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Original article

DEVELOPMENT OF MOTOR QUALITY, STRENGTH, AND SPEED THROUGH SPECIFIC MEANS OF THE VOLLEYBALL GAME AT HIGH SCHOOL

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Abstract

Aim. The purpose of this paper is to demonstrate that the game of volleyball, through its means, contributes to ninth grade students, both to the consolidation and improvement of motor skills and to the development of motor qualities, speed, and strength.

Methods. To test the motor qualities, we used the unique system of verification, assessment and detection" tests: 50 m speed run; throwing the 4 kg medicine ball back and forth; standing long jump.

Results. Following the applied tests, it was observed: in the 50 m speed test, the subjects of the experimental group recorded an average value of 8.675 s in the initial test and an average value of 8.092 s in the final test; in the standing long jump, the subjects of the experimental group registered an average value of 1.826 m in the initial test and an average value of 1.968 m in the final test; when throwing the medicine ball forward, the subjects of the experimental group recorded an average value of 6.371m in the initial test and an average value of 7.296m in the final test; and when throwing the medicine ball back, the subjects of the experimental group registered an average value of 7.825m in the initial test and an average value of 8.988m in the final test.

Conclusions. The game of volleyball, through its specific means, is effective in the development of motor qualities, strength, and speed, so that all the values of the indices of these motor qualities in the experimental group subjected to testing fell within the upper parameters of the evaluation sample

Keywords: mobility, junior player, competition, national junior team.

Introduction

Strength can be defined as the maximum force or maximum torque (twisting force) that a muscle or group of muscles can generate. A better definition would be the ability of the non-uromuscular system to produce force against external resistance. For example, muscle strength has been linked to sprint performance (Baker & Nance, 1999; Bret et al., 2002), American soccer performance (Fry & Kraemer, 1991), European soccer performance (Gissis et al., 2006; Hoff et al., 1999), volleyball performance (Ferris et al., 1995; Melrose et al., 2007), hockey performance (Hoff et al., 2005), rugby performance, and aerobic exercise performance (Bastiaans et al., 2001; Hoff et al., 1999; Jung, 2003; Melrose et al., 2007). These data seem to support the claim that muscle strength is a major contributor to most athletic activities. Therefore, the application of resistance training can alter the neuromuscular system in a way that enhances the athlete's ability to produce force and improves athletic performance (Haff et al., 2001; Stone et al., 1999).

Force is the result of the muscle contraction. The development of the musculature has the effect of improving strength, which must present increasingly higher indices of manifestation in different regimes and situations. Among the most important forms of manifestation of general strength, absolute (maximum) strength, explosive strength, and strength in resistance mode (Haare, 1973).

Strength is considered to be one of the most important capacities that greatly influences the manifestation of all motor components. It is expressed at the level of the body through its ability to perform efforts based on the muscle contraction.

Throughout his or her career, each individual athlete is faced with the need to adapt to different acts or motor actions, which presuppose a high degree of coordination complexity, a fact that requires maximum mobilization of different motor qualities (Platonov, 2015, p. 92).

Any act or motor action involves all the motor qualities in their performance, but with different weights (Cârstea, 2000, p.61).

In simple terms, strength is the ability to apply force. Its development should be the first concern for anyone trying to improve an athlete's performance. Athletes preparing to compete in the ancient Olympics used primitive forms of strength development; however, even today, there are many coaches who do not profit from these benefits. The use of several methods of strength development leads to a faster growth, 8 to 12 times higher, than using only the skills specific to a certain sport. For example, a volleyball player can develop faster jumping ability for an attack shot by using weight

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training rather than simply executing more attack shots during a volleyball workout. Therefore, strength training is one of the most important ingredients in the training process of athletes. (Bompa, 2000)

Dragnea A. (1996, p. 201) believes that strength is essentially the ability to try to overcome, maintain, or yield in relation to an external or internal resistance through the contraction of one or more muscle groups.

Manno R. (1996, p. 85) thinks that muscular strength is an ability that allows a person to overcome resistance or oppose it through an intense muscular effort.

Demeter et al. (1981, p.320) suggested that this motor quality is "an own ability to overcome an external resistance or to act against it based on the tension of most muscle groups and represents the general force". Speed mainly refers to the rapidity of a motor act or movement per unit of time. Among its various forms of manifestation, speed is a rather important motor quality in the game of volleyball, in which it manifests as such or along with other qualities. The flight speed of the volleyball ball in the modern game, in the case of an attack shot or serve from a medium force jump, is approximately 40 m/s, and the flight time to the ground does not exceed 75–80 m/s. Execution speed is the time required to perform a complex motor act when the stimulus and execution contain unexpected elements. For this, it is necessary that the technique is very well mastered.

Reaction speed in the game of volleyball is the most important form of manifestation of speed, as it allows the athlete to deal with ever-changing situations during the phases. Complex reactions predominate in the game of volleyball, and are mostly related to the movement of the players and the ball. Although they are complex relationships, speed can be developed as much as simple reactions because the volleyball player anticipates the actions of teammates, the opponent, and the ball.

Methods

Scientific research in the field of physical education and sports is characterized by its prospective, concrete, and practical aspects. Due to the complexity of the studied phenomena, the methodology of physical education and sport uses general methods applied by other sciences, as well as field-specific research methods and techniques. In the work I carried out, I used the following main methods with wide applicability in the field of physical education and sports methodology:

- To conduct the research, I consulted, selected, and interpreted a rich bibliographic material, compiling bibliographic files.
- I also studied the school documents from which I selected data on the content of the activity (school program, lesson plans), the activity of the students (record book, individual sheet, catalog), and the teacher (planning documents of the instructional process, the teacher's notebook) .

Observation, as a research method, must be carried out systematically according to a thorough plan and using technical means designed to capture the observed phenomena and processes, regardless of their degree of complexity. To establish the effectiveness of volleyball in developing basic motor skills, the subjects I worked with directly observed the experimental group. For this purpose, I observed the subjects during the hours of sports activities. The observations allowed us to gather a wealth of factual material, which I wrote down in my observation notebook during the lessons. Another method we used was the method for measuring the results obtained from the subjects and tests. Using this method, we followed the influence of the volleyball game on the researched subjects. For this purpose we used, for testing motor qualities, speed and strength, the tests of the "unique system of verification, appreciation and detection".

To test motor skills, we used the "Unique System of Verification, Assessment and Detection" samples:

- 50 m speed run;
- Throwing the 4-kg medicine ball back and forth;
- Standing long jump.

We sought that the samples we used for testing were as objective as possible and at the same time did not disadvantage children who had not practiced the game of volleyball. We did not use tests specific to volleyball players, such as 8x6 m, 6x4 m movements, relaxation from the spot and swing. The collected data were processed by the statistical-mathematical method, calculating the parameters of the two tests, the initial test and the final test. I also used a statistical method to quantitatively express the qualitative ratio regarding motor qualities. Method used in the collection of numerical data, their statistical processing, and their interpretation. The data provided by the mathematical statistics was of real help, as it contributed to the appreciation of the physical development and motor qualities of the subjects we studied. To achieve the purpose of this study. I used the comparative method, which allowed me to interpret the results obtained from the initial and final testing and to note the differences between the value indices of the motor qualities, speed and strength, obtained in the two tests.

Results

From studying the data that emerges from the tables, analyzing the graphs with the results obtained because of the experiment at the initial and final testing, we observed that, at the final testing, after performing the volleyball training in sports activities hours, an obvious increase of all indices of motor qualities, speed and strength, compared to the initial one. This increase was found in all the subjects analyzed.

Analyzing the difference in the results obtained after both tests, as well as the values of the increase in the indices of motor qualities, speed, and strength resulting from the initial and final testing, we found an increase in the value of the indices of both evaluated motor qualities.

MEDIA-STUDENT "T" TEST DEPENDENT

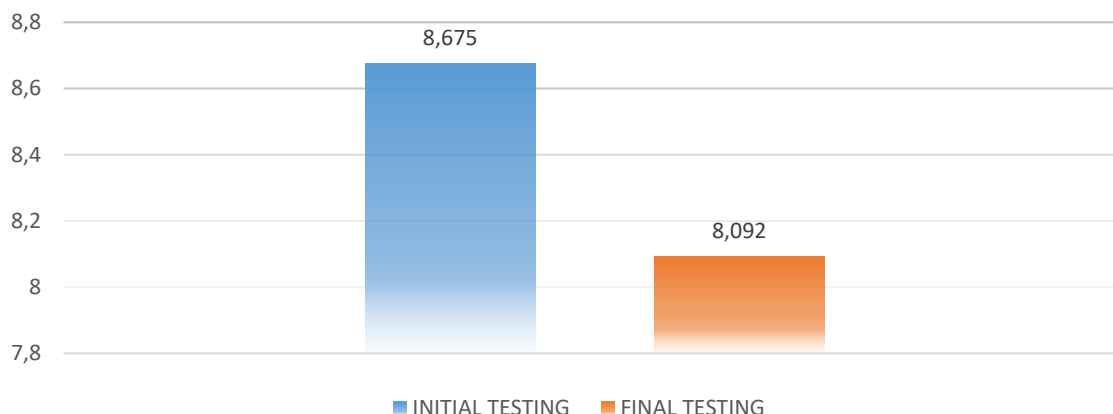


Figure 1. Speed 50 m

In the 50 m speed test, the subjects of the experimental group registered an average value of 8.675 s at the initial testing and an average value of 8.092 s at the final testing, the value of "t" being 8.147, thus recording a statistically significant difference at a threshold of $p < 0.0005$. The values of the coefficient of variability, below 10%, indicate high homogeneity of the results obtained from the subjects in the two tests. In the standing long jump, the subjects of the experimental group recorded an average value of 1.826 m at the initial test and an average value of 1.968 m at the final test, with the value of "t" being 9.265, thus recording a statistically significant difference at the threshold of $p < 0.0005$. The values of the coefficient of variability, below 10%, indicate high homogeneity of the results obtained from the subjects in the two tests.

MEDIA-STUDENT "T" TEST DEPENDENT

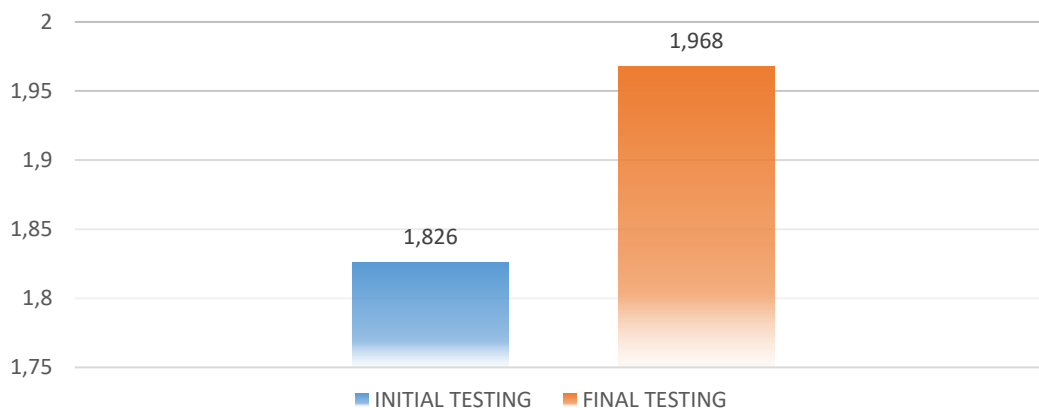


Figure 2. Standing long jump

When throwing the medicine ball forward, the subjects of the experimental group registered an average value of 6.371 m in the initial test and an average value of 7.296 m in the final test, the value of "t" being 12.635, thus recording a statistically significant difference at the threshold of $p < 0.0005$. The values of the coefficient of variability indicate low homogeneity at the initial testing and average homogeneity of the results obtained at the final testing.

MEDIA-STUDENT "T" TEST DEPENDENT

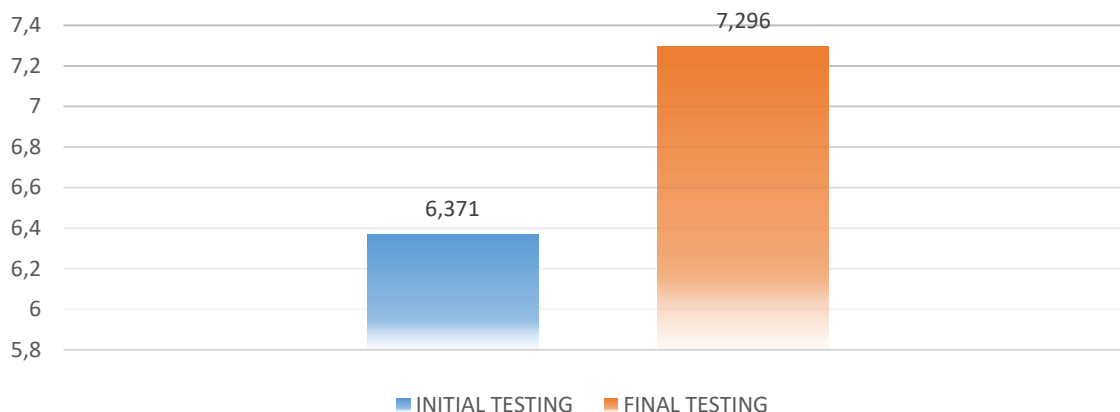


Figure 3. Throwing the medicine ball forward

When throwing the medicine ball back, the subjects of the experimental group registered an average value of 7.825 m in the initial test and an average value of 8.988 m in the final test, the value of "t" being 6.437, thus recording a statistically significant difference at the threshold of $p < 0.0005$. The values of the coefficient of variability, below 10%, indicate high homogeneity of the results obtained from the subjects in the two tests.

MEDIA-STUDENT "T" TEST DEPENDENT

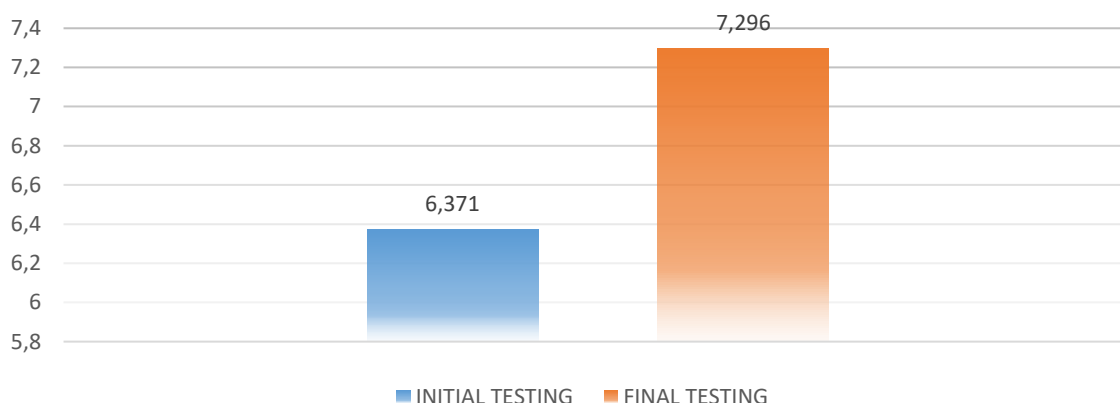


Figure 4. Throwing the medicine ball back

Discussions

Specific and non-specific means for the game of volleyball can lead to the development and improvement of motor skills, positively influence the growth and development process of the body, speed up the formation and improvement of skills, abilities, and basic motor skills, influence the formation of positive character traits and qualities moral and willpower, personality formation, and the development of the individual's psychic qualities. Motor capacities represent a subject of great interest among specialists, because of their determining role in human motor capacity. From this point of view, the development of motor skills is a central concern of teachers and coaches in different sports and implicitly volleyball.

Conclusions

The game of volleyball, through its specific means, is effective in the development of motor qualities, strength, and speed, so that all the values of the indices of these motor qualities in the experimental group subjected to testing or within the upper parameters of the evaluation sample. From the beginning of the testing and during it, the level of accumulation has obviously increased, approaching the performance requirements provided in the selection and sports training criteria. This increase is visible in all motor qualities.



During the initial testing, some value indices of the motor qualities were at the level of the parameters provided by the evaluation sample. The accumulations recorded in this group, in the motor qualities studied, were lower than those from the final testing, and the value indices of the motor qualities fell within the higher parameters of the evaluation sample only in some of the tested samples: standing long jump, throwing the medicine ball forward. There were also tests in which the value indices of the respective motor capacities were at a low level.

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