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Original Article

Integral development of jumping and of shot accuracy of young basketball players 12-13 years

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Abstract

Objective: to develop the principles of integrated development of speed-power qualities and Jump Shot Accuracy in basketball players 12-13 years old. *Material and methods.* The experiment involved 20 basketball players who were divided into two groups - experimental and control, each with 10 people. In the control group, the classes were conducted according to the traditional method, and in the experimental group additional exercises on jumping ability and basketball technique were introduced. Pedagogical observations were conducted in the process of training sessions. The following tests were carried out: 1. Jump up. 2. Jump Shot Accuracy after dribbling and stopping. 3. Jump Shot Accuracy from the spot. In the statistical analysis, a comparative analysis of the mean values for the Student's t- criterion was carried out, as well as the correlation analysis of Pearson. *Results.* The principles of the integrated development of speed-power qualities and jumping ability of young basketball players are presented. It is shown that the use of an integrated methodology for preparing basketball players has contributed to an increase in the level of special physical fitness and effectiveness of a jump shot. The developed technique has a positive effect on the relationship between the indicators of jumping ability and shots accuracy in basketball. *Conclusions.* The developed technique is adequate for solving the tasks of the training process for basketball players and can be recommended to the wide practice of preparing children's basketball teams.
Keywords: basketball, accuracy, shot, jump, speed, strength.

Introduction

Basketball contains a large number of special techniques and actions that make the game an unpredictable and exciting sight (Abdoli, Hardy, Riyahi, & Farsi, 2018; Gorman & Maloney, 2016; Kozina, Sobko, Safronov, Grin, Goptarev, & Palamarchuk, 2018). Contemporary basketball is an athletic sport that requires the development of both physical qualities and technical preparedness. A modern basketball player of high qualification is an athlete with a high level of development of jumping, speed, endurance strength, which reaches the level of development of these qualities in multi-player athletes. But in basketball, the athletic qualities should be organically combined with lightning-fast technique, high accuracy of target actions, which are manifested in the precision of the hits of the ball to the basket (Ardigo, Kuvacic, Iacono, Dascanio, & Padulo, 2018; Chen, Wu, Lo, Chen, Yang, Huang, & Liu, 2018; Kozina, Sobko, Vilvitsky, Xiaofei, Tymko, Glyadya, & Minak, A., 2018).

Modern basketball specialists, while examining in detail the various types of basketball players' training, practically do not concentrate on the techniques of combined development of speed-strength qualities, in particular, with the technical readiness of the players, in particular with the precision of throws (Kozina, Sobko, Vilvitskii, Xiaofei, Tymko, Glyadya , & Minak, A., 2018; Maglott, Xu, Shull, & Eeee, 2017; Marcolin, Camazzola, Panizzolo, Grigoletto, & Paoli, 2018). That is why the chosen direction of research is relevant and timely. When exploring speed-strength training, most authors indicate, in the first place, the ratio of force and

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speed (Nae, & Pop, 2015; van Maarseveen, & Oudejans, 2018), Which binds (with some exceptions) inversely proportional to the strength of the muscle reduction and speed with which this force is manifested in motion: with the decrease of the external resistance, the speed of movement increases, and the muscular power falls (Kozina, Shepelenko, Osiptsov, Kostiukevych, Repko, et al., 2017). There are two components of power in speed-force actions (Kozina, Sobko, Vilvitskii, Xiaofei, Tymko, Glyadya, & Minak, A., 2018):

1. Power component of power (dynamic force): the greater the speed of movement, the more dynamic power inferior in the mode of muscle contraction;

2. Speed component of power: one of the important mechanisms for increasing the speed component of power is the increase of speed contractile properties of muscles, the other - improving the coordination of muscle work. High-speed muscle properties are largely due to the ratio of fast and slow muscle fibers.

Among the coordination factors that play an important role in the manifestation of the explosive force, the nature of the pulse of the motor neurons of the active muscles, the frequency of their impulse at the beginning of the discharge and the synchronization of the impulses of various motor neurons (Kozina, Cretu, Boichuk, Sobko, Repko, 2018) are indicated. High-speed and power components depend not only on the cross-sectional, viscous properties, innervation density per unit volume of muscle fiber, but also on the state of the motor departments of the cerebral cortex (Kozina, Goloborodko, Boichuk, Sobko, Repko, et.al., 2018; Kozina, Iermakov, Bartík, Yermakova, Michal, 2018). In basketball, as a rule, the manifestation of speed-strength abilities is carried out in jumps. By the nature of the muscular activity, the jump relates to the groups of speed-force exercises with acyclic structure of movements, in which in the main link of impulse is developing muscular effort of maximum power, which has a reactive and explosive character. In this regard, such a manifestation of the speed-strength abilities of basketball players should be called jump (Kozina, Sobko, Vilvitskii, Xiaofei, Tymko, Glyadya, & Minak, A. 2018; Maglott, Xu, Shull, & Ieee. 2017; Marcolin , Camazzola, Panizzolo, Grigoletto, & Paoli, 2018).

As you know (Sobko, 2015; Popowczak, Struzik, Rokita, & Pietraszewski, 2015), the sensational period of jump development is 11-14 years old and up to 17-18 years old where it achieves the highest results. However, there is no reason to talk about the conservatism of the jump to further development or support at a high level of the results achieved at a later age, especially in the sport of higher achievements. Modern concepts in the theory and method of sports training on the development of jumping are reduced to the fact that the use of exercises mainly of a jump character contributes to improving only the speed of repulsion, and the use of exercises power and speed-force character provides growth and speed, and the forces of repulsion. It should be considered proven position on the necessity of the predominant development of speed-strength properties of the muscles, in combination with exercises to increase mobility in the joints and relaxation in order to develop jerking and inter-muscular coordination (Padulo, Nikolaidis, Cular, Dello Iacono, Vando, Galasso, Ardigo, 2018, Podmenik, Supej, Coh, & Erculj, 2017; Pojskic, Sisic, Separovic, & Sekulic, 2018). An open question remains about the qualitative parameters of the training effects of power and speed-force orientation, which ensure the development and support of the achieved level of jumping.

Thus, jumping is one of the most important physical qualities of basketball players and characterizes the player's ability to jump high as much as possible in different game situations (throws in a jump, ball heavens in the shield, controversial throws, rifle throws, etc.).

There is a general jump, under which the ability to perform a jump (up, in length) and a special jump - the ability to develop a high repulsion rate. The main link in the training of jump is to consider the combination of rebounding (Kozina, Sobko, Vilvitskii, Xiaofei, Tymko, Glyadya, & Minak, 2018; Maglott, Xu, Shull, & Ieee. 2017; Marcolin, Camazzola, Panizzolo, Grigoletto , & Paoli, 2018). Specific features of jump are: explosive force, speed and rhythm movements. The magnitude of the effort that develops in the shortest possible time when performing jump jumps must be extremely large. This is possible only with their explosive character. The interconnection of speed and strength is manifested in the power of motions. For short and strong repulsion, a manifestation of instantaneous muscle contractility with strong stress is required, which requires a strong concentration of volitional efforts (Zwierko, Popowczak, Wozniak, & Rokita, 2018).

Consequently, the explosive force is the ability to show the greatest value in the least time. The speed of movements, as a component of the jump, is ensured by a high functional lability of the nerve centers and, accordingly, accompanied by a rapid change in excitation and inhibition and, consequently, reduction and relaxation of the muscles. In addition, the coordination of muscle activity - synergists and antagonists, the right choice of activation of synergistic muscles with limited activity of the muscles-antagonists of a particular joint - is of great importance. For the manifestation of a certain level of jump, the accuracy of the applied efforts at high speed of execution of movements is of great importance. This match provides the rhythm of movements. One of the important factors in the development of jumping is the degree of manifestation of physical and coordination qualities. Therefore, in this study, the hypothesis was put forward: to increase the efficiency of throws in the jump it is necessary to combine the development of jumping and accuracy; For this purpose, it is necessary to develop the basic principles and methodology for the integral development of these qualities.

Purpose: to develop the principles of integrated development of speed-power qualities and accuracy of throws in basketball players 12-13 years old.

Material and methods

Participants. In the experiment, participated 20 basketball players, which were divided into two groups - experimental and control, each of 10 people. In the control classes were conducted according to the traditional method, and in the experimental one introduced additional exercises for jumping and technique of basketball players.

Control-pedagogical tests

Testing was conducted to determine the quality of the jump throw. The following tests were carried out:

1. Jump up (Kozina, Sobko, Vilvitskii, Xiaofei, Tymko, Glyadya, & Minak, 2018; Maglott, Xu, Shull, & Ieee, 2017, Marcolin, Camazzola, Panizzolo, Grigoletto, & Paoli, 2018). Each of the athletes performs 3 attempts:

- a jump from two feet up from the place;
- jump up from place;

The best result of three attempts is fixed.

2. The player leads the ball, makes a stop on two legs and performs a jump shot.

The number of hits from ten throws is fixed.

3. The player performs from the place of the throw to jump from place.

The fixed amount will hit 10 Shots .

Characteristics of the technique and criteria for mastering the technical element "Jump Shot"

For the development of the jump and the improvement of the technique of throwing, we used the following rule: when teaching the jump in a jump, it is necessary to mention the details of the throwing technique with one hand from place. Applying the method of successive training, it is first necessary to study separately each part of the throw on the ring with one hand from place. Then consistently combine them, the player can correctly master the desired technique.

When studying this technical element, it is necessary to determine the criteria of throw technology. These include:

- stable player before throwing;
- the position of the ball on the hand;
- ball rolling for a throw;
- throwing movement;
- a sense of purpose.

Stable player before shooting. Learning any technical elements should always begin with the player's stand. The player's position before the throw is an important moment in the training. Many players ignore this situation, which leads to the fact that they can not accurately execute a throw in a gaming environment. We strive to sharpen the attention of the players on the right rack before the throw. The stand should represent a "triple threat" when the player can throw, start a run or make a transfer. So, the stable player - the knees are slightly curved, the same name with the throwing the hand with the right hand is located on the ground front in front of the second, the body is straight, the head is looking at the ring, the ball in his hands, tightly adhering to the brush and lying above the palm of the throwing arm, the elbows are directed downwards torso

The position of the ball on the hand. The ball should be held by hand in the same way as it will be placed above the head when casting for a throw. Before casting, the ball is placed on the "working" arm so that the brush is from the bottom of the ball, and the widespread fingers are directed back up. The second hand holds the ball sideways. When taking a ball before a throw, it is undesirable to press the second ball with your hand from above, but preferably it is located sideways for better balance or support from below. Equilibrium is provided by the fingers, not the pressure on the ball by hand.

For players of different roles, the height of the hand is important before the ball is thrown. Protectors of small growth need to keep the ball at the level of the chest. This will help them to lengthen the way of taking the ball to the throw, which will allow you to jump higher. A high player needs a smaller amplitude, and, therefore, you can throw the ball through an opponent and after taking it at a higher point. For young basketball players, novice 8-9 years the brush is lowered as low as possible, the elbow is slightly allocated so after a sufficiently long ball escort, a throw is executed.

Ball rolling for a throw. The ball is put to throw a ring over your head. The ball is placed on the brush of a throwing hand, without touching the palm, the fingers are directed backwards. The brush of a throwing hand forms a funnel for placing the ball. The brush fingers are arranged so that the little finger and thumbs are in one straight line, and the index finger is perpendicular to the line, while it should not be strained.

The elbow and the brush of a throwing arm are in one plane with a single-legged foot. If the elbow of the throwing arm is arranged at the level of the eye, and at that the angle at the elbow is 90 degrees, and the brush is horizontally, then the ball will be ideally carried out for the throw. But some players are individually suited to address this issue.

Shot movement. In the casting movement, not only the passing of the ball plays an important role, but then on what trajectory will run the throw. If the ball is thrown as previously mentioned and continue to move the elbow upwards, and the brush up and forward, then the desired balloon trajectory is formed at 60 degrees. By

directing the ball in such an arc, the player is more likely to score the ball in the ring. Final effort brilliantly brushes. The ball alternately rolls up on the fingers of the throwing arm, ending with a throw of the index finger. Some coaches are advised to finish throwing the index finger, the other two at the same time - indicative and average. Everything is right, the main thing is that in the end, the ball has a reverse rotational movement. We observe that after the release of the ball the brush was delayed in the final position for at least 1 second, forming a "duck head".

A sense of purpose. The next important element that needs to be addressed is the sense of purpose. It is necessary that the throwing arm has a good sense of the target to be hit, this target is the front brace of the ring. Even with a certain hit on her, she can push the ball that he has fallen into the basket. In this sense, the front bracket is much more useful than the rear. If the coach directs the players to the back bracket, which is less useful in the sense of hit the ball, then for the successful completion of the throw, it is necessary that the ball always travels in front of the back bracket, which reduces the goal in size.

The quality of the technique of running the throw on the ring with one hand in the jump is the same as when performing a throw from the place:

- Stand and ball on hand
- ball rolling for a throw
- ball support and 60 degree throw angle
- delayed hand after throwing for 1 second
- the target, the front brace of the ring

The difference lies in the fact that the throw must be performed in a jump. When performing a throw, the player must be fast, but not hurrying. The ball leaves the brush of the throwing player when the arm is completely straightened, and it occurs at the highest point of the jump or momentarily until it reaches, but in no case down when it is lowered. Do not forget that the hand after the throw must be held up at the top for at least 1 second, forming a "duck head". However, at the moment in the jump there is another option when the goal may become a shield. The player must know that the shield can be used for most Shots from under the rings and when Shots from the side at a certain angle. The ball must be sent to the shield gently, with a slight rotation.

Exercises for the development of a jump and for a throw in a basket, both with the simultaneous execution of technical elements and without:

- jumping through the bench with the ball. The player with the ball stands sideways from the bench and performs jumps through it. During a jump, he transfers the ball around the body. The jumps are performed through the bench with a twinkle of two or one foot. Also, but the jump is performed by the player on the bench from the foot to the foot (one foot on the bench, the other on the floor).
- jumping through the bench with a roll on the ring. A player with a ball jumping through the bench, on her or from her, performs Shots into the jump basket.
- jumps with a touch of a knee to the chest. The player jumps, grouping up at the top to touch the chest. This task is performed both standing in place and moving forward.
- squatting with a partner on the shoulders. The player squats with his partner on his shoulders, sticking to the gym.
- jumps through the barriers. The player jumps through the barriers located in a row. The barriers are just the same as the square.
- Jumping through a rope. A player, holding a rope in his hands, performs jumps through it for a time or a given number of jumps. Just the same player in a jump time makes a double rotation around itself.
- Jumping with a partner. The partner, standing with his back in the player, holds him behind the belt and helps him jump like my top. The same thing, but the partner is holding back the jumps of the player by holding it behind the belt or shoulder.
- Shots in the basket by "5". Players are split into pairs and each player performs five runs in a row. Exercise is performed on time or on the specified number of hits.
- Shots a basket through one. Players are betting. One pair performs a throw on the ring and himself runs it to pick up, while the other at this time runs for a three-point line and goes out to the transfer partner for a throw. Exercise is performed on time or on the specified number of hits.
- Shots in teams from points. The players are divided into two teams. Each team works on its own shield and each team has two balls. The players line up one after the other and perform the Shots from the specified point by the trainer, who threw the ring to pick up his ball and end at the column. Exercise is performed for the specified number of hits, which of the teams first hits, and then passes to another point.

To identify the experimental factor, a comparative analysis of the results of the work with basketball players, which were selected in two training groups (experimental and control) (Table 1, 2) was conducted.

Athletes who took part in the experiment are about the same age: on average 12.5 years old, have approximately the same duration of basketball practice, which is on average 3 years. The main task was to: compare the results of the research between the experimental and control group, conducted in October 2017 and March 2018, as well as track the dynamics of changes in results, draw conclusions about the correctness of the methodology. The essence of the experiment was that in the experimental group during the classes specially

designed exercises for improving the technique of a throw and a jump were performed. In the control group instead of this part of the training used traditional basketball exercises.

When comparing the average values of the testing parameters of the control and experimental groups, Student's test for independent samples was used. The results of statistical data processing showed that the value of t is calculated for all the indices of the special physical (jump) and technical preparedness (jump throw) less than t-critical (p> 0,05), which indicates the absence of statistically significant differences between the control and experimental groups before the experiment (Table 1).

The results of statistical data processing showed that the value of t is calculated for all the indices of the special physical (jump) and technical preparedness (shot jump) less than t-critical (p> 0,05), which indicates the absence of statistically significant differences between the control and experimental groups before the experiment (Table 1).

Table 1

Indicators for testing basketball players of the control and experimental groups before the experiment (n = 10 in the experimental group, n = 10 in the control group)

Name of the test	Group	$\bar{x}$	S	m	t	p
Jump up from two legs	control	46.30	3.30	1.04	-0.31	>0,05
	experimental	46.80	3.88	1.23		
Jump up one step	control	45.60	2.88	0.91	-0.27	>0,05
	experimental	46.00	3.77	1.19		
Driving and stopping for 2 feet with a jump shot	control	4.40	0.97	0.31	0.94	>0,05
	experimental	4.00	0.94	0.30		
Jump Shot from place	control	4.80	0.63	0.20	-1.52	>0,05
	experimental	5.40	1.07	0.34		

Mathematical-statistical methods

When comparing the average values of the testing parameters of the control and experimental groups, Student's test for independent samples was used. Correlation analysis was also used. The processing of indicators was carried out with the help of computer programs - "EXCEL-2016" and "SPSS-17".

Results

The comparison of the average values of the test indicators before the experiment and after the experiment showed that almost all the indicators of the special physical (jump) and technical readiness (jump shot) results of the experimental group athletes have improved significantly, while the control group testing performance has improved improperly or not so obviously as in the experimental group (Table 2-4).

Table 2

Indicators for testing basketball players of the control and experimental groups (n = 10 in the experimental group, n = 10 in the control group) after the experiment

Name of the test	Group	$\bar{x}$	S	m	t	p
Jump up from two legs	control	46.40	2.70	0.85	-1.43	>0,05
	experimental	48.30	3.77	1.19		
Jump up one step	control	45.70	2.26	0.72	-2.48	<0,05
	experimental	47.90	3.48	1.10		
Driving and stopping for 2 feet with a jump shot	control	4.40	0.48	0.15	-4.64	<0,001
	experimental	5.70	0.82	0.26		
Jump Shot from place	control	4.10	0.74	0.23	-8.49	<0,001
	experimental	6.90	0.74	0.23		

It is presents a comparative analysis of the experimental group test results before and after the experiment in the Table 3. The comparison of the average values of the test indicators before the experiment and after the experiment showed that almost all the indicators of the special physical (jump) and technical readiness (jump shot) results of the experimental group athletes have improved significantly, while the control group testing performance has improved improperly or not as obviously as in the experimental group (Table 3).

In the as "Jump up from two legs" test the result was improved by 0.10 cm in experimental droup. The increment of this indicator is statistically unreliable (p> 0.05) in the control group, The unbelievable increase in the test result of the "Jump up from two legs" and in the control can be explained by the lack of time during which the pedagogical experiment was conducted, for a reliable improvement of this indicator, as the result in the Jump up from two legs, improves throughout the training process very slightly and rather slowly.

Table 3

Indicators for testing basketball players in the control group before and after the experiment (n = 10)

Name of the test	Period of testing	$\bar{x}$	S	m	t	p
Jump up from two legs	before the experiment	46.30	3.30	1.04	0.07	>0,05
	before the experiment	46.40	2.70	0.85		
Jump up one step	before the experiment	45.60	2.88	0.91	0.26	>0,05
	before the experiment	45.70	2.26	0.72		
Driving and stopping for 2 feet with a jump shot	before the experiment	4.40	0.97	0.31	0.29	>0,05
	before the experiment	4.40	0.48	0.15		
Jump Shot from place	before the experiment	4.80	0.63	0.20	2.28	<0,05
	before the experiment	4.10	0.74	0.23		

Table 4

Indicators of testing basketball players of the experimental group before and after the experiment (n = 10)

Name of the test	Period of testing	$\bar{x}$	S	m	t	p
Jump up from two legs	before the experiment	46.80	3.88	1.23	-0.88	>0,05
	before the experiment	48.30	3.77	1.19		
Jump up one step	before the experiment	46.00	3.77	1.19	-1.17	>0,05
	before the experiment	47.90	3.48	1.10		
Driving and stopping for 2 feet with a jump shot	before the experiment	4.00	0.94	0.30	-4.30	<0,001
	before the experiment	5.70	0.82	0.26		
Jump Shot from place	before the experiment	5.40	1.07	0.34	-3.64	<0,001
	before the experiment	6.90	0.74	0.23		

As can be seen from Table 3 and Table 4, before the experiment, the average values of the accuracy of the throw in both the two-leg jump and the middle-distance position in the athletes of the control and experimental group did not differ statistically. In the experimental group, the average number of hits was 4 hits (from two legs) and 5.4 hits (from the place), and in the control group - 4.4 eyes (from two legs) and 4.8 points (from the place), (p > 0.05).

The results of the initial testing showed that the characteristics of the throwing technique in the jump are random. In the initial testing, the indicators of the jump technique in athletes in the control group slightly exceeded (albeit statistically insignificant) the performance of the experimental group.

During the experiment period, both groups improved the performance, which characterize the efficiency of possession of a jerk throw. However, this improvement in different groups of participants in the experiment was of a different nature. As shown in Tables 2-4, after the experiment, the experimental and control groups began to differ markedly among themselves. In the experimental group, the average number of hits was 5.7 (from two legs) and 6.9 (from the place) respectively, and in the control 4.4 (from two legs) and 4.1 (from place), (p <0,001) . The obtained data testify to the positive influence of the technique developed by us on the jump throw.

Data from the first two experimental tests (a two-leg jump and jump from place) to illustrate the effect of the experiment we showed in the diagram (Fig. 1).

From this chart, we see that players from the experimental group predominate in the results of the control group. For a reliable improvement of this indicator in both groups, it is possible to explain not the reliability of the improvement of the result, as the result in a jump from two legs and a jump from the place improves throughout the training process very little and rather slowly. But the most reliable result is the jump from the place in which the experimental group participated and received the result (p <0,05).

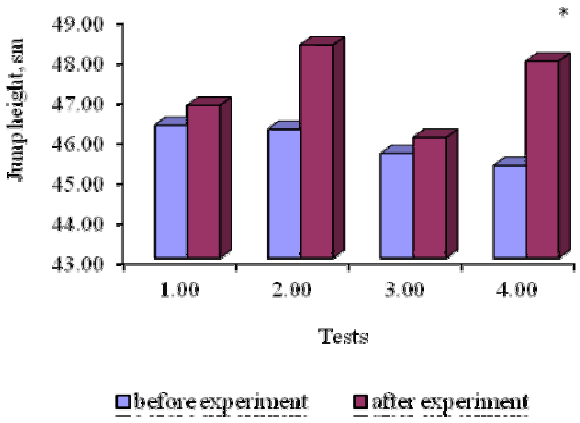

Fig. 1. The jump height in the control and experimental groups before and after the experiment
1 - jump from the two legs of the control group
2 - jump from two legs of the experimental group
3 - a jump from one step of the athletes of the control group
4 - jump from one step of the athletes of the experimental group
* - the difference between the control and the experimental group is reliable at p <0,05

Based on the data obtained, the dynamics of increase in players' jumping can be said that the developed technique affects the players positively. At the same time, such changes were not detected in the control group. The other two tests are shown in the diagram (Figure 2). Before and after the experiment was analyzed the number of hits in the ring basketball players. Such tests as "driving and stopping on 2 legs with a throw on a ring", "a throw in a jump from a place" were registered. In the experimental group, the average value of the number of hits was:

- before the experiment (4.00 driving and stopping on 2 legs with a throw on the ring) and (5.40 Shots in the jump from place)

- after the experiment (5.70 driving and stopping for 2 feet with a throw on the ring and 6.90 Shots in the jump from place). These changes are reliable at the highest level of significance (p <0,001) (Table 4).

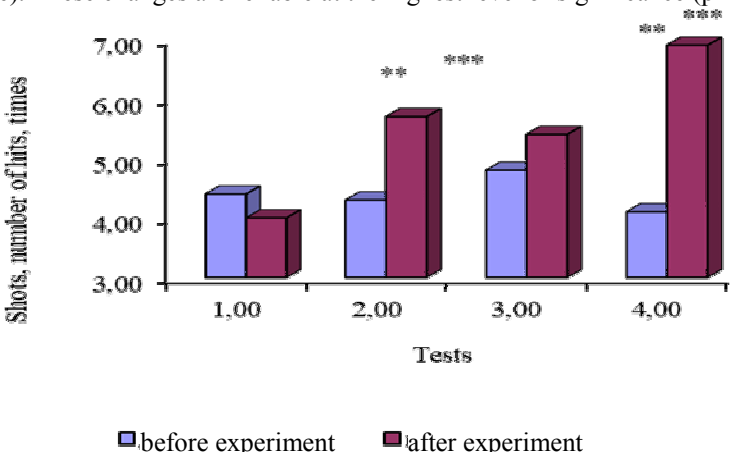

Fig. 2. Jump Shot in the control and experimental groups
1- Driving and stopping for 2 feet with a jump shot in the control group
2- Driving and stopping for 2 feet with a jump shot in the experimental group
3- Jump Shot from place in the control group
4- Jump Shot from place in the experimental group
** - the difference between the control and the experimental group before and after the experiment is reliable p <0.001
*** - difference between the control and the experimental group before and after the experiment, reliable p <0.001

In the control group, such changes in the number of k-th hits practically are not expressed. Thus, the average values of the number of tactical interactions in the control group, both before the experiment and after the experiment, were almost unchanged. Changes in these indicators during the experiment are unreliable (p> 0.05) (Table 3). From this it can be concluded that the complex training method used in the training process of the basketball players of the experimental group, contributed to the increase of all indicators. The results of the correlation analysis showed a smaller number of reliable interrelationships in the structure of the training of

basketball players in the experimental group compared with the control. In tabl. 5 shows the results of the correlation matrix of the experimental group before the experiment.

Table 5

Correlation matrix of testing experimental groups experiment

Indicators	Jump up from two legs	Jump up one step	Driving and stopping for 2 feet with a jump shot	Jump Shot from place
Jump up from two legs	1.00			
Jump up one step	0.17	1.00		
Driving and stopping for 2 feet with a jump shot	0.34	0.25	1.00	
Jump Shot from place	0.10	0.25	0.40*	1.00

Note. * - the correlation coefficient is reliable at p <0,05

From this table we can conclude that before the experiment in the experimental group, there was almost no relationship between the two, except the connection between the test "driving and stopping 2 feet with a throw" and the test "throwing a jump from place", where the coefficient the relationship was (r = 0.40 *, p <0.05). We also carried out a correlation analysis of experimental test groups after an experiment, the results of which are presented in Table. 6. The results of testing basketball players of the experimental group showed that in practically all indicators they significantly differ from the control group (Table 2-4).

The results of the correlation analysis showed that the expanded complex testing indicators applied had four reliable relationships after the experiment, while only one reliable relationship was detected before the experiment.

Table 6

Correlation matrix of testing experimental groups after experiment

Indicators	Jump up from two legs	Jump up one step	Driving and stopping for 2 feet with a jump shot	Jump Shot from place
Jump up from two legs	1.00			
Jump up one step	0.47*	1.00		
Driving and stopping for 2 feet with a jump shot	0.14	0.58**	1.00	
Jump Shot from place	0.17	0.54**	0.68**	1.00

Notes: * - the correlation coefficient is reliable at p <0,05;
** - the correlation coefficient is reliable at p <0.01.

After the experiment, the Shots in the jump of players improved both from place and from two legs, and the correlation coefficient increased from (r = 0.40) to (r = 0.68) at p <0.01. We also found a reliable relationship between a two-leg jump and a jump from place (r = 0.47, p <0.01) (Table 6). A reliable relationship was also found between the jump from place and the result of the test "driving and stopping on 2 legs with a shot on a ring". The correlation coefficient between these data is (r = 0.38), which is reliable at p <0.05.

Reliable interconnections are also found in indicators such as jump from one step and jump shot. The correlation coefficient in them is 0.34 at p <0.05. In the control group, the number of reliable interrelationships between these indicators practically did not change (Table 7, 8). Thus, the study showed the adequacy of the developed method of comprehensive development of jumping and accuracy of rollovers in basketball, as evidenced by a significant improvement in the results of testing on the special physical and technical readiness of young basketball players of the experimental group, as well as an increase in the number of reliable coefficients of the relationship between the indicators of jump up and the accuracy of Shots .

Table 7

Correlation matrix of tests for control group testing

Indicators	Jump up from two	Jump up one step	Driving and stopping for 2	Jump Shot from place
Jump up from two legs	1.00			
Jump up one step	-0.29	1.00		
Driving and stopping for 2 feet with a jump shot	0.37	-0.02	1.00	
Jump Shot from place	-0.38*	-0.11	0.15	1.00

Note. * - the correlation coefficient is reliable at p <0,05

Table 8

Correlation matrix of control group testing parameters after experiment

Indicators	Jump up from two legs	Jump up one step	Driving and stopping for 2 feet with a jump shot	Jump Shot from place
Jump up from two legs	1.00			
Jump up one step	-0.19	1.00		
Driving and stopping for 2 feet with a jump shot	0.37	-0.37	1.00	
Jump Shot from place	0.44*	-0.09	-0.09	1.00

Notes: * - the correlation coefficient is reliable at p <0,05;
** - the correlation coefficient is reliable at p <0.01.

Discussion

The hypothesis that for integrated development of jump and accuracy of Shots will be an effective method, which combines the development of speed-strength qualities and coordination abilities. The data on the indicators that determine the effectiveness of the athlete's actions in basketball are supplemented, including the accuracy and speed of the performance of the game techniques, as well as the ability to use the motor potential. In this regard, in terms of the development and improvement of the jump, it is especially important to be able to manage this complex ability in accordance with the performance of one or another motive action. The complexity of managing any quality in sports games is that the player is opposed by the rival, and he makes a specific decision depending on the gaming situation (the location of the team partners and the opponent, the direction of the flight of the ball, etc.) (Kozina, Sobko, Vilvitski, Xiaofei, Tymko, Glyadya, & Minak, A. 2018; Maglott, Xu, Shull, & Eeee; 2017; Marcolin, Camazzola, Panizzolo, Grigoletto, & Paoli, 2018).

However, a significant role in the management of movements belongs to the conscious ability to control the spatial and temporal parameters and is associated with development, which deal with the ability to accurately evaluate and analyze their actions. The techniques used in the jump are structurally complex and coordination actions and the correct distribution of movements in time, the exact differentiation of the duration and sequence of these movements, as well as the observance of a certain speed and the maintenance of the desired pace determines the success of their execution (Zwierko, Popowczak, Wozniak, & Rokita, 2018; Kozina, Iermakov, Bartík, Yermakova, Michal, 2018).

Purposeful pedagogical influence on separate mechanisms of control of human movements can increase their accuracy in athletes. The accuracy of ball rolling in a jump depends on 68 - 72% of the distance, on 17-28% of the direction and on 3 - 13% of the throwing method. The greatest effectiveness basketball players achieve when performing short-range races. As the distance to the ring increases, the accuracy of hits decreases. At the same time, the height of the jump varies depending on the conditions of the executed throw, which is due to the adaptive correction of the motor system.

In studies van Maarseveen, & Oudejans (2018); Marcolin, G., Camazzola, N., Panizzolo, F. A., Grigoletto, D., & Paoli, A. (2018) has proved that the opposing opposition from the side of the rival strongly influences the jump height when performing the jump shot and its efficiency. So, if during a passive resistance the defender's efficiency is more than 70% jump from the short range, with the average - 62 - 67% and from the distant - 42 - 46%, then when casting with an active resistance, the effectiveness of the fall significantly decreases and, accordingly, equals 40 -42%, 34-36% and 25-28%.

The most significant gauge of the jump height and the coefficients of use of the jump were detected when performing Shots in the jump with the active resistance of the defender. With the increase in the distance from which the Shots are made, the jump height and the rate of use of jump are reduced. The high performance of a jump thrust and its stability is achieved due to a wide variation of motor activity with high ability to control them. In addition, the opponent's resistance requires the player to be able to control this movement in a wider range of temporal and kinematic structures. Information on the degree of realization by the player of his hopping capabilities can improve the effectiveness of the implementation of technical techniques, structurally related to the manifestation of jumping.

Since jump is determined by many experts as a complex human ability to exhibit effort of maximum complexity in the shortest possible time, then the main criteria determining the controllability of the jump will be the time of repulsion, which is added in this force, the jump height and its duration.

The method of communication of dynamic elements - their temporary, quantitative and causal relationships, should be understood as the internal mechanism of motor activity. Knowledge of this mechanism is of paramount importance to sports practice, since it enables to improve the technical skill of athletes more effectively, the essence of which is the constant search and development of rational motor techniques that allow the best use of the growing motor potential in the specific conditions of sports activity. The novelty of the

conducted researches is to find out increase of correlation interrelation between indicators of speed-power preparation and accuracy of castings at application of the special technique of integrated development of a jump and techniques of possession of a ball.

Conclusions

1. The principles of the integrated development of speed-power qualities and jumping ability of young basketball players are presented.

2. It is shown that the applied method of training basketball players has increased the practically all indicators of testing of special physical preparedness, quality of equipment for the performance of the throw.

3. The developed method positively affects the relationship of indicators of jump and accuracy of rollovers in basketball.

4. The developed methodology is adequate for solving the tasks of the training process for basketball players and can be recommended in the wide practice of training children's basketball teams.

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Conflict of interest

The authors state that there is no conflict of interest.

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