IMPROVING THE BALL SERVE IN 12-13 YEARS OLD VOLLEYBALL PLAYERS BY TRAINING GOOD DISTANCE JUDGING

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Key words: volleyball, ball serve, training process, technical training, good distance judging, square- and triangle-shaped targets, stretching barrier tapes.

Annotation. The authors examined a specific technique – the ball serve and the method of its improvement by training good distance judging of young volleyball players at the training stage of preparation. The article describes in detail the means and methodological approaches that make it possible to increase the level of precision of the ball serve to the most vulnerable areas of the court. The article presents a methodology using targets, which were applied in the training process of female volleyball players of 12-13 years old. It was revealed that the improvement of the ball serve by training good distance judging improves the ability of volleyball players to estimate "by eye" the spatial features associated with the remoteness of objects, which affected the effectiveness of the precision of the ball serve.

Introduction. At the present moment, modern volleyball is characterized by an increase of height data and physical conditions of players, complication of power, precision and difficulties of the ball serve. Concerning the development of ball serve performance, an increase in precision and reliability of serves, their performance in competition conditions are also important.

Some authors, such as A.V. Belyaev, L.V. Bulykina, N.N. Vavilov, note that "the ball serve is an effective measure of offensive actions in volleyball. The high level of technical preparedness allows volleyball players to earn points directly by serving the ball, making the ball reception difficult for the opponent and limiting organization of the combination play. Performance of versatile and complicated serves, an ability to suddenly change the ways of performance and zones of ball's direction when serving, an ability to give the ball complicated trajectories with varying height, speed and distance of its flight force opponents to change into simplified types of tactical movements in the offence" [1, 2].

Yu.N. Kleshchev, A.G. Ajriyants and V.V. Rytsarev think tha6 "ball serves should be performed with high precision of hitting into tactically vulnerable areas of the opponent's court. Moreover, performance of ball serves should be reliable in extreme conditions of competitive activity within the effect of numerous external and internal hindering factors" [4, 7].

In the national school of volleyball, technique and tactics of the ball serve requires a constant improvement because the serve is a complicated technical and tactical element of the game. Thus, volleyball specialists note the need to search for new approaches to improve technical and tactical mastery of serving players.

The purpose of this study is to improve the ball serve of 12-13 years old female volleyball players by training good distance judging.

Methods and organization. Twelve female volleyball players of the first year training group (TE-1), who were divided into the experimental and control groups 6 girls each, participated in the 6-month long pedagogical experiment (September 2020 – February 2021). Girls were studying in the Municipal Budgetary Institution "Volleyball Olympic Reserve School $N_{\rm D}$ 12" located in Chelyabinsk. At the time of the pedagogical experiment, the age of test subjects was 12-13 years. Classes in the control group were carried out according to the Volleyball exemplary program [3]. Evaluation of the ball serve precision was conducted using the following tests:

1. Test for the ball serve precision. A precision and quality of performing a series of 10 ball serves to the right and left half of the court into zones outlined by sidelines and lines parallel to them at a distance of 2 meters are registered.

2. Ball serves to zones 1, 6, 5. Standard performance conditions: the test subject performs 30 ball serves to the opponent's side, where qualified volleyball players, who serve as the experiment's assistants, are located in zones 1, 5 and 6. Layout of the opponent's court and location of other assistants in the experiment (qualified playmaker and hitters) is as follows: the forward zone is divided by a line parallel to the middle line at a distance of 1,5 meters into two parts: the first offence zone (closer to the net) and the second offence zone.

System of the qualitative evaluation of the serve's effectiveness:

1) for winning with just the ball serve -1 point;

2) for the serve, after reception of which the ball returns to the servers' side without any offensive actions (passing the ball by curving trajectory) -0.7 points;

3) for the serve, after reception of which the second pass is performed by "digging" -0.5 points;

4) for the serve, after reception of which the second pass is performed by blocking it from the defense zone -0.4 points;

5) for the serve, after reception of which the second pass is performed by blocking it from the second offence zone -0.3 points;

6) for the serve, after reception of which the second pass is performed from the first offence zone -0.2 points;

7) for making an error when serving -0 points.

At first, a total amount of points for performing 30 serves is established, then an average score is calculated.

In order to evaluate good distance judging, two following methods were chosen:

- "Perception of the "line's length" method. Evaluation of an ability to perceive spatial segments (distance judging) can be carried out using a simple device (a ruler). The ruler's side, which is located towards the test subject, is glued to a piece of white paper; a clear line, which divides the ruler into two halves (left and right), is located at the center. Two moving markers (clips) are located above.

The test conductor moves one marker to the center (from the clear line) by 5-12 cm. The test subject, who is located 0,5 meters from the ruler, should move their marker by the same distance to the opposite side. A number of errors is calculated. A number of tries is 10.

A percentile precision (T) of measuring the segment's length is calculated according to the equation:

$$\Gamma = 100 - C_2 \times 100 / C_1,$$

where C_2 is a sum of differences from the set length of the segment (sum of errors made by the test subject, mm), C_1 – a sum of segments set by the test conductor. The results evaluation of the test according to the described method is presented in Table 1.

Table 1

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Evaluation in points	9	8	7	6	5	4	3	2	1
Precision of the line measuring, %	99	98	97	96	94	92	88	82	76

Evaluation in points according to results of precision of measuring the line's length

- the "Device dials" method. Registering parameters of scales of various devices is a simple and obvious example of using distance judging.

Conducting the study: the test subject is given (firstly in closed form (e.g. turned over)) a stimulating material containing images of 10 device dials, marked by letters, as well as the form for writing down answers. An instruction is given, then time is noted and a signal is given to open the stimulating material and start doing the task. After 2 minutes, a command is given to put a pencil away.

Instruction's contents: "On the presented image you will see pictures of 10 dials of devices, marked by letters. On every dial there is a pointer showing current device readings. Your task is to identify the value, shown by every device, and

write down the answer (a number) in the corresponding row of the table on the form, in the column "Answer: device readings". Two minutes are given for the task. When the signal is given, open the task list and start filling the form".

According to formulae presented on the form, values of relative errors (e) for every test, mean relative error (Me) and precision of perceiving device readings (T) are calculated and written down. A number of correct answers (when v=V) can also be calculated and written down in the corresponding field.

Results and discussion. The registered evaluation of precision of the ball serve by female volleyball players of both groups did not have significant differences according to all conducted tests "test for the ball serve precision" and "ball serves to zones 1, 6, 5". It is important to note that all test subjects of both the experimental and control groups show an average level of performance of the given technical move. The amount of points for 30 ball serves earned by the experimental group was 18,1 points, which aligns with an average indicator, which is 6,03 points. The amount of points for 30 ball serves earned by the control group was 18,5 points, which also aligns with the average indicator – 6,2 points. Obtained results of the evaluation of precision of the ball serve by female volleyball players of both groups are almost equal, which indicates a similar level of technical preparedness.

The evaluation of good distance judging in female volleyball players of both groups according to two selected methods "Device dials" and "Perception of the line's length" did not reveal any significant differences. In the "Device dials" method, an average indicator of correct answers in the experimental group was 6,3, in the control group -6,8. The precision of perceiving device readings (T) in both groups is almost equal -0,98 and 0,99 respectively. In case of the "Perception of the line's length" method, female volleyball players of both groups showed almost equal precision of measuring length by a ruler, and their average result was 88,7% and 87,7% respectively. It is noteworthy that results of the evaluation of good distance judging did not reveal statistically significant differences between groups.

Therefore, before the beginning of the experiment results of the evaluation of good distance judging did not have a significant difference in both groups, which allows us to note the similar ability to estimate "by eye" the spatial features associated with the remoteness of objects.

Methodological approaches of improving the ball serve in 12-13 years old female volleyball players using targets: before using targets, we examined data developed by I.V. Nikolaeva, N.V. Sivakova, which show an uneven hitting of court areas during the game, i.e. hitting the ball into specific zones and points of the volleyball court of the opponent in competitive conditions is always different. As a rule, most of the balls hit the central area of the court – the sixth zone, however, outer areas of the courts are considered as the most dangerous areas, but these areas are difficult to hit, despite the fact that such moves are more effective [5].

Considering this, we have selected exercises for improving the ball serve to the vulnerable points of the opponent's court. At the same time, young volleyball players were trained using various positioning of triangle- and square-shaped targets (visual que – good distance judging), functions of which support estimating "by eye" the spatial features associated with the remoteness of objects. Using square-shaped targets, volleyball players were improving the ball serve into vulnerable areas of zones 2 and 4, when using triangle-shaped targets, young volleyball players have to improve the precision of ball serves into zones 1, 6, 5 [6].

Moreover, we used stretching barrier tapes to limit the trajectory height of the flying ball, which served as a specific reference point for aiming by volleyball players and do not allow female athletes to make the ball's trajectory higher when serving it. It contributes to both improving the technical preparedness when serving the ball and training good distance judging (Fig. 1).



Fig. 1. Scheme of locating the targets for improving the ball serve by female volleyball players when serving the ball to the zones 1, 2, 4, 5 of the imaginary opponent's court

Thus, using square- and triangle-shaped targets contributes to the improvement of precision of ball serving with minimum trajectory of ball's flying above the net. That way, reception of the ball is difficult for opponents after serves, a reliability of hitting the ball into the court, the specific zone or into the set area of the opponent's zone are ensured.

A repeated testing of the evaluation of the ball serve's precision was carried out at the final stage of the study (Table 2).

It was shown in the table 2 that results of the evaluation of the ball serve precision became better in both groups. In the experimental group, a high level of precision was revealed in four test subjects.

When performing 30 serves, their average result ranged from 8 to 8,7 points. By reviewing the results, it is safe to say that the conducted final testing for the evaluation of the of the ball serve's precision of volleyball players indicated an improvement of indicators, especially in tests of the ball serve to zones 1 and 5, in which square- and triangle targets were used in the training process of volleyball players of the experimental group. Results of control experiments revealed statistically significant differences between groups in three tests – the ball serves to zones 1 and 5 and the test of the ball serve precision. In the fourth test "Ball serves to the zone 6", there were no statistically significant differences were registered, because there was no emphasis on the specific zone, the zone 6 was used mainly for modeling in-game situations.

Table 2

Evaluation of the ball	Experimental group	Control group	Т	Р
serve's precision				
Test of the ball serve	8,7±0,4	7,2±0,4	2,68	<0,05
precision				
Ball serves to the zone 1 (10	7,7±0,4	6,3±0,4	2,50	<0,05
serves)				
Ball serves to the zone 5 (10	8,3±0,4	6,5±0,4	3,21	<0,05
serves)				
Ball serves to the zone 6 (10	8,2±0,8	$6,8{\pm}0,8$	1,24	>0,05
serves)				
Amount of points for 30	24,2/8,1	19,6/6,5	-	-
serves				
Level	high	average	_	-

Evaluation of the ball serve's precision of volleyball players after the pedagogical experiment

After the experiment, we carried out the evaluation of good distance judging of 12-13 years old volleyball players (Table 3).

Table 3

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Evaluation of good distance judging after the pedagogical experiment							
Evaluation of good distance judging	Experimental	Control group	Т	Р			
	group						
"Device dials" method							
Amount of correct answers	8,7±1,6	8,3±1,6					
Precision of perceiving device	0,99±0,01	0,99±0,01	0	-			
readings (T)							
"Perception of the line's length" method							
Evaluation in points	6,7±0,4	4,5±0,4	2,75	<0,05			
Precision of length's measurement, %	96,7±1,2	92,7±0,8					

The table 3 shows that the evaluation of good distance judging in female volleyball players of both groups, according to two selected methods, is improved. In the "Device dials" method, the average indicator of the amount of correct answers in the experimental group was 8,7, in the control group - 8,3. Precision of

perceiving device readings (T) is equal in both groups and is 0,99. In case of the "Perception of the line's length" method, female volleyball players of the experimental group showed a higher percent of the precision of measuring length by a ruler, the average result was 96,7%, while in the control group it was 92,7%. It is noteworthy that results of the evaluation of good distance judging did not reveal statistically significant differences between groups in the "Device dials" method (p>0,05). After using target in the training process of the experimental group, results of the evaluation of the ball serve's precision were improved, indicators of the precision of length's measurement in the "Perception of the line's length" method, which allows us to state an improvement of the ability to estimate "by eye" the spatial features associated with the remoteness of objects (Fig. 2, 3).



Fig. 2. Bar graph of the increase in the ball serve precision of female volleyball players during the pedagogical experiment



Fig. 3. Bar graph of the increase in training of good distance judging of female volleyball players during the pedagogical experiment

Conclusion. Therefore, it is safe to say that the conducted pedagogical experiment allowed observing dynamics of the whole number of indicators in the experimental and control groups. A significance of differences in results of the

experimental group's participants in examined precision indicators in comparison with data of the control group, for which the traditional approach of training was used. Obtained results allow stating the effectiveness of using targets of different configuration, aimed at the ball serve's improvement and training of good distance judging of 12-13 years old volleyball players.

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