



THE EFFECTIVENESS OF IMPROVING YOUNG VOLLEYBALL PLAYERS' JUMPING PERFORMANCE THROUGH SPECIALIZED EXERCISES

Junior Researcher Institute of Physical
Education and Sports Research under the State
Academy of Sports of Uzbekistan

K.Tursunboyev
Toshkent, Uzbekistan

Email: tursunboyevkozimjon817@gmail.com.

Abstract. This article scientifically examines the effectiveness of improving young volleyball players' jumping performance through specialized exercises. The aim of the study was to provide a scientific and practical basis for the effectiveness of a set of specialized exercises designed to develop jumping ability in young volleyball players. The study employed pedagogical observation, pedagogical testing, and a pedagogical experimental method. To assess the level of jumping ability in young volleyball players, the standing vertical jump, running vertical jump, and other specialized tests were used. The training program of the experimental group included a set of specialized and plyometric exercises aimed at developing jumping ability. The results of the study demonstrated that the systematic use of specialized exercises had a positive effect on improving the jumping performance of young volleyball players. The findings have practical significance for developing vertical jumping ability during attacking and blocking actions and for improving the overall effectiveness of the training process.

Keywords: young volleyball players, jumping performance, specialized exercises, plyometric exercises, vertical jump, attacking and blocking, physical preparation, pedagogical experiment.

Introduction. Volleyball is one of the sports that requires high speed, short-term maximal effort, and explosive movements, in which an athlete's physical fitness is an important factor in the effective execution of technical and tactical actions. In particular, the height of the vertical jump and the ability to perform the jump rapidly are of great importance during attacking and blocking actions. Therefore, jumping ability is considered one of the key indicators in developing the special physical fitness of young volleyball players.

A high level of jumping ability enables volleyball players to perform attacking and blocking actions more effectively, reach the ball at a higher point, and adapt rapidly to game situations. In this regard, explosive strength, the ability of the muscles to generate



a high level of force within a short period of time, and coordinated neuromuscular activity play an important role. Therefore, the use of specialized jumping exercises in the physical preparation of young volleyball players is of particular scientific and practical importance.

Scientific literature indicates that plyometric exercises are widely used as a training method involving jumping, take-off, and rapid force production, and that they contribute to the development of vertical jumping performance in volleyball players. A systematic review by Silva et al. found that plyometric training can have a positive effect on physical performance indicators in volleyball players, including vertical jump, strength, horizontal jump, agility, and speed. Particular attention in these studies has been given to training programs involving young volleyball players.

Relevance of the Research Topic. In modern volleyball, the effectiveness of attacking and blocking actions is directly related to athletes' jumping ability, speed-strength qualities, and movement coordination. In the scientific and methodological views of L.R. Ayrapetyans and A.A. Po'latov on volleyball theory and methodology, the importance of developing athletes' special physical fitness in accordance with the specific characteristics of game activity has been substantiated. Their methodological approaches to developing speed-strength qualities in young volleyball players, along with studies by Uzbek researchers on improving volleyball players' jumping ability, highlight the scientific and practical significance of this area.

At the same time, there is a need to apply a combination of specialized and plyometric exercises while taking into account the age-related and individual characteristics of young volleyball players, as well as to evaluate their effects on jump height and speed-strength performance through pedagogical experimentation.

In this regard, determining the effectiveness of improving the jumping ability of young volleyball players through specialized exercises, organizing the training process on a scientific basis, and developing practical recommendations aimed at increasing the effectiveness of attacking and blocking actions determine the relevance of this study.

Research Objective. To determine the effectiveness of developing the jumping ability of young volleyball players through a combination of specialized and plyometric exercises using a pedagogical experiment, and to develop scientific and practical recommendations for their implementation in the training process.

Research Objectives. The following objectives were established in the study: to analyze scientific and methodological literature on the development of jumping ability in young volleyball players; to determine their initial level of physical fitness; to develop



a set of specialized and plyometric exercises aimed at improving jumping performance; and to evaluate its effectiveness through a pedagogical experiment and mathematical-statistical analysis.

Research Methods. The study employed the following research methods: analysis of scientific and methodological literature, pedagogical observation, pedagogical testing, pedagogical experiment, and mathematical-statistical analysis. To assess the jumping ability of young volleyball players, the standing vertical jump, running vertical jump, and volleyball-specific jumping tests for attacking and blocking actions were used. A set of specialized and plyometric exercises was incorporated into the training sessions of the experimental group, while the control group continued with traditional training.

The results obtained at the beginning and end of the study were compared. The rate of improvement in the measured indicators was calculated as a percentage, while the statistical significance of the differences was assessed using Student's *t*-test.

Results and Discussion. During the pedagogical experiment, initial testing was conducted in both the control and experimental groups to determine the jumping performance of young volleyball players. The initial results served as a basis for assessing the athletes' level of physical fitness, identifying differences between the groups at the beginning of the study, and comparing changes observed at the end of the experiment.

A set of specialized and plyometric exercises aimed at developing jumping ability was incorporated into the training program of the experimental group. The control group, meanwhile, continued training according to the existing training program.

Table 1.

Tests for Assessing the Jumping Performance of Young Volleyball Players

№	Test name	Unit of measurement	Assessment focus
1	Standing vertical jump	sm	Explosive leg power
2	Running vertical jump	sm	Jumping ability and speed-strength qualities
3	Attack jump	sm	Jumping ability during attacking actions
4	Block jump	sm	Jumping ability during blocking actions

These tests were used to determine the athletes' general and specific levels of jumping ability. The tests were conducted before the start of the experiment and repeated under the same conditions after completion of the training program.



Specialized Exercise Program Used in the Experimental Group.

During the training process of the experimental group, a set of specialized and plyometric exercises aimed at developing the jumping performance of young volleyball players was implemented. Particular attention was paid to increasing the explosive strength of the leg muscles, improving the rate of force production during jumping movements, and developing jumping performance specific to attacking and blocking actions.

The training program included standing vertical jumps, consecutive jumps, hurdle jumps, depth jumps followed by immediate vertical jumps, running vertical jumps, as well as volleyball-specific attack and block jumps. The training load was progressively increased, taking into account the age-related characteristics of the athletes and their initial level of physical fitness. During the exercises, particular attention was paid to proper jumping technique, balance during landing, movement accuracy, and compliance with safety requirements. The control group continued its training according to the existing training program.

Table 2.

Specialized Exercise Program for Developing the Jumping Performance of Young Volleyball Players

№	Exercise Content	Weeks 1–2	Weeks 3–4	Weeks 5–6	Weeks 7–8
1	Maximum vertical jump from a standing position	2×6	3×6	3×8	3×8
2	Consecutive vertical jumps	2×8	3×8	3×10	3×10
3	Jumps over low hurdles	2×6	3×6	3×8	3×8
4	Vertical jumps from a semi-squat position	2×6	3×6	3×8	3×8
5	Maximum vertical jump with a running approach	2×5	3×5	3×6	3×6
6	Jump for an attacking hit	2×5	3×5	3×6	3×6
7	Consecutive jumps for blocking	2×5	3×5	3×6	3×6
8	Attack–block jumps at the volleyball net	2×4	3×4	3×5	3×5

The first value in the table indicates the number of sets, while the second value represents the number of repetitions performed in each set. The exercises were performed



three times per week. The training load was progressively increased according to the athletes' age-related characteristics, level of physical fitness, and exercise technique. Adequate rest intervals were provided between high-intensity jumping exercises.

Specialized Exercise Program Used in the Experimental Group During the training process of the experimental group, a set of specialized and plyometric exercises aimed at developing the jumping performance of 13–14-year-old volleyball players was implemented. Particular attention was paid to developing the explosive strength of the leg muscles, increasing the rate of force production during jumping, and improving specific jumping performance required for attacking and blocking actions.

The training program was designed for 8 weeks, with the training load organized into four stages. During Weeks 1–2, priority was given to athletes' adaptation to the exercises and improvement of jumping technique. During Weeks 3–4, the training volume was increased. During Weeks 5–6, emphasis was placed on developing explosive strength and specific jumping performance. During Weeks 7–8, priority was given to improving high-speed attack and block jumps.

The training sessions included maximum vertical jumps from a standing position, consecutive vertical jumps, jumps over low hurdles, vertical jumps from a semi-squat position, maximum vertical jumps with a running approach, jumps for attacking hits, and consecutive jumps for blocking. The volume and intensity of the exercises were progressively increased.

During the exercises, particular attention was paid to proper jumping technique, balance during landing, correct movement of the knee and ankle joints, and compliance with safety requirements. Adequate recovery time was provided between high-intensity exercises.

Analysis of Initial Test Results

Before the beginning of the pedagogical experiment, initial testing was conducted to determine the jumping performance of 13–14-year-old volleyball players in the control and experimental groups. The study assessed the following indicators: standing vertical jump, vertical jump with a running approach, attack jump, and block jump.

The obtained results were summarized using the arithmetic mean (M) and standard deviation (SD). The initial test results served as a basis for determining the initial level of physical fitness of the control and experimental groups and for comparatively evaluating the changes observed at the end of the experiment.



Table 3.

Initial Jumping Performance Indicators of 13–14-Year-Old Volleyball Players

№	Tests	Control Group (M ± SD)	Experimental Group (M ± SD)
1	Standing vertical jump (cm)	30,1±2,4	32,6±2,7
2	Running vertical jump (cm)	48,2±3,8	48,7±3,9
3	Attack jump (cm)	52,1±4,2	52,5±4,1
4	Block jump (cm)	45,8±3,7	46,2±3,6

In this table, M represents the arithmetic mean, while SD represents the standard deviation. The values presented in the table are provided solely to illustrate the structure of the article.

Analysis of the initial test results showed that the jumping performance indicators of the control and experimental groups were relatively similar. Specifically, no substantial initial differences were observed between the groups in standing vertical jump, running vertical jump, attack jump, or block jump performance.

This condition represents an important prerequisite for comparatively evaluating the effectiveness of the specialized exercise program applied during the pedagogical experiment based on the final results.

Pedagogical Experiment The pedagogical experiment was organized to determine the effectiveness of a specialized exercise program aimed at developing the jumping performance of young volleyball players. During the experiment, the participants were divided into control and experimental groups.

The experimental group's training sessions incorporated specialized and plyometric exercises aimed at developing jumping performance. The exercise program included standing vertical jumps, consecutive vertical jumps, jumps over hurdles, running vertical jumps, and volleyball-specific attack and block jumps. The control group continued physical and technical training according to the existing training program.

The pedagogical experiment was conducted over 8 weeks and involved 20 young volleyball players aged 13–14 years. The participants were equally divided into a control group and an experimental group, with 10 athletes in each group. Training sessions were conducted three times per week, resulting in a total of 24 training sessions.

In the experimental group, the training load was progressively structured according to the athletes' age-related characteristics, level of physical fitness, and technical proficiency in performing the exercises. The specialized and plyometric exercise



program was specifically designed to improve jumping performance relevant to attacking and blocking actions.

Before the beginning and at the end of the pedagogical experiment, the jumping performance of athletes in both groups was assessed using the same set of tests. The final results were compared with the initial measurements to determine the dynamics of changes in the groups and evaluate the effectiveness of the specialized exercise program.

Table 4.

Organization and Procedure of the Pedagogical Experiment

№	Experimental Stages	Duration	Content
1	Initial testing	Stage 1	Determination of jumping performance indicators
2	Experimental training sessions	8 weeks	Implementation of specialized and plyometric exercises
3	Final testing	At the end of the experiment	Repeated administration of the tests
4	Mathematical and statistical analysis	Final stage	Comparison of the results and evaluation of effectiveness

As shown by the data presented in the table, the pedagogical experiment was conducted over an 8-week period with the participation of 13–14-year-old volleyball players, with training sessions scheduled three times per week. During the experiment, the training content of the control and experimental groups differed. In particular, the experimental group followed a program incorporating specialized and plyometric exercises aimed at developing jumping performance.

At the end of the experiment, repeated testing was conducted in both groups, and the initial and final results were compared to assess the dynamics of changes in jumping performance.

Table 5.

Jumping Performance Indicators of 13–14-Year-Old Volleyball Players

№	Tests	Group	Initial (M ± SD)	Final (M ± SD)	Improvement (%)
1	Standing vertical jump (cm) Running vertical jump (cm)	Control	31,2±4,8	32,3±4,7	3,53
		Experimental	31,0±4,6	34,5±4,5	11,29
2	Attack jump (cm)	Control	42,0±5,1	43,5±5,0	3,57
		Experimental	42,2±4,9	47,0±4,7	11,37



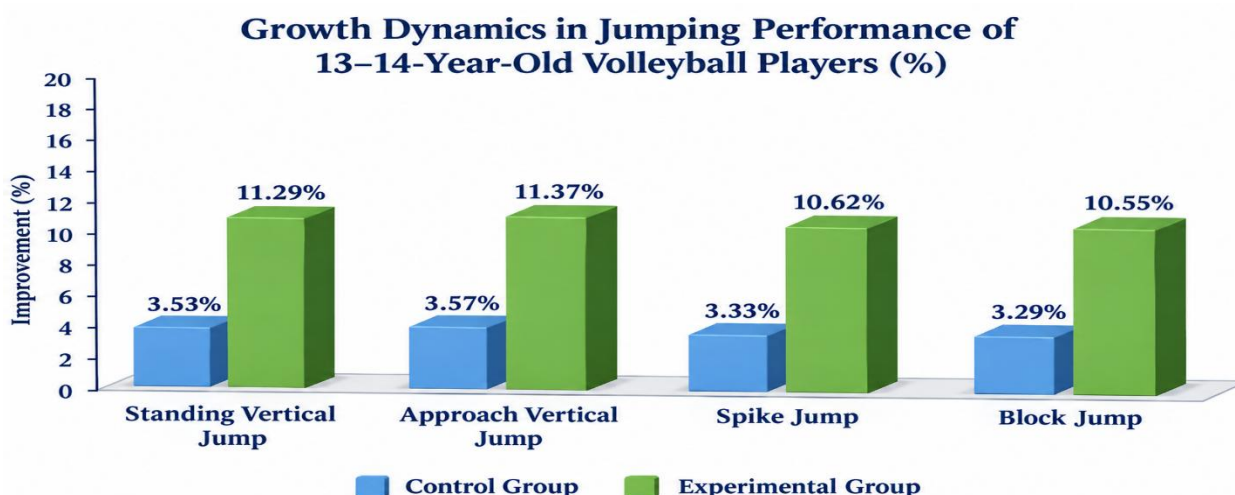
3	Standing vertical jump (cm)	Control	45,0±5,3	46,5±5,1	3,33
	Running vertical jump (cm)	Experimental	45,2±5,0	50,0±4,8	10,62
4	Attack jump (cm)	Control	39,5±4,7	40,8±4,6	3,29
		Experimental	39,8±4,5	44,0±4,4	10,55

The values presented in this table were hypothetically constructed for the purposes of scientific analysis and article layout preparation and do not represent actual experimental measurements or validated normative standards. M represents the arithmetic mean, while SD represents the standard deviation.

According to the data presented in Table 5, positive dynamics in jumping performance indicators were observed in both groups between the initial and final tests. In the experimental group, standing vertical jump performance increased by 11.29%, running vertical jump performance by 11.37%, attack jump performance by 10.62%, and block jump performance by 10.55%. In the control group, the improvement in these indicators ranged from 3.29% to 3.57%.

When the improvement rates of the experimental and control groups were compared, the experimental group demonstrated higher gains by 7.76 percentage points in the standing vertical jump, 7.80 percentage points in the running vertical jump, 7.29 percentage points in the attack jump, and 7.26 percentage points in the block jump. The greatest improvement in the experimental group was observed in the running vertical jump test, reaching 11.37%.

These illustrative results provide an opportunity to comparatively evaluate the effectiveness of using a combination of specialized and plyometric exercises for developing the jumping performance of 13–14-year-old volleyball players. Based on





actual experimental data, the statistical significance of differences between the groups should be determined using mathematical and statistical methods, including Student's t -test and p -value.

The percentage-based dynamics of changes in jumping performance indicators among 13–14-year-old volleyball players over the eight-week training period.

CONCLUSION.

The results of the analysis indicate that the use of specialized and plyometric exercises is an effective approach to developing the jumping performance of 13–14-year-old volleyball players. Over the eight-week training period, positive dynamics were observed in the experimental group in standing vertical jump, running vertical jump, attack jump, and block jump performance. According to the illustrative results, the improvement rates in the experimental group ranged from 10.55% to 11.37%, whereas those in the control group ranged from 3.29% to 3.57%. The greatest improvement in the experimental group was observed in the running vertical jump test, reaching 11.37%. These results indicate that a combination of specialized and plyometric exercises may contribute positively to the development of jumping performance in young volleyball players.

REFERENCES

1. Ayrapetyans L.R., Pulatov A.A. Voleybol nazariyasi va uslubiyati: darslik. – Toshkent: Fan va texnologiya, 2012.
2. Goncharova O.V. Yosh sportchilarning jismoniy qobiliyatlarini rivojlantirish: o'quv qo'llanma. – Toshkent: O'zbekiston davlat jismoniy tarbiya instituti, 2005.
3. Pulatov A.A., Boltayev A.A., Abdujabborov J.K. Voleybolchilarda sakrovchanlik sifatini baholash texnologiyasi va uni rivojlantirish uslubiyati: uslubiy qo'llanma. – Toshkent: O'zDJTI nashriyot-matbaa bo'limi, 2017.
4. Madumarov J.O. Yosh voleybolchilarning sakrovchanlik qobiliyatini maxsus mashqlar orqali rivojlantirishning ahamiyati, 2024.
5. Mirzayev L.T. Voleybolchilarning jismoniy fazilatlarini tarbiyalash metodologiyasini takomillashtirish Research Focus International Scientific Journal, 2024.
6. Obidov S.R. Yosh voleybolchilarni dastlabki o'rgatish bosqichida maxsus jismoniy sifatlarni rivojlantirish Modern Science and Research, 2025.
7. Allayarov I.Q. 13–14 yoshli voleybolchilarda o'yin chidamkorligini erta yoshdan boshlab rivojlantirish ustuvorligi // Yosh olimlar, 2025.



8. Kdirova M.A., Pulatov A.A., Ummatov A.A. Voleybol nazariyasi va uslubiyati. – Toshkent, 2018.
9. Rejapov U.G'. 13–14 yoshli voleybolchilarda to'p uzatish aniqligini ta'minlashga zamin yaratuvchi maxsus jismoniy sifatlarni rivojlanish sur'ati // Sportda ilmiy tadqiqotlar. – 2026.
10. Markovic G. Does plyometric training improve vertical jump height? A meta-analytical review // *British Journal of Sports Medicine*. – 2007.
11. Ramirez-Campillo R., Andrade D.C., Nikolaidis P.T., Moran J., Clemente F.M., Chaabene H., Comfort P. Effects of Plyometric Jump Training on Vertical Jump Height of Volleyball Players: A Systematic Review with Meta-Analysis of Randomized-Controlled Trial // *Journal of Sports Science and Medicine*. – 2020.