Elements of functional training in volleyball training sessions for young women aged 16-17

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Abstract

Objective of the study is to experimentally prove the effectiveness of volleyball training sessions with elements of functional training for young women aged 16-17.

Methods and structure of the study. Two groups of subjects participated in the 9-month scientific study: an experimental group (n=12), whose training process was based on the integration of functional training elements, and a control group (n=11), which followed a traditional training method.

Results and conclusions. The volleyball players in the experimental group showed statistically significant improvements in speed-strength and coordination indicators, manifested in jumping, throwing, special running exercises and trunk lifts. The results of the study demonstrate a marked positive trend in the experimental group: the increase in physical fitness indicators varies between 5.55% and 29.51%, while the control group showed less significant progress, confirming the effectiveness of functional training, including plyometrics, balance exercises, and medicine ball work in the training process. Experimental studies have shown that functional training significantly improves the special physical training of volleyball players; the greatest increase was noted in agility (36.65%) and torso strength (29.17%); the technique helps prevent injuries by improving jumping and landing techniques. The study is relevant for coaches and specialists in the field of sports training, offering scientifically based methods for optimising the training process.

Keywords: *young women aged 16-17, training, volleyball, teaching methods, functional training.*

Introduction. Currently, the focus of volleyball training is on the effective implementation of game movements and organisation, taking into account modern methods of teaching technique, tactics and the development of the body's functional capabilities, on which the manifestation of motor abilities depends [1, 6]. The choice of training methods and techniques should be diverse and based on knowledge of the requirements for the motor and functional preparedness of athletes specialising in game sports [2]. Improving the quality of functional training for athletes in game disciplines remains a pressing issue in modern training. Recently, functional training has been considered an effective means of developing motor skills in certain sports [3, 4, 5, 7].

Objective of the study is to experimentally prove the effectiveness of volleyball training sessions with elements of functional training for young women aged 16-17.

Methods and structure of the study. As part of the experimental study, a comprehensive theoretical and methodological approach was implemented, combining: a systematic review of scientific publications and methodological developments on the problem under study; methods of structured pedagogical observation with recording of dynamics of indicators, ascertaining and formative experiments, control-pedagogical tests and mathematical-statistical processing of the obtained materials. Particular attention was paid to the study and analysis of existing training methods in volleyball, which made it possible to develop an original experimental training method that integrates elements of functional training.

Volleyball players participating in the programme using elements of functional training were included in the experimental group (n=12). Training sessions in the control group (n=11) were carried out according

to the standard programme. The pedagogical experiment lasted 9 months, during which classes were held 3 times a week for 2 hours.

During the study, the athletes' physical indicators were monitored in stages using specialised control and pedagogical exercises. To ensure the reliability of the results, the following methods were used: pairwise comparison of initial and final data and assessment of the statistical significance of differences between groups, which ensured the scientific novelty and practical significance of the study.

Results of the study and discussion. The initial data on the coordination and speed-strength abilities of volleyball players obtained during the ascertaining stage of the study are presented in Table 1. The indicators of athletes in the experimental and control groups demonstrate a comparable level of preparedness at the initial stage of the experiment.

The statistical analysis did not reveal any significant intergroup differences ($p>0.05$) in the indicators of special physical fitness between the participants of the experimental and control groups, which confirms the initial homogeneity of the sample and provides a complete basis for their comparison in the process of the formative pedagogical experiment.

It should be noted that the effectiveness of volleyball training sessions with elements of functional training is confirmed by a reliable improvement in the indicators of the experimental group in the following control and pedagogical exercises: long jump and vertical jump, medicine ball throws, sit-ups from a supine position in 10 seconds (Table 2). The control group showed positive dynamics in physical fitness in all test indicators, but these changes are not statistically significant. After the formative experiment, significant changes were found in the results of the special jumping ability of volleyball players in the experimental group in the long jump and standing jump, which confirms the effectiveness of plyometric exercises, medicine ball jumps in combination with squats on an unstable surface ($t=2.500$ and $t=2.207$, respectively).

These functional training methods create favourable conditions for improving various types of jumping techniques and correct landing during the game, which in turn serves as a means of preventing injuries to the musculoskeletal system. Significant differences in the experimental group of volleyball players were found in lifting the torso from a supine position in 10 seconds ($t=2.187$) and throwing a medicine ball ($t=2.077$), the results of which improved on average by 2.09 times and 2.48 metres, respectively, confirming the effectiveness of exercises for balance, back and abdominal muscles (core) with medicine balls of different weights and expanders.

At the end of the pedagogical experiment, the subjects in the experimental group showed statistically significantly higher scores on all test exercises. In particular, in the standing long jump, the volleyball players in the experimental group showed a higher result by 13.4 cm ($t=3.441$), in the vertical jump – 3.8 cm ($t=3.656$), in the medicine ball throw – 1.05 m ($t=2.277$), the 92 m shuttle run – 1.64 s ($t=2.441$), the sit-up test in 10 s – 1.82 times ($t=3.566$), and the special agility test – 1.04 times ($t=2.144$).

It should be noted that the analysis of the dynamics of the studied indicators revealed a pronounced advantage of the athletes in the experimental group in terms of the rate of increase in special physical qualities compared to the control group (Figure 1).

Table 1. Initial parameters of special physical fitness of volleyball players (coordination and speed-strength characteristics at the stage of the ascertaining pedagogical experiment)

Control and pedagogical tests	Groups (x±m)		t	p
	Experimental	Control		
Standing long jump with two-foot take-off, cm	199,2±2,17	199,6±2,41	0,051	>0,05
Vertical jump with two-foot take-off, cm	47,7±0,64	47,8±0,94	0,041	>0,05
Medicine ball throw, m	14,35±0,33	14,86±0,33	0,426	>0,05
92 m shuttle run, s	27,11±0,49	27,31±0,36	0,114	>0,05
Sit-ups from supine position in 10 seconds, number of repetitions	6,12±0,25	6,24±0,27	0,132	>0,05
Special agility assessment, number of repetitions	3,12±0,29	3,24±0,30	0,116	>0,05

Table 2. Dynamics of coordination and speed-strength abilities indicators in volleyball players during the formative pedagogical experiment

Control and pedagogical tests	Groups (X±m)						t/p
	Control			Experimental			
	Before the experiment	After the experiment	t/p	Before the experiment	After the experiment	t/p	
Standing long jump with two-foot take-off, cm	199,6±2,41	205,2±3,34	1,357/ >0,05	199,2±2,17	218,6±1,99	2,500/ <0,05	3,441/ <0,05
Vertical jump with two-foot take-off, cm	47,8±0,94	49,1±0,84	1,028/ >0,05	47,8±0,64	52,9±0,61	2,207/ <0,05	3,656/ <0,05
Medicine ball throw, m	14,86±0,33	15,78±0,33	1,961/ >0,05	14,35±0,33	16,83±0,32	2,077/ <0,05	2,277/ <0,05
92 m shuttle run, s	27,31±0,36	26,89±0,48	0,696/ >0,05	27,11±0,49	25,25±0,47	1,049/ >0,05	2,441/ <0,05
Sit-ups from supine position in 10 seconds, number of repetitions	6,24±0,27	6,39±0,32	0,357/ >0,05	6,12±0,25	8,21±0,40	2,187/ <0,05	3,566/ <0,05
Special agility assessment, number of repetitions	3,24±0,30	3,48±0,39	0,116/ >0,05	3,12±0,29	4,52±0,29	1,359/ >0,05	2,144/ <0,05

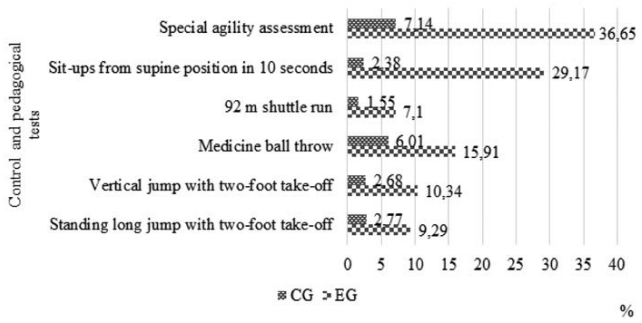

Figure 1. Indicators of growth rates in special physical fitness among young women in experimental groups (%)

It has been established that the growth rates of the experimental group are higher than those of the control group in the following test exercises: assessment of special agility by 29.51%, sit-ups from supine position in 10 seconds by 26.79%, throwing a medicine ball by 9.90%, vertical jump – 7.65%, standing long jump – 6.52%, and 92 m shuttle run – 5.55%.

Conclusions. The results of the formative pedagogical experiment revealed statistically significant positive dynamics and higher growth rates in the indicators of special physical fitness of 16-17-year-old volleyball players in the experimental group, which manifested itself in the improvement of the following parameters: speed and strength (increased results in jumping, throwing exercises and trunk lifts); motor coordination (decreased time to complete the shuttle run control pedagogical exercise, improved results in the special agility test).

Thus, the effectiveness of volleyball training methods with elements of functional training for young women aged 16-17 has been experimentally proven, as confirmed by the results of the study.

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