conflict of interests. The authors declare that no conflict of interest.

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