Use of special exercises to intensify speed and strength loads in the training of student volleyball teams

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Abstract

Objective of the study is to improve the physical and technical training of volleyball players through the use of special speed and strength exercises.

Methods and structure of the study. The study tested 25 volleyball players from a student team aged 19.5±0.8 years. Interval training included multiple repetitions of game jump exercises lasting five minutes each at a competitive pace of ball play and relatively short rest periods between sets.

Results and conclusions. The use of the repeated interval method of conjugate development of special speed-strength qualities of various muscle groups forms the physiological basis for maintaining a high playing pace and amplitude of performing game techniques by volleyball players in the intense conditions of competitive struggle.

Keywords: *volleyball, sports results, student teams, speed and strength qualities, exercises, intensity.*

Introduction. High athletic performance in modern volleyball is determined by the application of integrated technical skills, which ensures continuity in the development of technical mastery. The most important skills in volleyball are serving and attacking, the successful execution of which can directly earn a team a point [4].

The physical basis for the implementation of technical skills in volleyball is speed and strength, which are among the most important elements of a volleyball player's physical fitness and make a significant contribution to achieving sporting results in terms of the implementation of sporting skills [3].

Achieving functional adaptation and maximum game endurance is due to the development and implementation of innovative training methods and techniques that are most relevant to the specifics of modern volleyball.

To simulate the real conditions of competitive play, researchers are striving to develop modern training methods based on intensive exercise at competitive speed [1]. This develops the ability to combine physical qualities and complex technical skills in players through the use of standardized exercises that develop speed and strength in accordance with the components of the training load [2, 5].

Objective of the study is to improve the physical and technical training of volleyball players through the use of special speed and strength exercises.

Methods and structure of the study. The study tested 25 volleyball players from a student volleyball team aged 19.5±0.8 years who performed special fitness tests before and after completing a 6-month training program. The 90-minute training sessions were conducted three times a week using a high-intensity repetitive interval training method.

Interval training included multiple repetitions of game-specific jumping exercises, each lasting five minutes, at a competitive pace of ball play and with relatively short rest periods between sets.

The intensity of the exercises at each stage of the training varied by changing the speed of the exercises from submaximal (80-90% MOC) and maximal (90-95% MOC) to competitive. The optimal intensity of threshold training was maintained by performing game exercises at a speed of 88% MOC and 92% HR_{max} for 20-30 minutes.

To optimize MOC, an interval training method with a ball and high intensity load was used. Interval training included multiple repetitions of game jumping exercises, each lasting five minutes, at a competitive pace of ball play and with relatively short rest periods between sets.

The tests to assess the athletes' physical fitness included throwing a 2 kg medicine ball from a standing position for distance; standing long jump; serving the ball for accuracy; and attacking for accuracy.

Statistical data was processed using the Statistica and SPSS statistical software packages.

Results of the study and discussion. The concentration of technical techniques performed on the basis of explosive power in volleyball combinations is extremely high. Techniques such as jumping for attack and powerful fast hits on the ball are integrated into a single technical action, which requires the serial manifestation of speed and strength qualities.

Preliminary and final measurements show that the results of volleyball players' tests for explosive strength in their arms and legs show positive dynamics. This is due to the use of intensive exercises for speed work with the ball, which led to the development of explosive strength in the muscles of the legs and arms while maintaining the technique of performing game actions. The need to apply more force to perform jumps, strikes and movements at different intensities and with different numbers of repetitions contributed to an increase in the players' oxygen consumption efficiency. Repeated interval training improved oxygen consumption efficiency through technical economy of movement and the participation of an optimal number of motor neurons in competitive exercises. The achieved level of speed and strength development ensured greater speed in performing game techniques without additional energy expenditure.

The change in the power and accuracy of the ball's flight was due to the repeated use of special exercises for serving accuracy at time intervals corresponding to the play of the ball in competitive combinations.

The combination of technical exercises and speed-strength development methods in a single training block increased the players' ability to perform technical actions accurately in short time intervals while maintaining a high tempo of play and amplitude of game techniques.

The players' progress in performing powerful attacking shots is associated with exercises to develop the skill of selectively directing the ball at high speed into planned areas in accordance with game objectives.

The development of the ability to strike the ball powerfully and accurately while jumping, overcoming the resistance of blocking players, based on the development of speed and strength qualities, significantly reduced the percentage of errors and increased the effectiveness of players' attacking shots.

Conclusions. Isolated speed-strength training of the shoulder girdle muscles improves the overall functional condition of athletes without affecting the development of explosive strength in the lower limb muscles. The use of the repeated interval method of combined development of specific speed-strength qualities of various muscle groups forms the physiological basis for maintaining a high playing tempo and amplitude of playing techniques in the intense conditions of competitive wrestling.

Table 1. Dynamics of physical fitness indicators for volleyball players

Indicator	Before	After	P-value	
Throwing a 2 kg medicine ball from a standing position for distance, m	6,1±0,48	8,3±0,29	3,03	< 0,05
Standing high jump, cm	46,1±0,57	61,4±0,28	6,00	< 0,05
Accuracy of ball delivery, points	6,1±0,33	9,3±0,19	5,16	< 0,05
Performing an attacking strike for accuracy, points	7,7±0,22	9,5±0,20	6,10	< 0,05

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