МИР СПОРТА № 3 (92) – 2023

UDC 796.325+796.418.6:796.015.154

EFFECTIVENESS OF THE MINI-TRAMPOLINE EXERCISES FOR IMPROVING THE TECHNICAL SKILLS OF VOLLEYBALL PLAYERS

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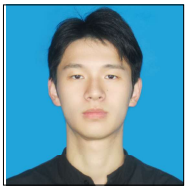

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The article considers the results of the research devoted to justification of the use of mini-trampoline exercises and their effect on technical skills improvement of volleyball players. The use of the special complex of acrobatic exercises allows improving the coordination abilities of volleyball players that is confirmed in increasing the level of technical preparedness. The obtained results can be used in the training process both of young volleyball players and high level athletes.

Keywords: sports training; physical preparedness; volleyball; technical skills; coordination abilities; mini-trampoline training.

ЭФФЕКТИВНОСТЬ ПРИМЕНЕНИЯ УПРАЖНЕНИЙ НА МИНИ-ТРАМПЕ ДЛЯ СОВЕРШЕНСТВОВАНИЯ ТЕХНИЧЕСКИХ ДЕЙСТВИЙ ВОЛЕЙБОЛИСТОВ

В статье представлены результаты проведенного исследования по изучению эффективности использования упражнений на мини-трампе для совершенствования технических действий волейболистов. Применение предложенного комплекса акробатических упражнений позволяет совершенствовать координационные способности волейболистов, что выражается в улучшении показателей уровня их технической подготовленности. Полученные результаты могут быть использованы в тренировочном процессе как начинающих волейболистов, так и спортсменов высокого класса.

Ключевые слова: спортивная подготовка, физическая подготовленность, волейбол, технические действия, координационные способности, тренировка на мини-батуте.

INTRODUCTION

Coordination can effectively ensure the exertion of strength in volleyball technical movements, such as jumping to serve, smashing and other fast power-dominated movements. Only when the coordination ability is good can the posture of the hands and body be adjusted properly, so that the ball and the body is in the proper spatial position, and the ball is dunked or hit hard. Coordination makes volleyball technical movements more effective and accurate. In the case of good coordination, it can effectively reduce redundant movements, reduce the preparation time for movements, and save energy in the secondary movement stage to ensure the body's physical fitness, so that it can display excellent volleyball skills more accurately and quickly. Targeted coordination training can effectively promote the completion of volleyball skills of athletes and promote the mastery of volleyball skills [1, 4].

Coordination is important motor skills and that without it one can't expect efficient performance given the technical and tactical structure in volleyball game. Volleyball is one of the most dynamic sports games with a constant change of typical and atypical situations, which players must quickly observe, analyze and adequately respond to them. Related to this, in the training process should strive as much as possible the approval of motor skills necessary for success in volleyball. A higher level of handling with technical-tactical elements, requires a higher level of motor preparation. Only such preparation contributes to a better, easier and economical application of complex movements in competitive conditions. In order to achieve a more efficient performance of the technical activities of the volleyball player, it is necessary an optimal motoric achievement, respectively, certain "inventories" of acquired motor skills. If these "inventories" of acquired motor skills are larger, above all of the general coordination, thus will be easier to dominate with new movements and the level of development of specific coordination will be higher [2].

The process of training in sport games is particularly complicated. Besides such factors as conditioning and psychological maturity, technique, including coordina-

tion abilities, plays an important role. According to D. D. Blume and P. Hobusch there are two aspects of the sports technique: motor skills and coordination abilities [2].

Improvement of motor skills belongs among the basic objectives of the long-term training system. There is a close relationship between coordination abilities and motor skills, the function of motor skills in physical education and sport is important from the point of view of those activities which are conditioned by coordination abilities. Motor skills are meaningful for those operations, which are of a creative character, such as activities of players in sport games [2]. D. Diachuk mentioned that the level of coordination abilities has an influence on technique in all stages of sport training, while the highest relationship was found between kinesthetic-differentiation ability and technique, as well as space-orientation ability, reaction speed and technique of sports game players [3]. Therefore the relevance of the research of these coordination abilities development in volleyball was obtained.

RESEARCH MATERIAL

Purpose of the research was to develop coordination abilities and improve technical skills of volleyball players using acrobatic exercises, it was concretized by solving such objectives:

1. To characterize the peculiarities of physical training in volleyball and to emphasize the main coordination abilities of volleyball players.

2. To evaluate the indicators of technical preparedness of volleyball players and to characterized different acrobatic exercises that can help improved it.

3. To devise and experimentally justified the complex of exercises on mini-trampoline for developing coordination abilities of volleyball players.

To solve the objectives, setted in the dissertation research, the generally accepted methods of pedagogical research were used: theoretical analysis and generalization of scientific and methodological literature; analysis of regulatory documents; pedagogical observation; method of expert evaluations; pedagogical testing; pedagogical experiment; methods of mathematical statistics.

Twenty students of the sports games department of BSUPC participated in two testing sessions and were allocated to a control group (N=10) and experimental group (N=10). In total, 20 volleyball players of the 1st year studying from the Department of Sports Games BSUPC took part in the research.

In the process of 1st part of staging experiment the indicators of technical preparedness of volleyball players – the pose of volleyball player in the air; the interaction with the ball; the effectiveness of winning attack were evaluated by 3 experts. During the first stage of testing, it was found that the results of expert assessments of the indicators of the control and experimental groups do not have significant differences (Table 1).

Table 1. – Comparison of the results of expert assessments of the control and experimental groups before the experiment

Poses in the air		Interaction with the ball		Effectiveness of winning attack	
CG	EG	CG	EG	CG	EG
3,07	3,17	3,12	3,14	3,14	3,13
3,23	3,20	3,22	3,21	3,21	3,21
3,07	2,93	3,00	2,97	2,97	2,98
3,23	3,23	3,23	3,23	3,23	3,23
3,10	3,07	3,08	3,08	3,08	3,08
3,00	3,23	3,12	3,18	3,18	3,16
3,03	3,00	3,02	3,01	3,01	3,01
3,27	3,00	3,13	3,07	3,07	3,09
3,13	3,17	3,15	3,16	3,16	3,16
3,27	3,27	3,27	3,27	3,27	3,27
U-criteria	45>23	U-criteria	9,5>23	U-criteria	49,5>23
p>0,05		p>0,05		p>0,05	

Analyzing the indicators of the Table 1, we can conclude that the level of coordination preparedness of athletes in the control and experimental groups can be characterized as an average. The results of the first stage of testing made it possible to substantiate the need to develop the coordination abilities of the students.

During the analysis of the literature, it was found that springboard jumping and trampoline jumping are used when volleyball players master movements in the air and soft landing, in which they are ready for subsequent game activities [5].

Acrobatics exercises, which are an excellent means of training the vestibular apparatus, are gaining more and more popularity among athletes and coaches. They are available to athletes of any age with different physical fitness. The forms of their use in the training process are very diverse. Trampoline exercises can precede or improve many body rotation movements. When performing exercises with rotation of the body in a supportless position, courage and determination are also developed - qualities that every athlete needs. Before mastering the exercises on the trampoline, athletes are encouraged to use the exercises on springboards and mini-trampolines that used in training to perform different types of jumps.

In the next – 2nd part of staging experiment – the participants of the experimental group were tested with the control exercise on the special apparatus – mini-trampoline. Athletes had to jump onto the mini-tramp net, then jump to the net with a 90 turn to the right (then left) and pass the ball into a special basket used by volleyball players in the training process – a passer simulator – to practice passes and improve skills receiving the ball (figure 1).

(A) (B)

Figure 1. – Mini-trampoline (A) and a simulator for practicing the quality of passing and accuracy of receiving the ball in volleyball (B)

The student stands in the center of the volleyball court, faces the volleyball net and jumps from the ground onto the mini trampoline, jumps from the mini trampoline while turning to the left 90° and landing, the coach immediately throws the volleyball above the student's head on the side, the student passes the ball into the designated area, the same is true on the right, and passes the ball five times on the left and right sides.

During the first testing using a mini-trampoline and the presented simulator, the following results were obtained (Table 2).

Analyzing the data in Table 2, it should be noted that during the first stage of testing, the athletes of the experimental group on average show effective ball passes from the left side – 1,2 times out of 5 (which is 22%), from the right side – 1,9 times out of 5 (which is 34,2% respectively).

All this served as the basis for the development and introduction into the training process of a special set of acrobatic exercises using a mini-trampoline to develop the coordination abilities of volleyball players, in particular, space- orientation ability, reaction speed, the balance ability, kinesthetic-differentiation ability, ability to redesign the motor programme, which most clearly reflect effectiveness of technical actions of volleyball players.

Table 2. – Results of the 1st testing of experimental group using control exercise

Athlete	Control exercise, times of throws											
	Left side						Right side					
	1	2	3	4	5	Sum	1	2	3	4	5	Sum
1	0	0	1	0	0	1	1	0	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0	1	1
3	1	1	0	0	0	2	0	0	1	0	0	1
4	1	0	0	0	0	1	0	1	1	1	0	3
5	1	0	0	0	0	1	0	0	1	1	1	3
6	0	0	0	0	1	1	0	1	0	1	0	2
7	0	0	1	0	0	1	1	0	1	0	0	2
8	0	0	0	1	0	1	1	0	1	0	0	2
9	0	1	1	0	0	2	0	0	1	0	1	2
10	0	0	1	1	0	2	0	1	0	0	1	2
			Ẋ			1,20			Ẋ			1,90
			σ			0,63			σ			0,74
			m			0,20			m			0,23

To develop the coordination abilities of volleyball players of the experimental group, a set of exercises on mini-trampoline of varying complexity was developed. This set of exercises was used during training sessions on the discipline "Improving sportsmanship" in the experimental group 2 times a week for 3 months in addition to the main part of the lesson, the exercises of the developed complex were performed immediately after the warm-up. Students of the control group mastered the content of the discipline "Improving sportsmanship" strictly in accordance with the curriculum.

Volleyball players of the experimental group were offered the following exercises (fragments of the training process presented on the figure 2).

Examples of the jump training: power skip, abdominal jump, "tummy hop", cross run, jump sideways, rope ladder side jump (three sets of each movement).

Examples of the mini-trampoline training:

1. Jumps on and off the mini-trampoline.

2. Jumps on the mini-trampoline, and then do the blocking action while jumping off.

3. Jumps on the mini-trampoline, jumps off while hitting and whipping the ball.

4. Turn your back to the mini-trampoline, turn around and jump to face the mini-trampoline, then jump up and down while doing the whipping action.

5. Face the mini-trampoline sideways, continue to jump on the mini trampoline sideways, and still jump off sideways (the same is true for the opposite direction).

Figure 2. – Fragments of the mini-trampoline training

6. Facing the mini-trampoline sideways, continue to jump on the mini trampoline sideways, then turn 180 degrees and jump off from the other side.

7. Turn your back to the mini-trampoline, turn around and jump to face the mini-trampoline, then jump on it, and after hearing the password, land from the designated position while hitting the ball and whipping in the air.

8. Turn your back to the mini-trampoline, turn around and jump to face the mini-trampoline, then jump on it, and perform a diving action from the designated position after hearing the password.

9. Turn your back to the mini-trampoline, squat down, turn around and jump to face the mini-trampoline, then jump on it, and land from the designated position after hearing the password.

After using the developed set of exercises, the athletes of the experimental and control groups were tested again. Expert assessments of the studied indicators were obtained. Comparison of the results of the control and experimental groups are presented in tables 3 and 4.

Analyzing the Table 3.3, we note that as a result of 3 months of training, the athletes of the control group, who worked at the training sessions on the academic discipline "Improving sportsmanship" strictly in accordance with the curriculum, there is a slight increase in expert assessments of indicators, which is quite true. Since the athletes improved the skills of technical actions and developed motor abilities, including coordination ones.

Significantly different results are observed during the analysis of the results of the experimental group, in the training process of which a set of special exercises was introduced.

As can be seen from Table 4, the results of the experimental group are significantly higher than the results of the control group. Thus, the increase in the “Pose of an

Table 3. – Comparing the scores of the experts of the control group before and after experiment, P<0,05

Conrol group						
Athlete	Poses in the air		Interaction with the ball		Effectiveness of winning attack	
	before	after	before	after	before	after
1	3,07	3,13	3,33	3,37	2,53	2,57
2	3,23	3,30	3,27	3,47	2,73	2,70
3	3,07	3,07	3,17	3,23	2,63	2,70
4	3,23	3,33	2,93	3,07	2,60	2,90
5	3,10	3,23	3,07	3,20	2,57	2,77
6	3,00	3,33	3,13	3,23	2,80	2,97
7	3,03	3,20	3,43	3,47	2,97	3,03
8	3,27	3,37	3,57	3,63	3,17	3,30
9	3,13	3,20	3,17	3,33	2,83	2,93
10	3,27	3,37	3,37	3,43	2,97	3,17
Ẋ	3,14	3,25	3,24	3,34	2,78	2,90
σ	0,10	0,10	0,19	0,16	0,21	0,23
m	0,03	0,03	0,06	0,05	0,07	0,07
%	62,8%	65%	64,8%	66,8%	55,6%	58%
Growth	2,2%		2,0%		2,4%	

Table 4. – Comparing the experts' scores of the experimental group before and after experiment, P<0,05

Experimental group						
Athlete	Poses in the air		Interaction with the ball		Effectiveness of winning attack	
	before	after	before	after	before	after
1	3,17	3,50	3,13	3,47	2,57	3,10
2	3,20	3,67	3,37	3,53	2,87	3,30
3	2,93	3,37	3,07	3,40	2,57	3,10
4	3,23	3,53	3,17	3,60	2,93	3,43
5	3,07	3,37	3,23	3,60	2,67	3,33
6	3,23	3,70	3,37	3,67	2,97	3,43
7	3,00	3,47	3,13	3,47	3,17	3,57
8	3,00	3,57	3,13	3,47	3,20	3,50
9	3,17	3,63	2,93	3,47	2,73	3,30
10	3,27	3,67	3,67	4,07	3,33	3,73
$\dot{X}$	3,13	3,55	3,22	3,57	2,90	3,38
σ	0,10	0,12	0,20	0,19	0,27	0,20
m	0,03	0,04	0,06	0,06	0,09	0,06
%	62,6%	71,0%	64,4%	71,4%	58,0%	67,6%
Growth	8,4%		7,0%		9,6%	

athlete in the air" indicator is 8.4%, while in the control group it is 2.2%. The increase in the "Interaction with the ball" indicator was 7.0% versus 2% in the control group. Significant differences (according to the Wilcoxon test) are also observed in the increase in the indicator "Efficiency of technical actions" 2.4% in the control group versus 9.6% in the experimental group.

We can also mention that using the Wilcoxon signed rank test allow to approve that the results of the experimental group before and after experiment have significant differences. Comparing the growths of control group and experimental group shows that experimental group's growth of the results is higher than the results of control group. In the experimental group, there is also a statistically significant increase in the performance of the control exercise (figure 3).

The use of acrobatic exercises on a mini-trampoline contributes to the development of coordination abilities, which is expressed in improving the efficiency of game actions. On the example of the study, the effectiveness of such exercises in the technical skills of setters is shown. At the same time, we believe that the variety of the proposed

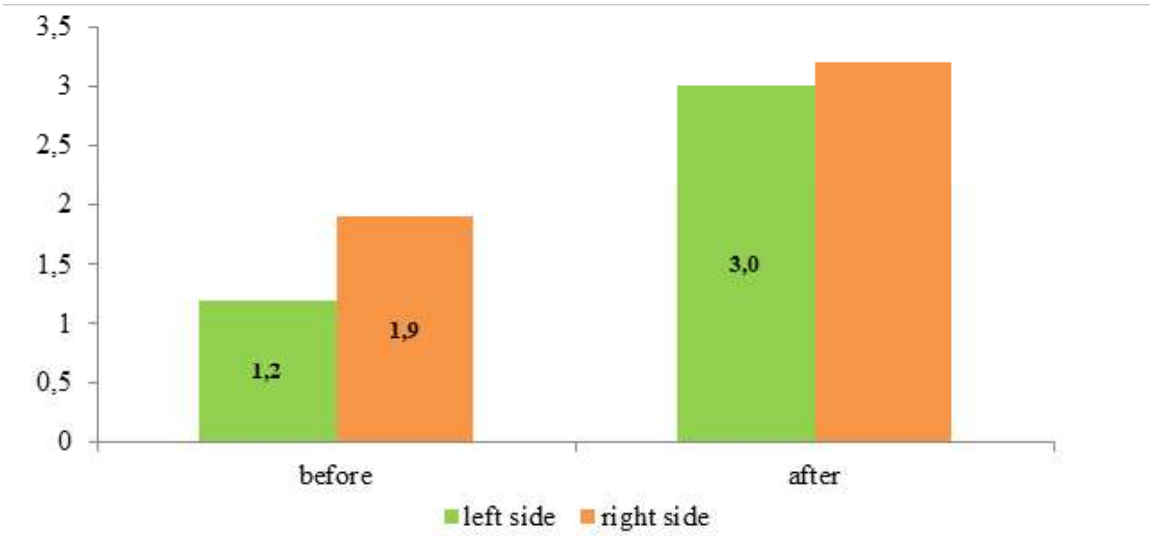

Figure 3. – Comparing the results of experimental group in control exercise before and after experiment, times of throws, P<0,05

exercises can improve the coordination abilities and the level of technical preparedness of players of other roles.

CONCLUSION

Performance in volleyball places a complex set of requirements on players. It consists of a large number of operations and acts, which are focused on realization of a certain aim, are logically structured as to time and controlled by voluntary processes. The majority of these game activities are realized in non-standard conditions, thus impeding the possibility of their acquisition and improvement in the training process. Coordination abilities share factors in common with the components limiting sport performance in volleyball, however, their exact percentage cannot be unequivocally stipulated. But these factors are depended on the level of development of coordination abilities. So during the pedagogical observation were found that the ability to control one's body in an unsupported position, the effectiveness of interaction with the ball and the accuracy of technical actions can be considered indicators of a high level of coordination readiness of a volleyball player. The necessary to develop coordination abilities and improve these indicators in the subjects were confirmed due to the data of the 1st testing. Using mini trampoline for coordination training can greatly enhance the professional technical level of volleyball players, effectively reduce redundant movements, improve the accuracy of movements, and promote the mastery of volleyball skills. At the same time, by successfully completing a series of movements such as catching, passing, and spiking in the training game, you can better control your body in the air, and display your excellent volleyball skills more smoothly and quickly.

Thus, it is possible to recommend exercises on a mini-trampoline for use in the training process of volleyball players, their combination with the technical actions of volleyball players, in particular, various actions with the ball.

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17.05.2023

КУБОК БГУФК ПАМЯТИ ЗАСЛУЖЕННОГО ТРЕНЕРА СССР М.И.ЦЕЙТИНА

С 29 октября по 2 декабря 2023 года на базе Белорусского государственного университета физической культуры пройдет **Международный турнир по спортивной акробатике «Кубок БГУФК» памяти Заслуженного тренера СССР М.И. Цейтина.**